

**ASSESSING THE INFLUENCE OF INTERNAL ENVIRONMENTAL
MANAGEMENT SYSTEMS ON GREEN PACKAGING MANAGEMENT, GREEN
INFORMATION SYSTEMS AND ORGANISATIONAL PERFORMANCE**

D.M. Mahlangu

209072512



PHD

in the discipline

LOGISTICS MANAGEMENT

in the

FACULTY OF MANAGEMENT SCIENCES

at the

VAAL UNIVERSITY OF TECHNOLOGY

Supervisor: Prof P. Hove-Sibanda

Co-Supervisor: Dr E. Chinomona

DECLARATION

FIRST STATEMENT

I, the undersigned, Donald Mliyelewa Mahlangu, hereby declare that this thesis entitled “Assessing the influence of internal environmental management systems on green packaging management, green information systems and organisational performance” is my own original work. It has not been and will not be submitted or presented for the award of any other degree, diploma, fellowship or similar title at any other institution.

Signature: _____

Date: _____

SECOND STATEMENT

I thereby grant the consent for my thesis, if it is accepted to be accessible for photocopy and interlibrary loan and to be available at the institution.

Signature: _____

Date: _____

THIRD STATEMENT

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

Signature: _____

Date: _____

ACKNOWLEDGEMENTS

The glorious accomplishment of this thesis was made possible through the support, encouragement and advice from assorted people and organisation(s). I would like to offer my gratitude to the following:

- Prof P Hove-Sibanda. Thank you supervisor for your invaluable support and patience with me.
- Dr E Chinomona. Thank you co-supervisor for your invaluable advice and guidance.
- The Higher Degrees office (HDU) for supporting me financially.
- The National Research Fund (NRF) for the support that you gave me. I will always be grateful and without your support the completion of this thesis would have been a lot more difficult.
- Prof Mokoena. Thank you for the moral support and guidance throughout tough times.
- Prof C Mafini. I will forever be grateful for your kindheartedness and brotherhood support that you gave me throughout my studies.
- Prof J Selesho. Thank you professor for your support both financially and morally, your advice and encouragement have made me reach this far. God bless.

DEDICATION

I dedicate this project to the Almighty God for the wisdom and power he granted me in order to carry out and compile this research. Glory to his name. It is also dedicated to my mother, Elizabeth Mahlangu, my father, Josiah Mathabela, my young brother, Mathews Mahlangu. I also dedicate this study to my future wife, for the kindheartedness, the love and care that you have shown me and which allowed me to gain confidence and inspired me towards greater achievements.

ABSTRACT

The effective practice of green supply chain has been a focus of both practitioners and researchers for almost a decade, mostly focusing on greenhouse effects and implementing full green supply chain control systems. However, not much attention has been given to empirical relationships between internal environmental management systems, green packaging management, green information systems adoption and organisational performance. The chief objective of this study was to assess the internal environmental management factors of the plastic packaging manufacturing organisations in Gauteng province in South Africa, mainly focusing on the three major internal environmental factors, namely pollution prevention plans, total quality management and environmental audits. Secondly, the study aimed to determine the relationship between green packaging management, green information systems and organisational performance. A positivist approach was used as this study is quantitative. A total number of 250 questionnaires were distributed to managers and employees of the chosen plastic packaging organisations. Although 250 questionnaires were distributed to the chosen organisations, only 230 were deemed to be fit for capturing due to some errors on the other 20 questionnaires. For data analysis the Statistical Package for Social Sciences (SPSS 24) was used to generate frequency tables and graphs. Furthermore, structural equation modelling (SEM) was used to generate regression weights and standard regression weights. The factor loading was also generated using SEM as well as model fitness and path co-efficiency values.

A detailed research approach was followed using a sample size of 230; the results of this study show that there is a positive significant relationship between internal environmental management systems, green packaging management and green information systems. Further, it was found that most organisations that adopt green management systems are more likely to perform better than those that do not. The study also discovered that the government policies that place emphasis on green practices, not only pressurise organisations, but also help them to be strategic. Most plastic packaging manufacturing organisations usually find it difficult to operate without polluting the environment, but this study discovered that if they control their internal environmental systems, it will be easy for these organisations to adopt environmental management systems and produce green products. Also, given the changing market environments, currently most consumers prefer green products and if organisations go green this might open up new markets for their new products and enhance performance. This study examined the importance of green packaging management from the perspective of both government policies and organisational policies. The results showed that some organisations are still struggling to align their internal environmental management process with the external environment; however, the market changes are enforcing that most plastic packaging

organisations start aligning their internal management systems with external systems, as it gives them opportunities towards new products and new competitive strategies that will lead to better performance. An environmental management framework was developed in this study. The framework aims to help guide plastic manufacturers with their long- and short-term strategies. In line with non-linear relationships between variables, the study recommends the following to the plastic packaging organisations: to create pollution prevention policies and strategies to improve organisational performance by eliminating pollution and avoiding penalties from the government. Pollution prevention plans, total quality management and environmental audits were used as independent variables to measure organisational performance. In line with the linear relationship between the adoption of green packaging management and organisational performance, it is recommended to the plastic packaging organisations that enterprises facing slow-moving sales growth, profitability and general performance challenges, should use green technologies as a remedy for their problems.

Key words: Internal environmental management systems, green packaging management, green information systems, organisational performance, and environmental management framework.

TABLE OF CONTENTS

DECLARATION	ii
ACKNOWLEDGEMENTS	iii
DEDICATION	iv
ABSTRACT	v
LIST OF FIGURES	xiv
LIST OF TABLES	xv
LIST OF ACRONYMS AND ABBREVIATIONS	xvi
CHAPTER 1 INTRODUCTION AND BACKGROUND TO THE STUDY	1
1.1. INTRODUCTION	1
1.2. PROBLEM STATEMENT	3
1.2.1. Research questions	5
1.3. PURPOSE OF THE STUDY	5
1.4. OBJECTIVES OF THE STUDY	5
1.4.1. Theoretical objectives	5
1.4.2. Empirical objectives	6
1.4.3. Research framework and hypotheses	6
1.5. LITERATURE REVIEW	8
1.5.1. Theoretical grounding	8
1.5.1.1. Institutional theory	8
1.5.1.2. The resource-based view (RBV) theory	9
1.5.2. Empirical review	9
1.5.2.1. Internal environmental management system	9
1.5.2.2. Green information systems (GISs)	10
1.5.2.3. Organisational performance	11
1.6. SCOPE OF THE STUDY	11
1.7. RESEARCH METHODOLOGY AND DESIGN	12
1.7.1. Research design	12

1.7.1.1. Target population	12
1.7.1.2. Sampling frame	13
1.7.1.3. Sampling method	13
1.7.1.4. Sample size	13
1.7.2. Data collection and measurement instruments	14
1.7.3. Data analysis procedure and statistical approach	14
1.7.4. Reliability, validity and trustworthiness	15
1.7.4.1. Research model fit assessment	15
1.8. ETHICAL ISSUES	15
1.9. OUTLINE OF THE STUDY/RESEARCH FLOW STRUCTURE	16
CHAPTER 2 GREEN SUPPLY CHAIN MANAGEMENT THEORIES	17
2.1. INTRODUCTION	17
2.2. THEORETICAL REVIEW	17
2.2.1. The RBV theory	17
2.2.2. The development of the RBV	21
2.2.3. Assumptions of the RBV	21
2.2.3.1. Critiques of the resource-based view theory	22
2.2.4. The application of the RBV theory	23
2.2.5. Institutional theory	24
2.2.6. The development of institutional theory	25
2.2.7. Assumptions of the institutional theory	26
2.2.8. The adoption of the institutional theory	26
2.2.9. The application of the institutional theory	27
2.3. CHAPTER SUMMARY	28
CHAPTER 3 SUSTAINABILITY IN THE PLASTIC PACKAGING INDUSTRY	29
3.1. INTRODUCTION	29
3.2. ENVIRONMENTAL SUSTAINABILITY IN SUPPLY CHAIN MANAGEMENT (ESSCM)	29
3.3. ENVIRONMENTAL POLICY INSTRUMENTS	31

3.3.1. The voluntary versus the non-voluntary/compulsory environmental policy instruments	33
3.3.2. Internal environmental management system	34
3.3.2.1. Various internal environmental management systems used both globally and in SA	34
3.3.2.2. Pollution prevention plans and environmental audits	35
3.3.2.3. Opportunities, challenges and reasons for adoption of internal environmental systems	36
3.4. ENVIRONMENTAL POLICY VS PRODUCT POLICY	38
3.4.1. ISO 14001	40
3.5. SECTORIAL IMPLEMENTATION	43
3.5.1. Plastic packaging in South Africa	43
3.6. THE SOUTH AFRICAN PLASTICS INDUSTRY	44
3.7. SUB-SECTORS WITHIN THE PLASTICS INDUSTRY	45
3.8. TRADE	46
3.9. GROWTH IN THE PLASTICS SECTOR	47
3.10. RAW MATERIALS	47
3.10.1. Polypropylene (PP)	48
3.10.2. Poly (vinyl chloride) or PVC	48
3.10.3. Polymer beneficiation (Downstream)	48
3.10.4. Critical success factors of plastics	49
3.11. SUMMARY	50
CHAPTER 4 GREEN SUPPLY CHAIN MANAGEMENT PRACTICES AND ORGANISATIONAL PERFORMANCE	51
4.1. INTRODUCTION	51
4.2. SUPPLY CHAIN MANAGEMENT	51
4.2.1. Conventional SCM versus green SCM	52
4.2.2. Green supply chain management frameworks	55
4.2.3. Effective packaging waste management	56
4.2.4. Green packaging management practices	58
4.2.4.1. Green packaging management practices locally	62

4.3. GREEN PACKAGING MANAGEMENT	64
4.3.1. Barriers to green packaging management implementation	65
4.4. SUMMARY	69
CHAPTER 5 RESEARCH DESIGN AND METHODOLOGY	70
5. INTRODUCTION	70
5.1. THEORETICAL METHODOLOGY	70
5.2. RESEARCH PHILOSOPHY	70
5.2.1. Research ontology	71
5.3. RESEARCH APPROACH	73
5.4. ADVANTAGES OF DEDUCTIVE APPROACH	74
5.4.1. Application of deductive approach (deductive reasoning) in business research	74
5.4.2. Research designs	75
5.4.2.1. Causal-comparative design	76
5.4.2.1.1. The characteristics of causal-comparative research	76
5.4.2.2. Design and procedure	77
5.4.2.2.1. Advantages of causal-comparative research	78
5.4.2.2.2. Disadvantages of causal-comparative research	79
5.4.2.3. Correlational research design	79
5.4.2.3.1. Principles of correlation research	79
5.4.2.3.2. Advantages of correlation research	80
5.4.2.3.3. Disadvantages of correlation research	80
5.4.2.3.4. Objectivity and error	80
5.5. TARGET POPULATION	80
5.6. SAMPLING FRAME	81
5.7. SAMPLING METHOD	81
5.7.1. Types of probability sampling methods	81
5.8. SAMPLE SIZE	83
5.9. DATA COLLECTION AND MEASUREMENT INSTRUMENTS	83
5.9.1. Administering and collection of the questionnaire	84

5.10. PILOTING THE INSTRUMENT	85
5.11. DATA ANALYSIS PROCEDURE AND STATISTICAL APPROACH	85
5.12. RELIABILITY, VALIDITY	86
5.12.1. Research model fit assessment	86
5.13. ETHICAL ISSUES	86
CHAPTER 6 DATA ANALYSIS AND INTERPRETATION	89
6.1. INTRODUCTION	89
6.1.1. Response rate	89
6.1.2. Pilot study findings	89
6.2. DEMOGRAPHIC INFORMATION	90
6.2.1. Number of employees	90
6.2.2. Type of business	91
6.2.3. Nature of the business	92
6.3. ANALYSIS OF VARIABLES	93
6.3.1. Pollution prevention plan	93
6.3.2. Total quality management	95
6.3.3. External environmental audits	96
6.3.4. Green packaging management	98
6.3.5. Green information system	100
6.3.6. Organisational performance	101
6.3.7. Reliability tests	103
6.3.8. Cronbach's coefficient alpha	103
6.3.9. Composite reliability	105
6.3.9.1. Validity tests	106
6.3.9.2. Construct validity	106
6.3.9.3. Convergent validity	106
6.3.9.4. Discriminant validity	107
6.3.9.5. Correlation matrix:	108
6.4. CONFIRMATORY FACTOR ANALYSIS (CFA) MODEL FIT/ACCEPTABILITY	109
6.5. SEM CONCEPTUAL MODEL FIT ASSESSMENTS	111

6.5.1. Chi-square (χ^2)	112
6.5.2. Goodness-of-fit index (GFI)	112
6.5.3. Root mean square residual (RMR)	112
6.5.4. The norm fit index (NFI)	112
6.5.5. The comparative fit index (CFI)	113
6.5.6. The incremental fit index (IFI)	113
6.5.7. Root mean square error of approximation (RMSEA)	113
6.6. SEM RESULTS AND THE CONCEPTUAL MODEL	114
6.6.1. The hypotheses testing stage and results	115
6.6.2. The impact of pollution prevention plans on green packaging management	116
6.6.3. The impact of total quality management and green packaging management	117
6.6.4. The impact of environmental audit on green packaging management	118
6.6.5. The impact of pollution prevention plans on green information systems	118
6.6.6. The impact of total quality management on green information systems	119
6.6.7. The impact of environmental audits on green information systems	119
6.6.8. The influence of green packaging management on organisational performance	119
6.6.9. The influence of green information systems on organisational performance	120
6.7. SUMMARY	121
CHAPTER 7 CONCLUSION AND RECOMMENDATIONS	122
7.1. INTRODUCTION	122
7.2. SUMMARY OF THE THESIS CHAPTERS	122
7.3. CONCLUSIONS BASED ON THE THEORETICAL OBJECTIVES	123
7.3.1. Conclusions drawn from the review of literature on internal environmental management	123
7.3.2. Conclusions drawn from the review of literature on green packaging management and green information systems	124
7.3.3. Conclusions drawn from the review of literature on organisational performance	125

7.4. SUMMARY AND CONCLUSION TO THE STUDY	125
7.5. CONCLUSIONS	127
7.6. CONTRIBUTION OF THE STUDY TO THE PLASTIC MANUFACTURING ORGANISATIONS	127
7.7. THE ENVIRONMENTAL MANAGEMENT FRAMEWORK	129
7.8. MANAGERIAL IMPLICATIONS AND RECOMMENDATIONS	136
7.8.1. Managerial implications to the plastic manufacturing managers	136
7.8.2. Managerial implications to the plastic manufacturing sector.	137
7.9. SUGGESTIONS FOR FUTURE RESEARCH	137
7.10. CHAPTER SUMMARY	138
REFERENCES	139
APPENDIX 1: Questionnaire	165
APPENDIX 2: Confirmation Letter	171
APPENDIX 3: CFA, SEM and Reliability Results	172

LIST OF FIGURES

Figure 1.1: Conceptual research framework	6
Source: Own compilation	7
Figure 2.1: The resource-based view	20
Figure 3.1: Continuous improvement cycle	40
Figure 3.2: The content of the ISO 14001 standard	43
Figure 3.3: Total plastic trade balance	47
Figure 4.1: The green supply chain model	53
Figure 4.2: State or government run recovery system model 2011	66
Figure 5.2: Application of deductive approach	74
Figure 6.1: Number of employees	90
Figure 6.2: Type of ownership	91
Figure 6.3: Nature of business	92
Figure 6.4: The research conceptual model	115
Figure 7.1: Environmental management framework	130

LIST OF TABLES

Table 4.1: Difference between the conventional and green SCM	55
Table 5.2: Ways in which questionnaires were distributed	84
Table 6.1: Pollution prevention plans	93
Table 6.2: Total quality management	95
Table 6.3: External environmental audits	96
Table 6.4: Green packaging management	98
Table 6.5: Green information system	100
Table 6.6: Organisational performance	101
Table 6.7: Accuracy analysis statistics: Cronbach's coefficient	104
Table 6.8: Composite reliability	105
Table 6.9: Accuracy analysis statistics: factor loadings	107
Table 6.10: Correlations between constructs	108
Table 6.11: Model of fit criteria and acceptable fit level	110
Table 6.12: CFA model fit results	111
Table 6.14: Hypothesis testing and path-efficiency	116

LIST OF ACRONYMS AND ABBREVIATIONS

AGFI	augmented goodness of fit index
AMOS	Analysis of Moment Structures
AVE	average variance extracted
CDP	Carbon Disclosure Project
CFA	confirmatory factor analysis
CFI	comparative fit index
CR	composite reliability
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
EIA	environmental internal audit
EMA	environmental management accounting
EMAS	Eco-Management and Audit Scheme
EMS	environmental management system
ESSCM	environmental sustainability in supply chain management
EU	European Union
FTC	Federal Trade Commission
GFI	goodness-of-fit index
GIS	green information system
GPM	green packaging management
GSCD	green supply chain design
GSCM	green supply chain management
IEM	integrated environmental management
IEU	internal environmental audits
IFI	incremental fit index
IRC	Integrated Reporting Committee
IS	institutional theory

IT	information technology
JSE	Johannesburg Stock Exchange
NFI	normal fit index
NRBV	natural-resource-based view
OP	organisational performance
PDCA	plan-do-check-act
PPP	pollution prevention plan
RBV	resource-based view theory
RMR	root mean square residual
RMSEA	root mean square error of approximation
SCM	supply chain management
SEM	structural equation modelling
TLI	Tucker-Lewis index
TQM	total quality management
UK	United Kingdom
US	United States

CHAPTER 1 INTRODUCTION AND BACKGROUND TO THE STUDY

1.1. INTRODUCTION

Most manufacturing organisations in developing countries, including South Africa, struggle to meet production demands without polluting the environment (Department of Environment Affairs (DEA) 2015:39). Environmental management is a challenge. It has become an area of focus to both policy makers and researchers and has been discussed between scientists and practitioners for the past decade as a relevant multidisciplinary issue (Neuteleers & Engelen 2015; Plastic Recyclers Europe 2016:124). Previous studies have reported an increasing pressure from the government policies in South Africa regarding the environment and attribute it to the adoption of environmental policies and management tools such as the green information system (GIS) by many organisations (Yalabik & Fairchild 2011:527; Demirel & Kesidou 2011:68). Nyirenda, Ngwakwe and Ambe (2014:5) linked an organisation's adoption of internal an environmental management system (EMS) to the various packaging-related pollution challenges still facing the majority of organisations.

Packaging is defined as the enclosure of products, items or packages (in a wrapped pouch, bag, box, cup, tray, can, tube, bottle or other container form) for protection and/or preservation, communication and utility or performance (International Packaging Institute (IPI) 2010:43). Chaneta (2012:112) views packaging as part of strategic planning, which tries to match organisational needs and attitudes with the organisational objectives. In other words, designing new packaging material that is environmentally friendly could become the major source of improving organisational performance and firm competitiveness.

Packaging materials such as plastics are very firm and stay in the environment for a long time after they are discarded, especially if they are shielded from direct sunlight by being buried in landfills (Singapore International Energy Week (SIEW) 2015:17). Kilian (2016:10) associated packaging with the benefits of environmental protection, financial savings in products and contributing to economic expansion and community well-being by enabling the circulation and delivery of products to the marketplace. Its useful life contributes to environmental solid waste that is difficult to be managed at any level. Kilian (2016:10), on the contrary, revealed that effectively managing packaging (especially plastic) waste is a challenge, especially in emerging or underdeveloped economies. Cong and Wei (2010:4), in support, highlighted that creating economically viable, closed loop systems for the recovery of packaging materials is a challenge to many organisations. More so, statistics from the World Health Organisation

(International Political Science Association (IPSA) 2012:876) claim that in developing countries ineffective packaging can result in the loss of approximately 50 percent of products before they even reach the final consumers; South Africa is not exempt from this problem.

Currently in South Africa, accountable packaging management is a well-established and respected practice in the packaging industry. The purpose of responsible packaging is to address economic, legal and regulatory concerns associated with container use (Responsible Packaging Management Association of South Africa 2014:2). The need to look after the environment has resulted in the development and growth of the recycling and reconditioning industries, as they process old packaging materials into new materials in an environmentally friendly manner (Packaging Council of South Africa (PACSA) 2015:63).

In the contemporary business world, as environmental information systems are becoming the backbone of green packaging (Chaneta 2012:19), most businesses and organisations are also becoming aware of the negative effects brought by the organisations' unsustainable strategies. As such, GISs have become not only a tool to reduce the environmental impact of processes and products, but also an atypical strategy to create a competitive advantage and enhance both performance and social welfare (Vachon & Klassen 2008:232). In this study, GIS is defined as a gathering of data sets and information that have some significance for the study and/or monitoring and/or exploration of the environment. The term GIS is used mostly to define various socio-economic indicators such as a contact list of consultants or a list of chemicals that are used in the production cycle. GIS can serve as a source of firm competitiveness and improved organisational performance.

Organisational performance is one of the most popular terms in today's management terminology. The idea of organisational performance is becoming widely accepted and adopted all over the world (IPSA 2012:73). It spread from the public sector in the developed countries and has recently found its way into many developing countries. Input aspects, mainly financial resources, determine organisational performance. However, performance measures, mainly developed from costing and accounting systems, have been criticised for encouraging short terms (Zhu & Sarkis 2014:289). Hence, in this study, organisational performance is also viewed from the environmental performance of an organisation in terms of complying with the policies on green initiatives and meeting the production demand.

1.2. PROBLEM STATEMENT

More recently, the macro-economic environment has been challenging for the packaging industry, mostly caused by the pressure on both commercial and consumer spending (Guan, Amea, Ariffin & McKay 2016). In contrast, the blend of economic uncertainty and resource and energy price inflation has also had an undesirable impact on packaging producers who rely on sophisticated printing and converting machinery to deliver the quality, efficiency and innovation that the market demands. Thus, management needs to be skilled at determining how much to spend on maintaining and adding to the capabilities of their machine park (South African Maritime Safety Authority 2016).

Despite the scientists' and practitioners' claim that the development and application of new technologies will enable the packaging industry to achieve more with less, most of these technologies are not more than promising new and irreplaceable techniques. This is because it is challenging for most organisations to implement the environmental management policies without assessing the internal environment (EYGM 2013:1014). Even though organisations in the packaging industry are becoming aware of customer demands for packaging provided without damage to the environment, organisations have to ensure that they remain in business by continuously identifying risks and opportunities by increasing their elasticity and making climate change along with the measurement, verification and reporting of the emissions part of their core business strategy. However, not all of these organisations have embraced the idea of greening up in their processes and systems, especially with an aim of enhancing their organisational performance. For instance, in South Africa, plastic packaging contributes to 44 percent of the emissions and pollution during manufacturing and disposal, which is a significantly high percentage of emissions (EYGM 2013:1014). This raises questions of whether the plastic manufacturing organisations have some internal EMS in place and if they do, whether they implement them effectively. What influence does the implementation of these internal environmental systems have on green packaging management, GIS management and organisational performance? Thus, a detailed study on the influence of an EMS on green packaging management, GIS and organisational performance is justified.

Though previous researchers (Yalabik & Fairchild 2011:527; Zhu, Van Dijk, Fritz, Smolders, Pol, Jetten & Ettwig 2012:152; Ontoraël, Suhadak & Mawardi 2017:47) have touched on several environmental factors that affect organisational performance, it is difficult to locate a study that measured the direct influence of internal environmental management on organisational performance. Moreover, most scholars have investigated the environmental

management practices from the external environmental perspective and there is a lack of practical evidence on how the internal environmental management practices affect packaging organisations. Thus, even if previous researchers have identified the environmental management factors that affect organisational development, most of them have focused on the adoption of the external environmental management practices and their influence on organisational performance. Since very few researchers have till now focused on the management of the environment from the internal perspective of an organisation, a need therefore exists to consider the internal environmental management as the internal environment comprises all essentials that are endogenous to the organisations, which are largely influenced and totally controlled by the organisation. All these components make up the value chain analysis, which is based on the connection between the company's resources and its competitive position and it explores how these components contribute to profitability and organisational performance (Zhu, Tang, Zhang & Yang 2012).

More so, if the main objective for organisations is to perform well compared to rivals, the fundamental questions that arise are: why are some organisations performing better than their competitors do and why do some organisations achieve continuous success while others do not? If such questions are raised, then there is a need for researchers to look at the internal environmental management of the organisations rather than focusing on developing environmental management practices, which are external to the organisations (Zhu et al. 2012). In other words, research on the internal environment should answer all resource-related questions, solve all resource management issues and represent the first step in drawing up the performance strategy.

The ultimate goal of this study was thus to develop an environmental managerial framework to assist in guiding plastic packaging manufacturing organisations with their adoption and management of green internal environmental systems, green information systems, green packaging and how to utilise these to improve their organisational performance. It was the intention of the researcher to formulate this managerial framework by means of conducting a thorough study of the recent and current literature pertaining to the measurement methods of internal environmental management practices upon which a comparison could be drawn between the relationship among green internal environmental management, GISs, packaging and the actual measurement and reporting of organisational performance.

1.2.1. Research questions

Based on the identified problem, the following research questions were formulated:

- How do internal environmental management systems influence green packaging?
- What influence do internal environmental management systems have on green information systems?
- What influence do green information systems have on organisational performance?
- How does green packaging influence organisational performance?
- How do internal environmental management systems influence organisational performance?

1.3. PURPOSE OF THE STUDY

The purpose of this study was to assess the influence of internal environmental management systems, GISs and green packaging management on organisational performance. This study aimed to explore how internal environmental management systems support GISs and organisational performance of the packaging industry in South Africa. Furthermore, this study shows the standpoint of the organisations and what they strive for regarding green supply chain management practices. The study further explored the environmental practices and here in this thesis illustrates organisational views and the underlying reasons for the managers of manufacturing organisations to consider internal environmental management and their need for the green environmental systems adoption.

1.4. OBJECTIVES OF THE STUDY

1.4.1. Theoretical objectives

The following were the theoretical objectives for this study:

- To review the literature on internal environmental management systems
- To review the literature on green packaging management
- To examine the literature on green information systems
- To assess the literature on organisational performance.

1.4.2. Empirical objectives

From the above objectives, the following empirical objectives were developed for this study:

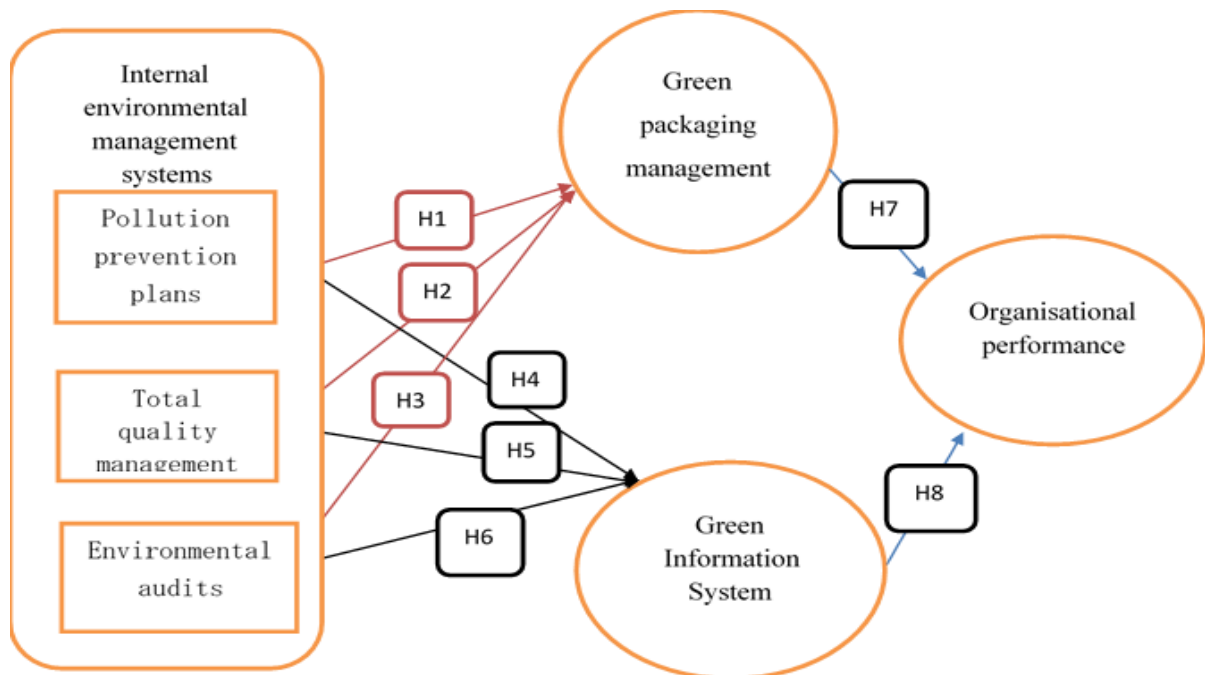
- To develop an environmental management framework to guide plastic packaging manufacturing organisations with their adoption and management of green internal

environmental systems, green information systems, green packaging and how to utilise these to improve their organisational performance.

- To determine the influence of internal environmental management systems on green packaging management
- To determine the influence of internal environment management systems on green information systems
- To investigate the influence of green information systems on organisational performance
- To investigate the influence of green packaging management on organisational performance.

1.4.3. Research framework and hypotheses

Figure 1.1: Conceptual research framework



Source: own compilation

Drawing from the literature review, research framework above was conceptualised. The above Figure 1.1. research framework hypothesised relationships between research constructs were developed thereafter. In the conceptualised research framework, internal environmental management systems are the predictors while green packaging management and GIS are the mediators and organisational performance is the outcome variable.

Source: Own compilation

Based on the conceptualised framework, the primary hypothesis of this study was formulated as:

Internal environmental management systems have a positive influence on organisational performance.

The secondary hypotheses were formulated as follows:

H01: Pollution prevention plans have a negative and insignificant influence on green packaging management.

H1: Pollution prevention plans have a positive and significant influence on green packaging management.

H02: Total quality management has a negative and insignificant influence on green packaging management.

H2: Total quality management has a positive and significant influence on green packaging management.

H03: Environmental audits have a negative and insignificant influence on green packaging management.

H3: Environmental audits have a positive and significant influence on green packaging management.

H04: Pollution prevention plans have a negative and insignificant influence on green information systems.

H4: Pollution prevention plans have a positive and significant influence on green information systems.

H05: The adoption of total quality management has a negative and insignificant influence on green information systems.

H5: The adoption of total quality management systems has a positive and significant influence on green information systems.

H06: Environmental audits have a negative and an insignificant influence on green information system.

H6: Environmental audits have a positive and significant influence on green information system.

H07: Green packaging management has a negative and insignificant influence on organisational performance.

H7: Green packaging management has a positive and significant influence on organisational performance.

H08: The adoption of green information systems negatively and insignificantly influences organisational performance.

H8: The adoption of green information systems positively and significantly influences organisational performance.

1.5. LITERATURE REVIEW

1.5.1. Theoretical grounding

1.5.1.1. Institutional theory

This study used the institutional theory to explain the environmental management factors and their effect on organisational performance. Institutional theory is a broadly recognised notional bearing that underlines rational myths, isomorphism and legitimacy. It focuses on the deeper and more resilient aspects of social structure. It considers the processes by which structures, including schemes, rules, norms and routines become established as authoritative guidelines for social behaviour (Greenwood, Oliver, Lawrence & Meyer 2017:43). Various mechanisms of institutional theory clarify how these elements are created, diffused, adopted and adapted over space and time and how they fall into decline and disuse.

The institutional theory asserts that the institutional environment can strongly influence the development of formal structures in an organisation, often more profoundly than environmental pressures (EYGM 2013:1014). The theory also states that innovative structures that improve technical efficiency in early-adopting organisations are legitimised in the environment. Ultimately, these innovations reach a level of legitimisation where failure to adopt them is seen as irrational and negligent (or they become legal mandates). At this point,

new and existing organisations will adopt the structural form even if the form does not improve efficiency. The institutional theory studies the process by which activities or items become institutionalised or embedded in institutions as norms and accepted practice and the role of institutions in society (Scott 2005:14). In the current study, the institutional theory offers insight for further understanding the relationship between internal information management, GIS and organisational performance.

1.5.1.2. The resource-based view (RBV) theory

This study also draws from the resource-based view (RBV) of the firm postulated by Penrose (1959). The RBV theory assumes that organisational resources are developed into capabilities that help the organisation to manage its environment and enhance performance (Barney 2001:41). Resources can be assets, processes, systems, information, knowledge, technology and customers, whilst capabilities include organisational processes and routines rooted in knowledge (King 2007:15). These resources are developed through a routine of environmental management practices and systems. In other words, the RBV theory advocates that a firm's ability to respond to the environmental concerns generates superior rents and promotes green packaging management capabilities, the effective implementation of GISs and improves firm performance (Barney 2001:21). In this case, a firm has shared its resources by integrating their functions and plans to create inimitable capabilities that will improve their competitiveness and performances.

1.5.2. Empirical review

1.5.2.1. Internal environmental management system

From a general point of view, resource production and consumption induce waste generation, including end-of-use items or residues. Additionally, mistakes and errors during the manufacturing process, or quality issues, create waste. Moreover, waste arises due to the fact that items are purchased in 'trade-sizes' generally, which means that these are non-modular and will help to reduce waste, implying that parts and pieces are not useable (Roos 2016:339).

However, some of these items are sold back to the market, such as plastic bottles. Thus, it is indicated that waste is caused due to coordination failures between the internal functions of an organisation. Furthermore, plastic manufacturing has to comply with the policy stating that its client deliveries should be packed in specific packaging for the sake of company branding. This requirement creates the need of repacking and thus increases the waste volume (Kowarsch & Jabbour 2017:189). Overall, the mindset concerning resources plays a vital role as well as

the level of resource scarcity. If items are not scarce, “it is easier to get a new item rather than recycle” without a sanction policy in place and ultimately, the idea that the waste stream is a value stream is not spread throughout the organisation (Drenner 2016:259).

It also depends on structural items such as the priorities that are set regarding activities and process efficiency. The strategy offers limited potential on learning, leading to a higher possibility of production defaults and, consequently, a higher chance of waste. Perhaps a modular approach would be a solution in such cases, as modules to fit most needs could cut waste by only installing the final modules upon completion of the order by a client of a hull originally built on speculation.

1.5.2.2. Green information systems (GISs)

GISs mention the use of information systems to attain environmental objectives, while green information technology (IT) refers to the practice and study of using information technology and computer resources in a more environmentally responsible and effective manner (Marino, Rohling, Rodríguez-Sanz, Grant & Heslop, Roberts, Stanford & Yu 2015:198). Information systems, computers and computing, in general, consume an immense amount of natural resources, the energy used to power them and the problems that arise in the disposing of obsolete hardware. Issues of sustainability have started to become a significant topic of discussion in the information systems community. IT practitioners are focused more now than ever on reducing the direct impact that IT use has on the environment (Chumchal *et al.* 2016:259).

Managing challenges that are complex requires complete and multi-disciplinary approaches to address ecological, technological, economic, social, cultural and political issues. The information systems discipline, being built on the foundations of multiple disciplines, has a central role in addressing environmental issues and in creating a sustainable society because of the field’s experience in designing, building, deploying, evaluating, managing and studying information systems to address complex problems (Marr & Schiuma 2010:689). GIS applies the transformative power of information systems to support sustainability endeavours. It can contribute to sustainability through automating, information and transforming products, processes, behaviours and relationships to support environmental sustainability (Chumchal *et al.* 2016:259). Thus, in the same way information systems have transformed modern business to provide significant productivity improvements, GIS has the potential to enable sustainable ecological, economic and social practices (Marr & Schiuma 2010:690).

1.5.2.3. Organisational performance

Organisational performance can be measured through its efficiency and ability to respond to its stakeholder's requirements. Therefore, to measure performance it is necessary to identify the organisation's stakeholders and its demands (Santos & Brito 2009:2). Mitchell, Agle and Wood (2014:854) highlighted that organisations that highly perform are the ones attending to the demands of investors, customers, employees, government and the society. According to Miller (2012:115), financial performance also represents organisational performance and it is represented by profitability, growth and market value. However, market value and profitability measure an organisation's future and past ability to generate returns, while growth is the increase in a firm's size.

An organisation has a competitive advantage when it can create more economic value than the marginal competitors of the same product market and they define economic value as the difference between the customers' willingness to pay and the economic cost of the company (Obura 2015:30; Organisation for Economic Co-operation and Development (OECD) 2013:8). If the company has a higher economic profit than its competitors do, it will experience higher profitability. On the other hand, if the customer surplus is higher when compared with the market, customers will prefer the firm that will manifest in higher growth rates. In this sense, growth is a complementary dimension to profitability (Elliott, Sieper & Ekpott 2011:27). Firm performance measurement is derived from a broad variety of disciplines, including accounting, economics, human resource management, marketing, operations management, psychology, strategic management and sociology (Galbreath & Galvin 2010:110). Organisational performance measures are defined as metrics employed to quantify the efficiency or effectiveness of actions (Drasovic, Temperley & Pavicic 2009) and have always remained a problematic issue in business research (Fahy, Cotter, Sud & Subramaniam 2011:640).

1.6. SCOPE OF THE STUDY

The scope or area of this study covers the plastic manufacturing organisations operating in the southern region of the Gauteng province. Plastic manufacturing was chosen in this study because plastics contribute to 44 percent of the emissions and pollution during manufacturing and their exposal.

1.7. RESEARCH METHODOLOGY AND DESIGN

1.7.1. Research design

A research design is defined as the tactical plan for a research project or research programme, setting out the broad outline and key features of the work to be undertaken (Brink, Bruns, Tobi & Bell 2017:42). It includes the methods of data collection and analysis to be employed and shows how the research strategy addresses the specific aims and objectives of the study and whether the research issues are theoretical or policy-oriented (Gordon 2013:43). The suitable paradigm for this study is post-positivism. A post-positivist paradigm supports methodological pluralism (Blumberg, Cooper & Schindler 2008:42). It is based on the assumption that the method to be used in a study should be selected based on the research question being addressed (Ampuero & Vila 2006). Since a post-positivist paradigm was selected, a quantitative research approach was adopted in this study.

A quantitative research approach was followed since the relevant numerical data pertaining to the management of plastic manufacturing organisations were analysed statistically to investigate the relationships between the research variables (pollution prevention, total quality management, environment audits, green packaging management, GIS and organisational performance). Quantitative research tools are reviewed as systematic and structured devices that aim to obtain information from respondents in a direct and open manner (Rokka & Uusitalo 2008). Obtaining results from these research tools is easily quantifiable and the instruments have a potentially high degree of accuracy. These quantitative research tools often are used for testing specific hypotheses and generalisability purposes. Considering the nature and strengths of this method, this study employed a quantitative research tool.

1.7.1.1. Target population

A target population is defined as the total collection of elements the study seeks to make some inferences about (Blumberg *et al.* 2008:42). The target population in this study was the plastic manufacturing organisations in southern Gauteng. The main reason for focusing on these manufacturing organisations is that they are large in size, have a significant impact on the environment and contribute to the high emissions and environmental pollution in South Africa, for example burning 1 kg of oil creates about 3 kg of carbon dioxide. In other words, for 1 kg of plastic, about 6 kg carbon dioxide is created during production and incineration.

1.7.1.2. Sampling frame

A sampling frame is a list of all those within a population who can be sampled and may include individual households or institutions (Cooper & Schindler 2008:170). The sampling frame of this study was the manufacturing organisations' sector of the Johannesburg Stock Exchange (JSE). This is because this sector has a variety of large manufacturing organisations that own the largest market share in the plastic industry and they are available in the major regions nationwide. The current population of manufacturing organisations listed with the JSE is 23 percent share; this includes organisations such as Bowler Plastics, Master Plastics and Plastic SA.

1.7.1.3. Sampling method

There are two types of sampling techniques, namely probability and non-probability sampling (Hair, Babin, Anderson & Tatham 2010:20). This study used probability sampling. A probability sample is one in which each element of the population has a known non-zero probability of selection (Armstrong & Kotler 2007:111). A simple random sampling was used in this study; each element in the population has an equal probability of selection and each combination of elements has an equal probability of selection.

Objective: Divide the population into non-overlapping groups (i.e. strata) N_1, N_2, N_3, N_i , such that $N_1 + N_2 + N_3 + \dots + N_i = N$. Then do a simple random sample of $f = n/N$ in each strata.

There are various reasons why the researcher prefers probability sampling. First, it ensures representativeness of not only the overall population, but also key subgroups of the population, especially small minority groups. If one wants to be able to talk about subgroups, this may be the only way to ensure doing so effectively. If the subgroup is extremely small, one can use different sampling fractions (f) within the different strata to over-sample the small group randomly (although it will then mean having to weigh the within-group estimates using the sampling fraction whenever they want overall population estimates).

1.7.1.4. Sample size

A sample size is the actual number of the individuals in the population that is going to be surveyed. In this study, a final sample size of 230 was drawn from the packaging industry database. The present study employed the historical evidence approach to determine the sample size for the quantitative study. Based on previous similar studies conducted by Chan, He, Chan

and Wang (2012:630), it was indicated that the more data collected the better, as statistical power is improved by increasing the sample size.

1.7.2. Data collection and measurement instruments

Data collection is defined as the actual systematic gathering of information that is relevant to the research problem (Murthy & Bhojanna 2010:241). Primary data were collected using a self-administered questionnaire. The structured questionnaire comprised five sections. Section A consisted of questions on the demographic profile of the employees. Section B covered questions on internal environmental management systems. Section C was based on questions on GIS and Section D was comprised of questions on green supply chain management practices. Section E covered questions on operational performance, Section F comprised questions on environmental performance and lastly, Section G consisted of questions on firm performance. A five-point Likert scale was used for sections B, C, D, E, F and G. The standardised questionnaire was pre-tested to check the suitability of questions and the general attitude of the respondents towards the survey. A pilot study was conducted with 50 respondents to establish the reliability of the questionnaire. Thereafter, the questionnaire was refined for use in the main survey.

1.7.3. Data analysis procedure and statistical approach

The data analysis commenced with the coding of the data from the questionnaire into the Microsoft Excel spreadsheet. Descriptive statistics with Statistical Package for Social Sciences (SPSS) version 24.0 and path modelling with Analysis of Moment Structures (AMOS 24.0) were formed subsequently for structural equation modelling (SEM). SEM demonstrates and tests the theoretical linkages of a proposed study and the significance of the relationships between the constructs (Hair *et al.* 2010:20). SEM stipulates a technique where separate relationships are allowed for each set of dependent variables and it provides an estimation technique for a series of separate multi-regression equations to be estimated simultaneously. By assessing each relationship simultaneously, rather than separately, an incorporation of all the multi-scale items can be used to account for measurement errors within each scale (Hair *et al.* 2010:20).

The Kruskal-Wallis and Mann-Whitney U tests were utilised to establish whether respondents varied in terms of green packaging management. The fitness of the measurement and structural model was examined using absolute fit indices that included the chi-square value over degree of freedom, the goodness-of-fit index (GFI), root mean square error of approximation

(RMSEA) and incremental fit indices, that is, the comparative fit index (CFI) and TuckerLewis index (TLI).

1.7.4. Reliability, validity and trustworthiness

Reliability refers to the extent to which an experiment, test, or measuring procedure yields the same results on repeated trials (Baines, Brown, Benedettini & Ball 2012:87). Validity refers to the degree to which the measurement item actually measures what it claims to measure (Nakano & Nguyen 2010:597). This section comprises methods used to measure reliability and validity of the measurement instruments. For reliability testing, the current study used Cronbach's alpha value and composite reliability value. As for validity, both convergent and discriminant validity were checked. Convergent validity were checked using item-to-total correlation, item loadings and average variance extracted (AVE) values. However, discriminant validity was assessed using AVE values, compared to shared variance and the inter-construct correlation matrix.

1.7.4.1. Research model fit assessment

A confirmatory factor analysis (CFA) was done to establish whether the model was fit for the conceptualised research model. Model fit indicators such as chi-square degrees of freedom, goodness of fit index (GFI), augmented goodness of fit index (AGFI), normed fit index (NFI), incremental fit index (IFI), Tucker-Lewis index (TLI), comparative fit index (CFI) and RMSEA were used to assess the model fit.

1.8. ETHICAL ISSUES

For most professions, ethical codes in research are an integral part of their overall ethics, though some research bodies have evolved their own codes (Kumar 2014:216). In research, ethical issues can be examined as they relate to participants, researchers and sponsoring organisations. According to Kaufmann, Panni and Orphanidou (2012:216), the participants, the researcher and the sponsoring organisations all have ethical issues, which should be considered when formulating a research document. The researcher obtained a letter, indicating that permission had been obtained to conduct a study on the mentioned company. Collecting organisational operational data is a very sensitive issue and therefore it is imperative to seek permission from owners or managers of the business and the employees concerned to obtain the information that is needed. Hence, participation was voluntary and anonymity of the respondents and confidence of information had to be guaranteed.

1.9. OUTLINE OF THE STUDY/RESEARCH FLOW STRUCTURE

This thesis has eight chapters with the contents as mentioned below:

CHAPTER 1: INTRODUCTION AND BACKGROUND TO THE STUDY

This chapter provides the research background. In particular, it provides an explanation of the background of the problem, purpose, research objectives, justification, scope and the significance of the study.

CHAPTER 2: GREEN SUPPLY CHAIN MANAGEMENT THEORIES

Chapter 2 presents the resource-based view theory and the institutional theory and develops them based on the previous literature.

CHAPTER 3: SUSTAINABILITY IN THE PLASTIC PACKAGING INDUSTRY

Chapter 3 discusses internal environmental management as well as systems.

CHAPTER 4: GREEN SUPPLY CHAIN MANAGEMENT PRACTICES, AND ORGANISATIONAL PERFORMANCE

This chapter discusses green supply chain management, environmental performance, operational performance and organisational performance.

CHAPTER 5: RESEARCH DESIGN AND METHODOLOGY

This chapter discusses issues such as the sampling technique and method of data collection, while statistical techniques also receive attention.

CHAPTER 6: DATA ANALYSIS AND INTERPRETATION

This chapter covers descriptive statistics with SPSS and CFA and path modelling with AMOS were subsequently formed for SEM.

CHAPTER 7: CONCLUSION AND RECOMMENDATIONS

This chapter presents the conclusions drawn from the research findings and the implications of the findings, recommendations, limitations and future research directions are discussed.

CHAPTER 2 GREEN SUPPLY CHAIN MANAGEMENT THEORIES

2.1. INTRODUCTION

This chapter introduces the theories that support the study through the view of relevant literature. Therefore, the chapter establishes the foundation from which the conceptual framework and research propositions are derived. The chapter starts with introducing the resource-based view (RBV) and the RBV literature where sources of competitive advantage are identified. Their importance on establishing organisational performance is also discussed. Next, the development of the RBV will be discussed followed by the assumptions and critics of the RBV. This study offers a strategic look at the importance of institutional theory and its impact on the timing, marketing, acceptance and implementation of green strategies in an office environment. There are various environmental factors that must be examined and managed in the entire change process of an organisation in order that long-term sustainable competitive advantages are experienced within and external of a firm and its adopted paradigm. Additionally, various types of isomorphism are also presented as effective practices for an organisation to implement in order to achieve homogeneity during the change process in its attempt to market and create a green work environment.

2.2. THEORETICAL REVIEW

2.2.1. The RBV theory

Ever since the inventive work by Wernerfelt (2008) and Barney (1991:18), the RBV theory has dominated in the field of management, as well as several other academic disciplines. The roots of RBV can be traced to a number of intellectual origins, including Phillip Selznick in the 1950s and even as early as David Ricardo in the 19th century. Before defining the resource-based view theory, it is necessary to define a resource. Wade and Hulland (2004:110) described resources as any tangible or intangible assets, which are related to the firm's development. A resource is any asset in a firm that can be considered as a strength or weakness (Dhanaraj & Beamish 2013:294). In other words, resources can be considered valuable when they empower the organisation to improve its efficiency and effectiveness, whilst rarity means that the advantage giving resources or strategies are not implemented by other organisations. If the resource is common, there would be no competitive advantage to be had because the competition would employ the same resources. However, valuable and rare resources must also be imperfectly imitable, because otherwise the competition will acquire the same resources for themselves. Tangible assets are physical things such as land, buildings, machinery, equipment

and capital (Hart & Dowell 2010:986). Also, these physical resources can easily be bought in the market so they confer little advantage to the organisations in the long run because rivals can soon acquire the identical assets. Intangible assets are everything else that has no physical presence but can still be owned by the company (Teece 2007:1319; Maritan & Peteraf 2011:1374). The most important intangible factor that will advocate a better environmental performance and improve company profits, is reputation.

In the plastic manufacturing sector, reputation is vital and most communities value organisations that respect their environment (Kapferer & Bastien, 2012:17). A bad reputation can therefore ruin years of market value for an organisation. For that reason, it is very important that they constantly manage their reputation. Employee skills and knowledge regarding environmental management and recycling are considered as intangible assets of the organisation as they influence the production and the design of a product (Chan & Bishop 2013). Furthermore, intangible resources are considered as internal assets of organisations; therefore, organisations should enhance their employees in strategic environmental plans as they have an impact on the processing and contribution of environmental stability. Also, most customers have developed an expectation of sustainability as a quality assurance when buying their products (Kapferer & Michaut 2015). According to RBV, an organisation can be considered as a collection of physical resources, human resources and organisational resources (Barney, 1991:108). These resources of an organisation are valuable, rare, imperfectly imitable and imperfectly substitutable and are the main source of sustainable competitive advantage for sustained superior performance (Barney 1991:108).

The RBV argues that it is a firm's bundle of resources rather than a product deployment of those resources that determines the firm's competitive position (Wernerfelt 2008:761). Similarly, if the strategic factor market is perfectly competitive, even if organisations implementing strategies that create an imperfectly competitive product market, those strategies are not a source of economic rents (Almarri & Gardiner 2014:437). In contrast, one firm's expectations on strategic factors are different from another. This heterogeneous nature of a firm's expectations makes it possible for certain organisations to obtain above normal returns from acquiring strategic resources to implement a product market strategy. The fundamental assumptions of the RBV theory relate to a firm's resource heterogeneity and immobility. The first assumption is that skills, capabilities and other resources that organisations possess differ from one company to another (Rothaermel 2012:9). If organisations would have the same amount and mix of resources, they could not employ different strategies to outcompete each other and it simply means that what one company would do, the other could simply follow and

no competitive advantage could be achieved (Thompson & Martin 2010:140). This is the scenario of perfect competition, yet real world markets are far from perfectly competitive and some organisations, which are exposed to the same external and competitive forces, are able to implement different strategies and outperform each other. Therefore, RBV assumes that organisations achieve competitive advantage by using their different bundles of resources.

The second assumption of RBV is that resources are not mobile and do not move from company to company, at least in the short-run (Rothaermel 2012:9). Due to this immobility, organisations cannot replicate rivals' resources and implement the same strategies. Intangible resources, such as brand equity, processes, knowledge or intellectual property are usually immobile. Johnson, Scholes and Whittington (2008:156) argued that organisations could not expect to obtain sustained competitive advantage when strategic resources such as human, organisational and financial resources are evenly distributed across competing organisations and that they are highly transferable.

In the RBV context, strategic assets can be assessed using the VRIO framework. Barney (2002:160) proposed four questions that can be used to assess resources as potential sources of competitive advantage. Barney (2002:160) provided the following VRIO analysis that explains the nature of resources, which are available for competitive advantages of organisations.

Valuable: A resource has value when it exploits opportunities and neutralises threats in the environment. In the RBV context, valuable resources are defined in economic terms; that is, these generate above-normal returns.

Rare: Resources present in other organisations are common; those resources not widely held by other organisations are rare. Common or generic resources are not sources of competitive advantage. At best, these are a sources of competitive convergence or parity. However, rare resources can offer temporary competitive advantages and are sources of strength. Rareness, then, is necessary, but not the only characteristic of a competitive advantage.

Inimitable: If resources can be easily copied, an organisation stands to achieve only competitive parity through value and rareness. Inimitability means organisations protect their resources so that competitors cannot easily copy them.

Organisational focus: An organisation's formal processes and production functions are the backbones that support strategic assets; organisations protect their assets through business practices. Within the VRIO framework, if a resource is only valuable, it leads to competitive

parity. Both value and rarity are required for a temporary competitive advantage. Value, rarity and inimitability are required for a sustained competitive advantage and an organisational focus is necessary to both develop a competitive advantage and sustain it.

Figure 2.1: The resource-based view



Source: Rothaermel (2012:5)

Figure 2.1. above provide an overview of the resource-based view theory. It explains that resources can be tangible or intangible that must be heterogenous and immobile and have VRIO attributes to become resources that provide competitive advantage. The resource-based view theory sometimes referred to as the capabilities view theory of strategy asserts that the competitive advantage and superiority of an organisation are explained by the distinctiveness of its capabilities (Barney 1991:99). Strategic capabilities are the capabilities of an organisation that contribute to its long-term survival or competitive advantage. Resources are the assets that organisations have or can call upon (e.g. from partners or suppliers), that is what we have. Competences are the ways those assets are used or deployed effectively, that is what we do well.

2.2.2. The development of the RBV

The natural-resource-based view (NRBV) is developed with the connection between the environmental challenge and firm resources operationalised through three interconnected

strategic capabilities: pollution prevention, total quality management and environmental audits (Sarkis, Zhu & Lai 2011:15). Propositions are then developed connecting these strategies to key resource requirements and sustained competitive advantage (Shi, Koh, Baldwin & Cucchiella 2012:54). The NRBV emerged from an earlier theoretical contribution of the resource-based view (RBV) (Peattie 1995). NRBV stressed the importance of environmental factors that are related to the organisational development (Jackson 2005). With the increased pressure by government, organisations are forced to operate in a manner that supports environmental sustainability.

The NRBV theories suggest that an organisation's internal resources can only support organisational performance if they are aligned with environmental goals (Shi *et al.* 2012:54). Raising from such arguments, the NRBV theory explains the importance of considering natural resources in every operation of every organisation. In the plastic packaging industry, the NRBV stipulates that if organisations consider recyclable products, they can create the green products and gain competitive advantage by providing cheap and unique products with less pollution. According to the NRBV, pollution prevention technologies involve much tacit knowledge through skill development and green teams (Hart & Copeland 2010:673). The tacit knowledge results in a resource that is difficult to replicate. Pollution prevention technologies could produce knowledge of entire product life cycles, which can be converted into the potential for competitive advantage through strategic priority. In brief, internal environmental management knowledge, which is generated by environmental management practices, is significant for organisational competitiveness and performance (Hart & Copeland 2010:673). They are also crucial antecedent variables of another advantageous resource, green information system adoption (Galende & De la Fuente 2003:715).

2.2.3. Assumptions of the RBV

The RBV theory is based on two key assumptions, namely resources that are heterogeneously distributed across all the organisations, and are largely immobile. Given these assumptions, a firm secures competitive advantage if the resources possess the qualities of rarity, value, imperfect imitability, non-substitutability and no transferability (Kor & Mesko 2013:233). The proponents of RBV (Abid, Khan, Rafiq & Ahmed 2014:166) argued that competing organisations will not be able to imitate strategies based on resources because there is causal ambiguity and social complexity associated with the relationship between these resource configurations and sustained competitive advantage.

RBV has gained wide currency in the academic lexicon because its capability logic is very convincing in explaining why some organisations achieve success despite the fact that they fall under the industry that is not performing well. The core logic behind the RBV is the capability logic that states that a firm can outperform rivals only if it has a superior ability to acquire, develop, configure and use the resources to sustain its competitive advantage (Killen, Jugdev Drouin & Petit 2012:525). The basic argument of the RBV is that a firm's competitiveness is a positive function of the resource mobilisation and capability building so that strategies are designed to capitalise on the opportunities and mitigate threats stemming from the environment. The way in which organisations exploit and leverage internal abilities and resources is the key. Having superior resources is a necessary, but not sufficient, condition. What is important is that the resources and competencies need to be protected from exploitation by competitors through imitation and substitution (Barney, Ketchen & Wright 2011:1299).

2.2.3.1. Critiques of the resource-based view theory

The thought of the effect of resource availability and value on firm competitive advantage stressed by RBV has stayed compelling inside the key writing, yet as a hypothetical stage RBV has confronted numerous difficulties, prompting a vivacious progressing banter and proceeded with refinement of RBV ideas, definitions and applications. One significant region of discussion for RBV has been definitional issues in its conceptualisation. Priem and Butler (2014:24) saw that since important assets and upper hand are characterised in similar terms, a redundant issue exists inside the initially imagined builds, which bargains RBV's falsifiability. The hypothetical generalisability of RBV because of its accentuation on asset uniqueness has likewise been tested; however, as Levitas and Ndofor (2013:137) called attention to, greater refinement of operationalisation draws near and observational testing is required before RBV is even prepared for speculation.

Maybe the most in-depth analysis of RBV is that it does not have the outside market point of view. Similarly, as defenders of RBV have censured the business-based upper hand see for making prohibitive suspicions with respect to assets, RBV does precisely that in regards to the item advertise condition. While the business-based view expects asset homogeneity and versatility among associations in the business, RBV makes comparable presumptions with respect to request. Since it is the outer market condition that at last decides if a specific asset is genuinely important, as the market changes, the overall estimation of assets may likewise change. To control for this, RBV makes the verifiable presumption of homogeneity and fixed status of item showcases (perpetual interest).

Brouthers, Brouthers and Werner (2013:940), in their assessment of section mode choices, raised the overall idea that asset worth might be a basic thought for associations working in assorted institutional conditions, for example in the global setting. Their experimental outcomes demonstrate that institutional impacts, which may shift from nation to nation, sway the estimation of the firm's asset put together favourable position with respect to backup execution, showing that asset-based points of interest are not all inclusive, yet rather setting explicit. From multiple points of view, the RBV hypothesis speaks to a pendulum swing from the excessively outside perspective on industry-based speculations to an excessively inside one, a hole that a portion of all the more incorporating speculations of business technique that follow it have endeavoured to accommodate (Levitas & Ndofor 2013:140).

2.2.4. The application of the RBV theory

Currently, RBV theory and NRBV theory are adjusted to help and clarify the exploration factors and ideas. The resource-based view contends that associations have assets, a subset of which empowers them to accomplish the upper hand and a further subset of which prompts unrivalled long-haul execution. As per RBV, the resources incorporate all benefits, capacities, authoritative procedures, firm traits, data and information constrained by a firm that empowers that separate firm to imagine and actualise techniques that improve its proficiency and adequacy (Barney *et al.* 2011:1299). There are four states of the assets which are significant, to be specific the feeling that they misuse openings and additionally kill dangers in a company's domain; are uncommon among an association's present and potential challenge; remain defectively imitable; and, at long last, that there can't be deliberately identical substitutes. The three capacities referenced right now, contamination counteraction, absolute quality administration and inner reviews.

Contamination avoidance alludes to endeavours to lessen, change, or forestall outflows and profluent releases through better housekeeping, materials substitution, reusing, or changes in the creation procedure (De Giovanni & Esposito Vinzi 2012:907). Contamination anticipation, which looks to forestall waste and outflows as opposed to tidying them up toward the finish of the channel, is related with lower costs. For instance, expelling contamination from the creation procedure can build productivity by diminishing the sources of information required, improving the procedure and decreasing consistence and obligation costs (William, Hoskisson, Short & Yiu 2010:1335).

2.2.5. Institutional theory

Institutional hypothesis is characterised as strategy making that underlines the correct and legitimate parts of government structures. Institutional hypothesis is a comprehensively perceived notional bearing that underlines sound legends, isomorphism and authenticity (Battilana 2006:653). It centres around the more profound and stronger parts of social structure. The institutional hypothesis considers the procedures by which structures, including plans, rules, standards and schedules, become set up as definitive rules for social conduct (Aten, Howard-Grenville & Ventresca 2012:80). Different components of institutional hypothesis explain how these components are made, diffused, received and adjusted over existence and how they fall into decrease and neglect.

Institutional theory offers intervals of knowledge for additional understanding of the connection between timing of greening procedures and firm execution. Institutional theory contemplates the procedure by which exercises or things are standardised or installed in foundations as standards and its general public (Hillebrand, Nijholt & Nijssen 2011:595). Institutional theory fixates on the effect of natural weights that the firm experiences and that, along these lines, impact the firm's arrangements, systems just as structure until the associations inside an authoritative field seem to turn out to be fundamentally the same without essentially getting increasingly productive. Associations capitulate to these environmental powers and weights so as to pick up assets from the condition that can incorporate monetary assets just as clients, political force and institutional authenticity. DiMaggio and Powell (1983:1211) looked to clarify the likeness of the three associations in their authoritative practices and structure through three institutional instruments which are coercive isomorphism, mimetic isomorphism and standardising isomorphism.

Institutional hypothesis affirms that the institutional condition can firmly impact the improvement of formal structures in an association, frequently more significantly than ecological weights. Imaginative structures that improve specialised productivity in early embracing associations are legitimised in nature. At last, these advancements arrive at a degree of legitimisation where inability to receive them is viewed as unreasonable and careless (Nguyen, Hermansen & Mogensen 2010:2561). Now, new and existing associations will embrace the basic structure regardless of whether the structure doesn't improve proficiency. Institutional hypothesis attests that associations embrace activities so as to pick up authenticity or acknowledgment inside society (Sarkis *et al.* 2011:15). Subsequently, reception of certain

hierarchical strategies may expand a company's authenticity to work by outer entertainers and partners.

As indicated by institutional hypothesis, natural arrangement might be affected by three weights: regularising, coercive and mimetic (DiMaggio & Powell 1983:111). In the first place, regulating pressures cause associations to fit in with being seen as increasingly authentic. Normally, this weight is applied by outside partners who have a personal stake in the association. Client prerequisites structure the centre regulating pressure for Chinese producers to actualise green supply chain management (GSCM). In particular, fares and deals to outside clients are two fundamental drivers that may persuade Chinese makers to receive ecological administration and GSCM rehearses. Second, congruity through coercive weights happens through impact applied by people with significant influence. Government offices are instances of amazing gatherings that may impact the activities of an association (Sarkis *et al.* 2011:15).

2.2.6. The development of institutional theory

As Scott (2008:132) noted, institutional theory has moved from determinant to intuitive contentions. In determinant contentions, imperatives on key conduct happen as underestimated components and oblivious adjustment to conventions produce outlines for dynamic (Berger & Luckmann 1967:42). Institutional conditions may make for basic consistency among associations, as associations ceremoniously embrace structures to increase institutional authenticity. Through procedures of an organisation, options can become unbelievable (Tolbert & Zucker 1983:1211). Appropriation of another hierarchical structure may start as a quest for proficiency yet later spreads in a journey for authenticity, in a two-arrange model of dispersion (Tolbert & Zucker 1983:1893). Vulnerability may prompt correspondence, as foundations face solid, regulating and mimetic weights (Simin, Janjušić, & Blažević 2013). Intuitive contentions, paradoxically, recognise open doors for decision and utilisation of organisation (Scott 2008:132). Institutional hypothesis could be used to look at issues of interests and office inside the procedure of systematisation. Oliver's (1991:1112) combination of institutional hypothesis with asset reliance contentions speaks to perhaps the soonest reaction to DiMaggio's test. She proffered a progression of key reactions to institutional weights and distinguished indicators of which reaction an association is probably going to receive. As Scott (2008:132) watched, Oliver's article "pried open institutional theory, accounting for increasingly purposive activity".

2.2.7. Assumptions of the institutional theory

Institutional arguments are not about accumulations of individual activity; however, higher request factors over the individual level impact political procedures and results and will in general produce standard examples or balance. Of the three assortments inspected, sociological institutionalism is a type of hierarchical hypothesis and basically a social hypothesis (Pache & Santos 2013:972). It treats states and other composed political on-screen characters to a great extent like different associations, giving an expansive social hypothetical point of view on associations and in this way legislative issues; the hypothesis centres around the dispersion of thoughts and other social structures, as associations look for authenticity. Along these lines of inspecting political conduct and procedures, ordinarily involves clarifying likenesses among institutional structures and arrangements and regularly alludes to issues encompassing the advancement of an open approach as the dispersion of structures and strategies, frequently through the interceding impact of associations that are global in scope (Pache & Santos 2010:455).

2.2.8. The adoption of the institutional theory

In most studies, the institutional theory has been used to understand how organisations adopt, assimilate and develop operations' strategy initiatives such as total quality management (Anderson, Daly & Johnson 1999:38), lean manufacturing (Ketokivi & Schroeder 2014:250), Six Sigma (Braunscheidel, Hamister, Suresh & Star 2011:439) and supply chain management/GSCM (Tolbert & Zucker 1999:170) successfully.

Within the context of GSCM, actors in the supply chain operate in a way that fulfils both customer and legal requirements. Hence, pressures from government agencies and national international regulators will influence the adoption of environmentally responsible behaviour (Zailani, Eltayeb, Hsu & Tan 2012:732). Stanković, (2012) found that organisations have institutionalised environmental practices because of pressure from external and internal forces as well as an awareness of the consequences of non-compliance with environmental imperatives. If organisations have a legitimate concern for the environment and there is social approval, then environmental practices will be deployed more rapidly throughout the supply chain (Katersky & Carter 2007:447).

A few investigations have been completed in evolved nations that show how associations have been driven by institutional standards to improve performances by receiving environmental practices or GSCM. Zhu and Sarkis (2007:1411) and Sarkis *et al.* (2011:15) explored various

examinations that considered institutional hypothesis as a key driver in embracing GSCM and found that associations were principally affected by outer drivers.

These drivers include legislation and regulation issued by governments, including the applicability of Waste of Electronics and Electrical Equipment in August 2005, Kyoto Protocol's Clean Development Mechanism (CDM) in 2008–2012, Climate Change Act (in the UK) in 2008, American Clean Energy Bill (USA) in 2009, Restriction of Hazardous Substance in July 2006, customer requirements such as the Sustainable Packaging Program at Wal-Mart, Consumer Electronics Recycling Program at Best Buy, Zero Carbon Store Program at Tesco, Leadership in Environmental Performance at Toyota in 2004 and Go Green Dealer Program at Ford in 2010 respectively.

A research challenge that was identified in the current study is to understand heterogeneous responses to GSCM implementation from institutional pressures exist. Therefore, this theory still needs to be studied and particularly so in emerging economy countries. More so, it is proposed that the institutional norms in emerging economy countries where manufacturing has been outsourced (Ferdows 1997:85), will be different from results of previous studies conducted in developed countries.

2.2.9. The application of the institutional theory

Recognition of the strategic importance of the institutional theory of the organisation has been described as a significant trend in GSCM and it has been shown that efficient green supply chain can provide lucrative economic benefits and improve organisational competitiveness (Büyükoçkan & Çifçi 2012:3002). The institutional theory explains organisations as institutions that are made up of different stakeholders. It explains that various pressures from stakeholders and institutions motivate organisations to pursue GSCM-related practices (Tate, Ellram & Kirchoff 2010:19). Also, top management may have greater influence from specific types of institutional pressures, such as government regulations, customers' needs or competitors' strategies. Therefore, their support can vary in response to each different type of institutional pressure. In this regard, this study applied the institutional theory to explain that the reactions from top management are to heterogeneous institutional pressures, which effectively treats this as a middle-step towards an analysis of the effects of top management on the implementation of GSCM. In addition, the institutional theory of the organisations explains how organisational legislative with the government rules influences green supply chain. Moreover, the development of these rules at an infant stage in most developing organisations increasingly impacts on a large proportion of green manufacturing.

2.3. CHAPTER SUMMARY

This chapter provided the green supply chain management theories. The chapter resumed by explaining the resource-based view theory. The resource-based view theory was explored by tracing its origins. Also, previous studies which used the RBV theory were stated to build a strong foundation of the theoretical framework. However, it was important to explain the development of the RBV. The natural resource-based view (NRBV) theory was further discussed in relation to green supply chain management. With relation to this current study the NRBV assumptions were also given explaining arguments and critics surrounding the NRBV and RBV theories. Furthermore, the institutional theory was adopted to explain the behaviour of the organisations given the pressure from the government regarding the environmental rules and regulations. Lastly, the chapter provided the application of the institutional theory to the current study. The next chapter explores the three internal environmental management factors, namely pollution prevention plans, total quality management and environmental audits.

CHAPTER 3 SUSTAINABILITY IN THE PLASTIC PACKAGING INDUSTRY

3.1. INTRODUCTION

Environmental management framework, as characterised by Sroufe (2007), is a framework and database, which coordinate methods and procedures for preparing of the work force, observing, condensing, and revealing of specific environmental execution data to inside and outside partners of a firm. The objectives of a natural administration framework as consistence and waste decrease were further ordered and condensed. Consistence is the demonstration of achieving and maintaining insignificant legitimate guidelines. Inability to agree by associations may pull in punishments or fines from the specialists. Waste decrease goes past consistence to diminish natural effect. Waste decrease starts by limiting and staying away from contamination just as waste. At the leave level, waste is decreased by reusing. This section talks about the environmental management factors that influence the plastic assembling associations in South Africa.

3.2. ENVIRONMENTAL SUSTAINABILITY IN SUPPLY CHAIN MANAGEMENT (ESSCM)

The primary goal of sustainability concerning the environment is to add to the nature of the environment over the long haul or, in any event, not bargain it (Coyle, Thomchick & Ruamsook 2015:367). At the point when natural environment is talked about, for the most part, four themes are considered: vitality utilisation, water utilisation, ozone harming substance emanation and waste age that additionally set up the size of the over expressed issues (Planet SA & Danish Technological Institute 2010:35). The significant impression is to diminish human effect on the earth however much as could reasonably be expected through decreasing vitality and assets utilisation, lessening contamination and waste age (Lovins 2008:33).

On the issue of supply chain environmental sustainability, organisations are mainly concerned with the management of materials, information and capital flows as well as cooperation among organisations along the supply chain while taking goals from all three dimensions of sustainable development, such as economic, environmental and social, into account which are derived from customer and stakeholder requirements (Seuring & Müller 2008:1700).

Various researchers (Dubey, Gunasekaran, Papadopoulos, Childe, Shibin & Fosso 2017:117), on the meanings of ecological manageability in a catalogue network, proposed that ESSCM is the intentional incorporation of social, monetary and natural contemplations. The main aim is

to bury hierarchical business frameworks to make a planned store network to adequately deal with the material, data and capital streams related with the acquirement, creation and dissemination of items or administrations to satisfy present moment and long haul benefit, partner necessities, intensity and strength of the association (Carter & Liane Easton 2011:48; Pagell & Shevchenko 2014). Consequently, ESSCM can be comprehended as a framework that centres around keeping up natural, financial and social strength for long and manageable environmental development (Ahi & Searcy 2013:786; Leppelt, Foerstl, Reuter & Hartmann 2013:97). Sustainability is a systemic concept, relating to the continuity of economic, social, institutional and environmental aspects of human society (Adlo & Neckel 2019:1015). It is intended to be a means of configuring civilization and human activity so that society, its members and its economies are able to meet their needs and express their greatest potential in the present, while preserving biodiversity and natural ecosystems, and planning and acting for the ability to maintain these ideals in a very long term (Adlo & Neckel 2019:1015).

Going to the current natural issues, the Intergovernmental Board on Environmental Change requests the full stoppage of petroleum product utilisation by 2100, to control the world carbon impression (Itokić, Fruk & Jermić 2011). This has brought about plastic assembling and bundling associations to embrace eco-friendlier procedures, advances, items, vitality proficient frameworks and preservation methods (Dubey *et al.* 2017:117). As indicated by Vlaeminck, Jiang and Vranken (2014), natural methodologies received by associations directly affect the store network and seriousness of the association. However, Ji, Peng, Nicole, Allen and Traw (2014:909) clarified different techniques for ecological protection which include: improving interest estimate precision, interest in carbon decrease innovation, joint dispersion, embracing cross-docking systems, improving vitality productivity, a consolidating plan for the environment and far reaching reclaim systems.

Preservation of the regular habitat and monetary improvement are gradually being perceived as being on a similar side of the coin, as opposed to speaking to restricting faces (Abbasi & Nilsson 2012:517). This implies clients are becoming mindful of the natural supportability. In this way, it is significant for a plastic bundling production network to adjust its long-haul objectives to the ecological objectives. Maintainability is fundamental for almost all inventory chains. In plastics, this implies advancing with reused plastics, creating bio plastics capacities and endeavouring towards zero net waste creation. Numerous clients pay attention to supportability. Incredible providers request their clients outside and interior on the sourcing issues that issue to them and adjust their techniques to this information. According to Arseculeratne and Yazdanifard (2014), great plastics organisations commit to zero net waste

by removing recyclables and reusables from landfill-bound waste, implementing an in-house energy conversion process, such as pyrolysis, gasification, or incineration with energy recovery, partnering with other suppliers who can effectively recycle or repurpose waste diverted from landfills and educating employees on in-house waste diversion and zero net waste initiatives.

Similarly, Abd Aziz and Samad (2016) perceive that sustainable development is not just about keeping up financial action and improving social welfare; however, it is fundamentally likewise about guaranteeing that the normal asset base will not be hopelessly drained or harmed after some time. Aside from the ecological maintainability issue, a portion of the significant concern incorporates issues which may involve irreversible changes that will make our planet dreadful, in light of the absence of fundamentally significant assets, unusual and broad cataclysmic events. That is the reason it is so significant for the administration, associations and individuals to be compelled to give extraordinary consideration to the ecological issues. Besides, natural records are effectively quantifiable and could become sensible goals for administrative and associations' advancement procedures and approaches.

3.3. ENVIRONMENTAL POLICY INSTRUMENTS

Since the time of the 1972 Stockholm statement, numerous national constitutions have consolidated circumstances to the earth concerning crucial human rights (Baumann-Pauly, Wickert, Spence & Scherer 2013). However, no substantive connection between human rights and ecological rights have yet been remembered for any coupling universal instrument. The reason might be a few fortunate conditions, both the Between time Constitution of the Republic of South Africa and the Constitution perceive substantive ecological rights as fundamental, justiciable human rights. Segment 24 of the Constitution states as follows: Everybody has the privilege to a domain that isn't destructive to their wellbeing or prosperity, to have the earth ensured, to support people in the present and in the future, through sensible administrative and different estimates that forestall contamination and biological debasement, advance protection and secure environmentally maintainable improvement and utilisation of common assets while advancing reasonable financial and social advancement.

It is noteworthy that a greater part of plastic bundling exercises affects the environment (Gordon 2013:56). To deal with those exercises, organised ways are required to empower the expulsion or relief of these effects on the environment (European Commission (EC) 2013a:78). By and by, there is an exhaustive clarification for the term environmental management system (EMS) in the report AS/NZS ISO 14001:2004 (2004, cl. 3.8): Some portion of an association's

administration framework must be used to create and execute its ecological approach and deal with its natural angles.

In other words, the general errand of any EMS is to improve an organisation's environmental presentation and subsequently to impact emphatically on the reasonable advancement of the planet and society. To better comprehend what EMS is, it may be useful to clarify the terms environmental viewpoints and natural arrangement. All plastic packaging exercises, administrations, items that have or conceivably may have a positive or negative effect on the environment are called natural perspectives (EC 2011:45). There is an assortment of exercises, possibly destructive for the environmental business, which frustrate the feasible improvement of the association and the general public by and large. Shockingly, for the most part there are far fewer exercises that are focused on maintainable advancement.

Environmental policy is a statement by top management of the company, where an organisation's intentions and practices, objectives and targets in terms of environmental performance could be found (Martens 2010:889). Different tools exist in order to help organisations in implementing an EMS. For instance, there are various environmental certificates which are described in the further chapters in detail. All these tools have some common features and serve to plan, implement, check and act and develop all of a company's business activities and impacts related to the environmental issues. In other words, the PDCA (plan-do-check-act) method should be applied when adhering to any management system (Weiß & Bentlage 2016:24).

Additionally, it is imperative to make reference to the fact that every one of those methods ought to be implemented on an ongoing basis and with thoughtfulness regarding the subtleties to ensure the consistency with such key guidelines of any EMS as consistent improvement (Weiß & Bentlage 2016:24). The extent to which the procedure of arranging any EMS is concerned, includes considering three primary concerns, namely the criticalness of the ecological perspectives, the lawful and other natural prerequisites, and ultimately the destinations and focuses of EMS.

Chen, Levent, Mortelmans, Filkina and Dinh (2013:432) referenced that EMS assists with setting clear natural goals and targets and permits evaluating the advancement towards their accomplishment. Then again, McKinnon, Cullinane, Whiteing and Browne (2010:62) saw that EMS usage generally gives an upper hand and exhibits generosity of the organisation. Moreover, if plastic bundle associations need to encourage execution of EMS to make it work in the most productive and powerful manner and to build representatives' inclusion, it is

essential to structure an Ecological Administration Framework as per the centre standards of the other administration frameworks actualised in the organisation.

For instance, the planning cycle, the methodology towards corrective and preventive activities ought to be the equivalent (Weiß & Bentlage 2016:21). Along these lines, it is imperative to envision and attempt to dodge the potential boundaries on the way of EMS usage and fundamentally decline its productivity and adequacy. A portion of the obstructions incorporates the absence of the executives' support as well as workers' association, insufficient assets required to actualise EMS, absence of attention to the board and representatives about advantages of EMS, and unclear sensible division of obligations concerning EMS usage (Hillary 2009:154).

3.3.1. The voluntary versus the non-voluntary/compulsory environmental policy instruments

When concentrating on environmental management policies, there are a few explicit instruments that fall under this mark of intentional methodologies: deliberate understandings between industry affiliations or associations and the administration (either as one-sided announcement by industry alone, as respective understanding or as a programme offered by the legislature), eco-the board plans (which have a place with the classification of procedural instruments, however are wilful simultaneously), confirmation plans with or without outer check, green name plans and detailing programmes. (Toller & Bocher 2013:2).

Numerous companies in South Africa are currently expanding their concentration from exclusively benefit boosting to accommodating the needs and interests of other stakeholders, such as employees, neighbours and the environment. In this manner, they acknowledge a portion of duty regarding the aggregate great. (Toller & Bocher 2013:7). Natural rights speak to a critical test all around and South Africa is no uncommon case. All countries, especially the developing countries, are looked at with a critical trial of ensuring that there is balance between natural rights and money-related improvement. Human rights cannot be totally recognised inside an adulterated or dirtied condition. Interfacing money-related improvement with biological rights makes a rights-based approach to manage normal confirmation that puts the overall public hurt by characteristic defilement at its middle (Epstein 2018:19). The common explanation in the Constitution incorporates two portions (Republic of South Africa (RSA) 1996:15). The regular protection is of prime centrality right now, is set as one of the essential targets and hallowed responsibilities of the State. Despite the fact that the Constitution has presented a few ecological strategies, it has neglected to show in what organisations these

arrangements are required and when are they expected to be in force. This makes it hard for plastic producers to actualise a portion of these arrangements (RSA 1996:2).

3.3.2. Internal environmental management system

3.3.2.1. Various internal environmental management systems used both globally and in SA

The ISO 14001 EMS standard is presumably the most unmistakable EMS right now and it is the EMS standard for which there are the most accepted accreditations. There are more than 66,000 associations and associations with ISO 14001 confirmations in 113 nations around the globe, as from December 2003 (Carelse, 2016:14). While affirmation to the ISO 14001 standard is a significant objective, numerous associations just adjust to ISO 14001, without officially ensuring (Department of Environmental Affairs and Tourism (DEAT) 2004:5). This is discussed further in Section 3.2.2.2.

The EU proposed the Thematic Strategy on the Urban Environment. One of their objectives was to contribute to a high level of quality of life and social well-being for citizens by providing an environment where the level of pollution does not give rise to harmful effects on human health and the environment, which they did by encouraging sustainable urban development (Carelse 2016:14).

The topical technique at its centre directs that coordinated, targeted environmental management be utilised as the vehicle through which urban zones ought to be overseen. It is along these lines that the key administration of ecological effects of all exercises all through the civil territory of ward is required. The perfection of this methodology is the level of incorporation between divisions, the commitment of partners and the amalgamation of strategies over the three circles of government (Carelse 2016:16).

At its core, the strategy attempts to guide authorities in deciding whether to take a holistic and structured approach which categorises key issues, assesses the current state of these challenges, assigns targets for policies, then assesses the various options available to policies, facilitates stakeholder engagement and finally leads to the successful implementation of effective policies.

3.3.2.2. Pollution prevention plans and environmental audits

As indicated by Interwaste (2016:5), reuse and reusing of plastics have the motivation behind keeping materials from entering the waste stream and lessening the measure of waste produced

that climbs the chain of command. These two ways of taking care of systems are supported by mindfulness crusades and offices offered by legislative organisations as well as NGOs. It is significant that individuals think about the advantages that reuse and reusing have on nature. When the overall population is fully educated, it is likely applicable that reusing stations are set in the correct spots. There are the two focal points and inconveniences to this technique for squander treatment. While the points of interest are self-evident, burning is costly as an innovation (building costs), requires participation with neighbourhood associations or legislative organisations and needs to follow certain ecological guidelines (Kleis & Dalager 2007:27).

Also, making contract employees mindful of environmental management issues at the site can assist with diminishing the probability of a temporary worker being answerable for contamination for which an association is held responsible. An EMS doesn't ensure improved natural execution; mishaps and episodes can at present occur. Be that as it may, it allows snappy location, moderation and, if essential, remediation of any contamination episode (WRAP 2013:14).

As indicated by Daughtry (2014:33), most associations perform inner and outer reviews once every year. For the Eco-Management and Audit Scheme (EMAS), the recurrence of the review cycle must be at interims of no longer than three years, while there is no detail in ISO 14001 or in Ecological Recognition, despite the fact that associations must reregister following one year. This implies a large number of the associations decided to perform reviews more often than prescribed or stipulated by any of the principles (Daughtry 2014:33).

However, strictly speaking, an EMS includes EMS viewpoints and capacities along these lines. EMAS was created before the ISO 14000 arrangement. The nearness of an EMS was understood in EMAS and the appearance of ISO 14001 implied that the standard could be perceived as a stage towards EMAS enlistment, though preceding this, EMSs must be created (DEAT 2004:5). EMAS is for the most part viewed as a stricter structure than ISO 14001, requiring determined reviews, more noteworthy open accessibility of data and more prominent execution improvement. EMAS is a deliberate plan that was basically created for use inside the European Association. There are at present 4050 destinations in 3072 EMAS enrolled associations (DEAT 2004:5). DEAT's 2004 appraisal of the standard of evaluating of EMAS is significant in understanding the principles as they are presently contrasted with at that point.

According to Berndt and Petzer (2011), auditing within an environmental internal audit (EIA) is not carried out as effectively as in EMSs. EMS auditing involves both an internal and

external component which creates a higher degree of confidence in the information, reduces potential risks and reduces the potential for errors. EIAs that are to be linked to EMSs need to have sound monitoring, data checking, reviewing and auditing systems, to ensure that errors are not magnified as they pass through the system. Peer review and data checking are normally carried out in EIAs but, in some instances these activities are the first to be affected by budget cuts. Quality controls must be maintained to protect the integrity of the EIA findings and recommendations as they pass through to the EMS (Carelse 2016:13). As with all environmental management tools, accurate data are of paramount importance, checking methods and systems are needed in both tools to ensure that the information being used is accurate and will not corrupt or distort management decisions which can have wider implications for the project or operation (Du Plessis & Nel 2015:234).

3.3.2.3. Opportunities, challenges and reasons for adoption of internal environmental systems

Integrated environmental management (IEM) in South Africa has experienced critical changes. Having begun as an intentional procedure, IEM in South Africa arrived at an achievement in 1997 with natural effect evaluation (EIA) getting required. The EMP gives a depiction of the strategies and methodology for alleviating and checking impacts. The EMP additionally contains ecological goals and targets which the venture advocate or designer needs to accomplish so as to lessen or wipe out negative effects. The EMP report can be utilised all through the venture life cycle. As per Antonioli, Mancinelli and Mazzanti (2013:975), it ought to be normally refreshed to stay lined up with the task as it advances from development to activity and, at long last, to decommissioning. The most widely recognised difficulties that are experienced while embracing inner administration frameworks are waste and wastewater, urban spread, significant levels of air contamination bringing about poor air quality, haggardness of the constructed condition, shortage of recreational territories and green belts, expanding traffic volumes and resulting clog issues and elevated levels of ozone harming substance emanations.

The above challenges are mostly experienced by certain urban areas in the European Union (EU) nations. Environmental difficulties in urban areas inside the EU need to ascend to the IEM procedure, which is endorsed by neighbourhood specialists to cure their natural issues (Carelse 2016:13). The issues they face differ in a multifaceted nature, seriousness, recurrence and are as a rule interrelated just as being pervasive in the entirety of their urban territories. Albeit deliberate, natural approach instruments are quicker to embrace, progressively adaptable, less adversarial and less exorbitant and take into account the utilisation of

administrative information on part of the managed or even consider aggregate learning; there are likewise some related issues.

The problem with these approaches is that they appear plausible in some ways, but they look at the phenomenon from one side only and do not reflect an adequately complex concept of politics. Politics is not interests automatically producing outcomes (without actors and institutions) nor is it business players deliberating on how to save the world (after having focused on profits over the last centuries), nor is it the process of benevolent government actors solving problems regardless of their interests (Toller & Bocher 2013:8). Toller and Bocher (2013:8) posited that the shortcomings of traditional policy instruments tend to be exaggerated and they do not automatically have the consequence of bringing about new instruments, which require evaluation and learning, making political decisions for change and the successful overriding of contradictory interests and institutions (path dependencies).

The EU, through the topical procedure, recommends that IEM can be accomplished by top circles of government (national and common) providing help to nearby specialists. Top-down help can be accomplished through connecting the different approaches overseeing the earth from national through commonplace to that of neighbourhood government. This additionally goes about, for instance, a decent coordinated regulatory framework. Another case of an incorporated methodology is creating long haul vital dreams, which would manage future and current undertakings (Carelse 2016:15).

To the South African government, integrated environmental management means that interrelated issues such as environmental stewardship, spatial planning, urban management, economic welfare and social inclusion are addressed. The Thematic Strategy at its core dictates that integrated environmental management is used as the vehicle through which urban areas should be managed. It therefore calls for the strategic management of environmental impacts of all activities throughout the municipal area of jurisdiction. The ideal of this approach is the horizontal integration between departments, the engagement of stakeholders and amalgamation of policies across the three spheres of government (Carelse 2016:15).

3.4. ENVIRONMENTAL POLICY VS PRODUCT POLICY

A few analysts found that all together for plastic bundling associations to amplify the advantages from EMS usage, they ought to execute them in an organised manner and set quantifiable goals (Alloggio & Thomas 2013:108; Bodansky 2010:40; Du Plessis & Nel 2015). This is mostly accomplished for the long haul motivations behind natural assurance by means

of participation and commitment to feasible improvement of the planet by the organisations from everywhere throughout the world (Sands, Peel, Fabra & MacKenzie 2012:21). The expanding worldwide monetary reliance, exchange progression and globalisation are changing the manner by which business is directed. This, combined with developing weights on the earth and the utilisation and abuse of regular assets, has implied that exchange and nature have become inseparably connected (Alloggio & Thomas 2013:108). In the event that exchange and nature are to be commonly strong, it is significant that the exchange progression process is resembled with the improvement and reinforcing of successful and non-protectionist ecological enactment broadly, provincially and universally. Correspondingly, exchange well disposed ecological arrangements could give a motivator to mechanical developments, advance financial proficiency and thus improve profitability.

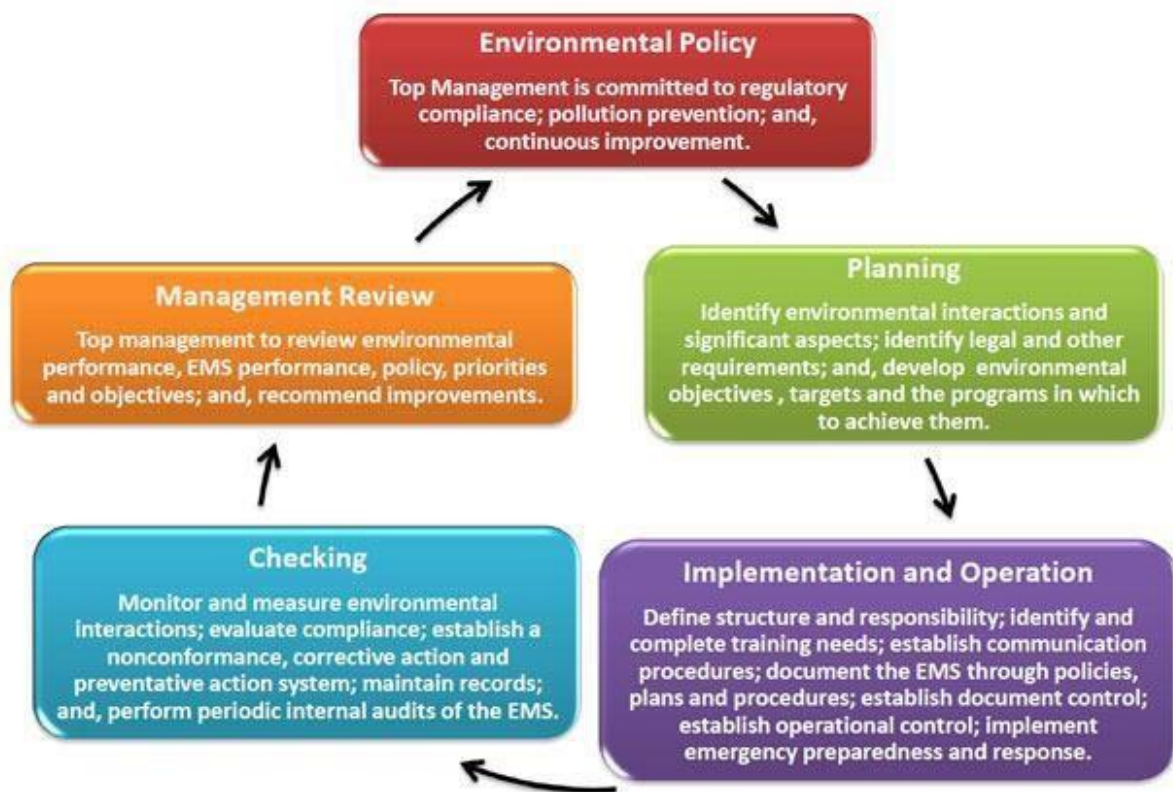
For as long as a decade, different natural norms have been built up and they contrast from one another by the degree of inclusion, by the giving body, by the prerequisites and the endeavours which ought to be made to be guaranteed, the degree of acknowledgment, by the strategy of affirmation and numerous different perspectives (EC 2013b:19). In spite of the assortment of existing endorsements, some of them are more unmistakable than others and merit uncommon consideration. For instance, EMAS and ISO14000 arrangement of models identified with EMS could be featured and in the accompanying two sections there will be indicated data about those devices for EMS usage (Weib & Bentlage 2006:27). Several factors motivate organisations to get an environmental certificate. Some of the factors are general benefits which environmental certification brings to the majority of the organisations, regardless of the type of this certificate. First, all those certificates are the tools for EMS implementation (Camisón & Villar-López 2014:652). Consequently, they provide a framework which helps to improve, manage and follow up environmental performance effectively and efficiently and as a result, to save energy, to decrease resource consumption, to reduce environmental impacts and to cut costs.

Also, accessibility of the natural authentication in the organisation is a viable advertising apparatus, since it is considered as a statement of corporate social obligation. In addition, now and again the ensured organisation will have the chance to put eco names on their items (Gunday, Ulusoy, Kilic & Alpkan 2011:834). In this manner, the way that the organisation is ensured improves the picture of association and creates the upper hand. It assists with fulfilling partners and neighbourhood networks, to attract new clients, to have the option to work with solid providers and could offer a chance to enter new markets. Next, getting an ecological declaration for the most part implies an organisation's consistence with existing natural

guidelines and laws, and prompts fewer issues with specialists. Finally, ecological confirmation assists with improving danger the board (Bhat, Darzi & Parrey 2014).

With regard to SMEs, they may have more tight spending plans and fewer assets than huge associations, for instance, time or workers who know about ecological issues. Furthermore, frequently plastic producers are not completely mindful of natural accreditation, think little of potential advantages and have no idea about the method required. In as many as 17 cases, these makers need to choose where to best apply their assets, so they select targets to place their resources and make sure they comply with the few prerequisites that could be governed by the law (Planet South Africa & Danish Technological Institute 2010:7). Over referenced reasons result in numerous SMEs needing to give preference to certain benchmarks over natural ones, and often they don't think about ecological accreditation.

Figure 3.1: Continuous improvement cycle



Source: Henri and Journeault (2014:165)

Figure 3.1 presents the continuous improvement cycle, comprising of five stages. The five stages shows that the creation of environmental policies should be a continuous process and the management is committed to regulatory compliance, pollution prevention and continuous

prevention. EPIs are one segment of environmental management accounting (EMA). EMA can be characterised as the administration of environment and monetary execution through the improvement and usage of suitable natural related bookkeeping frameworks and practices. EMA commonly includes lifecycle costing, full-cost bookkeeping, benefits evaluation and key preparation for natural administration which in certain associations may incorporate detailing and inspecting. EMA is thus viewed as one part of EMS.

3.4.1. ISO 14001

As of now referenced, EMS ought to be actualised in an organised way. ISO 14001 that was initially acknowledged in 1996 and afterwards refreshed in 2004, is a notable deliberate worldwide natural administration standard which completely meets this objective of giving the structure for EMS. The fundamental thoughts behind the ISO 14000 group of norms are to improve effectiveness of asset utilisation and to inspire associations to control their natural effects (EC 2011:2). ISO 14001 has a place with ISO 14000 groups of natural gauges and spotlights on ecological administration framework, its shape, substance and execution (Weiß & Bentlage 2006:28).

Brownhilder (2016) included that while citing ISO 14001 engineers, there are some normal results from the ISO 14001 guaranteed associations. For instance, an association with an affirmed natural administration framework is dealing with its cooperation with the earth and is showing its responsibility to forestalling contamination, meeting material lawful and different necessities and consistently upgrading its ecological administration framework so as to accomplish enhancements in its general ecological presentation. Furthermore, it is imperative to explain that ISO 14001 sets the structure for the advancement and execution of compelling EMS; however, it does not list any solid ecological necessities or targets.

This fact, thus, makes ISO 14001 truly adaptable and appropriate for any organisation paying little mind to its size, part and exercises. ISO 14001 norms comprise 17 components, which are secured by five key standard classes (Brownhilder 2016). These are ecological approach; arranging (natural angles; legitimate and different necessities); destinations, targets and programme(s); usage and activities (assets, jobs, obligation and authority; fitness, preparing and mindfulness; correspondence; documentation; control of archives; operational control; crisis readiness and reaction); checking (observing and estimation; assessment of consistence; dissention, restorative activity and preventive activity; control of records; inside review); and the administration survey (Canepari 2017).

The substance of the standard exhibits the apparatus' trustworthiness and breadth, just as it shows its adaptability and appropriateness for the assorted variety of associations. Plan (Arranging) natural viewpoints; lawful and different necessities; destinations, targets and programme(s); Do (Execution and Activity) assets, jobs, duty and authority; skill, preparing and mindfulness; correspondence and documentation; control of reports and tasks; crisis readiness and reaction check (checking) observing and estimation; assessment of consistence; individuality, restorative activity and preventive activity; control of records; inward review Act the board.

Survey Natural Strategy 19, regarding the advantages of ISO14001 for associations are worried, and according to the authentication designers, there are four key advantages (Cant & Wiid 2014): 1. Decreased utilisation of vitality and materials; 2. Improved company picture among partners; 3. Lower cost of waste administration; and 4. Conceivably lower circulation costs.

As indicated by the Large Green Open door for Plastic Bundling Report (Green American 2013:15), the majority of the plastic bundling associations which are ISO14001 affirmed underscored the advantages of this authentication as it increased interest in items and administrations, comfort and adequacy as an administration apparatus, higher exporters' generosity and eagerness to participate in view of organisations' validity improvement (Chen *et al.* 2010:654).

In addition, such significant benefits as a reduction of the environmental risks and, obviously, sustainability enhancement and achievement of environmental compliance could be added (Dangayach, Pathak & Sharma 2005:31). Some organisations are aware of the benefits, but still do not have this certificate. As things stand, because of the existing challenges on the path towards ISO 14001 certification, which are especially relevant in the case of SMEs, one of the biggest challenges is the company's resource limits.

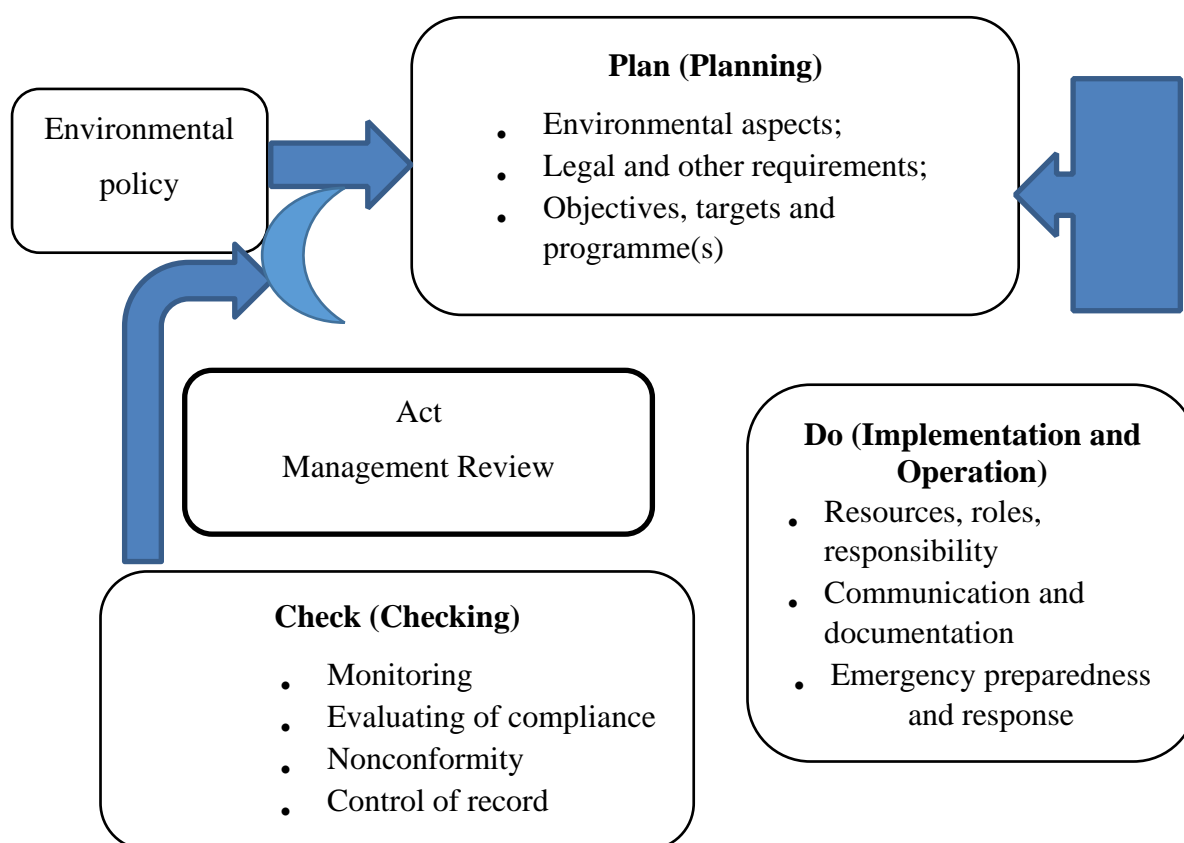
These resource limits apply to human resources limits (in most of the cases there are no employees who have experience and knowledge of environmental management systems); financial restrictions (development, implementation and running cost of EMS could be high) and time restrictions (the whole process is very time consuming, especially in some cases). The second challenge could be lack or no demand from the authorities, customers, suppliers and other stakeholders. The third challenge is lack of information. Many organisations are not fully aware of the potential benefits from EMS implementation and obtaining an ISO14001

certificate; do not know how to start; or do not know what resources will be needed (Comoglio & Botta 2012: 92).

Last, but not least, organisations, especially small and medium-sized ones, often have to focus on other standards that are more important for the sector of business which they belong to or are required by the law. Subsequently, there are no resources and any motivation left to develop and implement EMS and to apply for ISO 14001 certificates. But there is also an advantage for an SME that intends to get an ISO 14001 certificate (Chen, Habert, Bouzidi & Jullien 2010:654). In most of the SMEs, operations and processes are much simpler than in the big organisations. Additionally, the organisational system in small and medium-sized enterprises is usually plain that, for example, allows to get management commitment easier and faster with much less bureaucracy (Green American 2013:17). Hence from this side, SMEs usually need to put in fewer efforts to get certified. To understand some of the challenges and advantages for SMEs trying to get certified, it is reasonable to describe the process of obtaining an ISO14001 certificate. The steps listed below illustrate why the whole process can be time and resources consuming.

The content of ISO 14001 standards is shown graphically in Figure 3.2, where the PDCA cycle is used as a basis.

Figure 3.2: The content of the ISO 14001 standard



Source: Adapted from Department of Environmental Affairs (DEA 2015:7)

Figure 3.2 above presents the ISO 14001 framework. It explains the pillars that builds the ISO 14001. The framework indicates how environmental policies are aligned with environmental and legal planning. It also indicates the process that is followed in implementing the framework.

3.5. SECTORIAL IMPLEMENTATION

3.5.1. Plastic packaging in South Africa

There are several challenges facing the plastic packaging industry in South Africa and this needs all the stakeholders in this sector to mitigate against the challenges. One of the challenges has been the macro-economic environment, which is beyond the control of businesses in this sector in many ways.

The macro-economic environment has been challenging for the packaging industry in recent years, mainly due to pressure on both commercial and consumer spending. The combination of economic uncertainty, raw material and energy price inflation has also had a negative impact on packaging producers who rely on sophisticated printing and converting machinery to deliver

the quality, efficiency and innovation that the market demands. Management needs to be skilled at determining how much to spend on maintaining and adding to the capabilities of their machine park (IQ Business 2004: 04).

Plastic and paper manufacturer impact identified some of the challenges in the packaging industry to be skills shortages, high cost of administered services such as electricity and municipal services, increasing incidence of imported goods – all of which are already packaged, unreasonable customs and excise duties on South African packaging exports; and high levels of product waste, which can be as high as 40 percent as a result of inadequate packaging materials and poor infrastructure (IQ Business 2014: 04). The pace of quantity, complexity and range of regulations is growing all the time in the environmental field. Increasingly stringent and far-reaching environmental legislation has come from Europe and the United Kingdom (UK). Additionally, the enforcing authorities have shown that they will not hesitate to prosecute when necessary. It is important for any organisation or business to ensure it complies with UK environmental legislation and be able to demonstrate compliance with the appropriate regulatory authorities (WRAP 2013: 22).

Plastics are a vital part of any economy and having widespread use in the manufacture of a variety of goods. There is not an economic sector that does not use some plastics as an input or finished product. Plastics globally consume around four percent of oil produced. Oil is produced for transport, heating and chemical usage. Plastics are mostly manufactured from the waste gases from drilling operations. Therefore, reducing the amount of plastics is not going to save much oil or coal. The main feedstock for the production of plastics in South Africa is coal. Plastics are a global success story. The world plastics production has seen continuous growth over the last 50 years and in 2012 it rose with more than 2,8 percent to 288 million tons. Europe has seen a decline of three percent from 2011 to 2012. South Africa has seen an increase of 5,4 percent in 2012 from 2011.

3.6. THE SOUTH AFRICAN PLASTICS INDUSTRY

The plastics business has been recognised by Government and the Branch of Exchange and Industry as a need segment. In January 2012, the accompanying key vital topics were distinguished to address difficulties inside the business: PP and PVC beneficiation, composites, reusing of post-purchaser waste and worldwide seriousness which included activities around innovation overhauling, aptitudes improvement and import substitution (Zawislak, Cherubini, Tello-Gamarra, Barbieux & Reichert 2012:14). Some essential market contemplates and benchmarking examination and activities were required to aid the advancement of legitimate

usage programmes (Fitzgibbon 2015:134). Be that as it may, these were not seen as significant as more activity was required.

Damanpour and Aravind (2012:423) saw that the plastics part together with steel and concrete delivers the fundamental structure squares of the assembling division in the South African creating economy. Likewise, these items are used in enterprises as shifted as home and individual consideration, nourishment and drink, car and development. Plastic items are empowering influences of development in the public eye (Galliano & Nadel 2015:467). The plastics fabricating sub-segment is a piece of a store network extending from the polymer producing industry synthetic associations through to an assortment of end-use advertisers and is described by simplicity of section as a result of its low economies of scale and a high level of motorisation. This implies the following:

- There are numerous smaller scale and little associations and a couple of medium-sized plants (80–85 percent of industry is SMMEs, which creates immense openings for work);
- The sub-area utilises around 60 000 individuals;
- Plastics producing cells can be found inside assembling plants of other assembling ventures;
- An expected 1 400 000 million tons virgin material changed over in 2013.

Assembling Industry: There are approximately 1 800 associations right now, utilising around 60 000 individuals. Plastics producing is additionally a different sub-division and can be additionally separated into a few sub-ventures identified with the crude material (input) and the assembling procedure. These are: Plastics items and parts, modern elastic items and segments (this avoids assembling and re-stepping of tires) and composite items and segments.

3.7. SUB-SECTORS WITHIN THE PLASTICS INDUSTRY

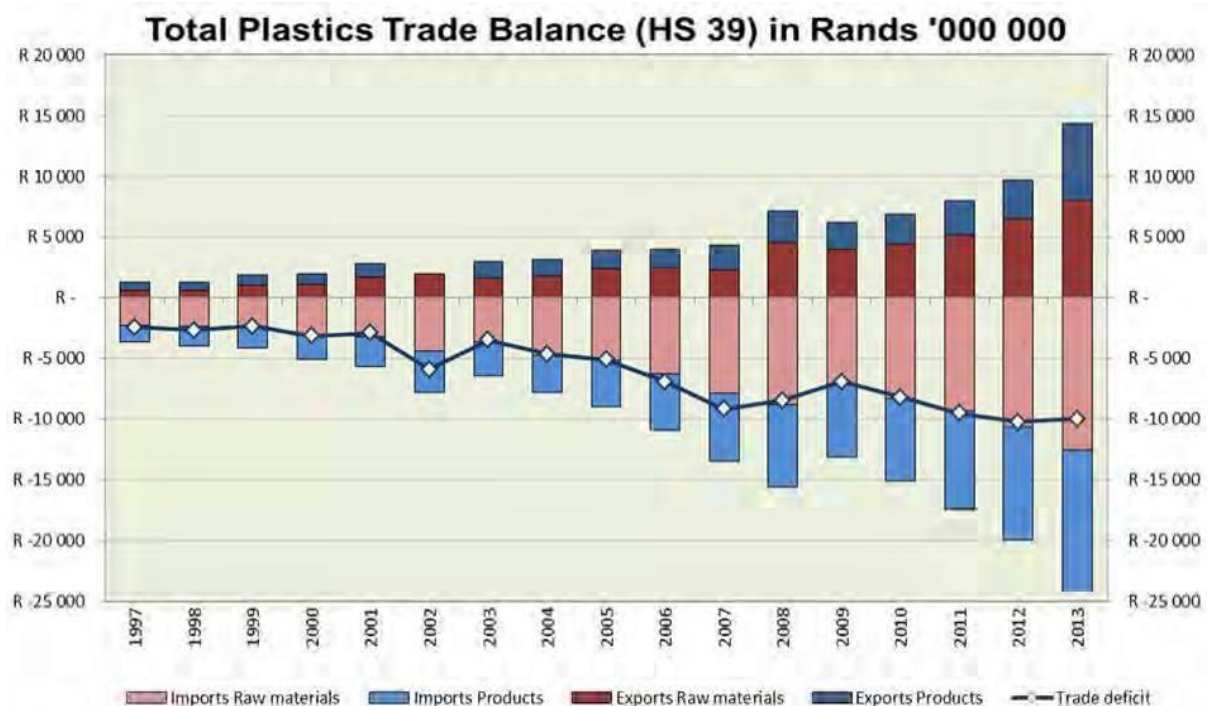
Bos-Brouwers (2010:417) referenced that the size of the plastics bundling part in South Africa is 54 percent both adaptable and inflexible bundling, while the bundling sub-division in Europe is 39 percent of the market. Notwithstanding, a few enormous corporate associations overwhelm the bundling business despite the fact that there are in excess of 200 smaller associations likewise devoted to bundling (Business Innovation and Skills (BIS) 2015). In recent years, building and development, electrical and cars and transport were formed into greater market areas.

The neighbourhood business is not really solid in bundling; it is more the nation's shortcoming in the non-bundling segment that ought to be featured (Bhat *et al.* 2014). Not many associations are not playing about the building area and even those that can be named designing providers, make them bundle items in their item runs. It is a known market with almost no hazard included.

3.8. TRADE

The total trade deficit for plastics in 2013 amounted to just over R10 billion. This is money that could have added value to the local industry. If added, it would have added 0.3 percent to the GDP. Serious programmes are needed to reduce this deficit and a successful beneficiation programme could achieve exactly that (Chahal, Dangwal & Raina 2014). The trade deficit for polymers alone was 75 482 tons which was 36 percent less than in 2012. This deficit amounted to R4 456 million which was 8.7 percent more than the previous year. This illustrates the reduced value of the Rand from 2012 to 2013. The exchange rate is a vital part of the performance of the local industry. Most of the additives (auxiliary chemicals) required are imported. The raw materials used to manufacture engineering and medical components are also imported. The industry should embrace the poor currency and export finished and beneficiated products, but the higher import costs of some critical raw materials and the volatility of the exchange rate hamper export development.

Figure 3.3: Total plastic trade balance



Source: Chukwuma, Ezenyilimba and Agbara (2018)

Figure 3.3 presents the total plastic trade balance. It shows an increase in number for use of plastic packaging products. The packaging company is growing, and the trade of plastic packaging is increasing globally and it also affect the economy.

3.9. GROWTH IN THE PLASTICS SECTOR

As shown in Figure 3.3, an overall growth in polymer production of 28.7 percent was experienced in the last ten years, despite the international economic downturn in the last decade. Growth forecasts for the plastics and rubber industry are very variable and depend largely on the performance of the sectors which use their products. As such, the market growth for plastics is a factor of the overall growth in the economy. The plastics industry appears to have grown quite consistently over the last five years, despite the impact of the global financial meltdown in 2008. The industry consumption of virgin raw material grew by 2.2 percent and the use of recycled raw material grew by 2.7 percent in 2013.

3.10. RAW MATERIALS

The study by Gliem and Gliem (2013) mentioned that raw materials used in the plastics industry include polymers in the pure format and modified polymers used as compounds, blends and alloys. Additives would also form part of the raw materials and can be used in their pure state or as a master batch. This section focuses on the polymers only. More than 30 different materials are used by the converting industry to manufacture a whole range of products, from single use packaging items to engineering components designed to last 30 or more years. Most of the commodity polymers are produced locally (Chalal *et al.* 2014) Most of the other polymers are imported as they are not locally produced. Most of the local production of plastics raw material is utilised or converted in South Africa into products. The following volume or commodity polymers are produced in South Africa where downstream beneficiation could take place:

3.10.1. Polypropylene (PP)

Polypropylene (PP) in primary, or unconverted, form is part of the primary polymer and rubber sub-sector of the chemical industry. Polypropylene is the fastest growing commodity polymer category globally and is only surpassed by polyethylene in market size. PP has a very low density and good mechanical properties (especially when filled or compounded), therefore it

is very suitable for sectors where large volume, cost and weight are issues (Chahal, Dangwal & Raina 2014).

3.10.2. Poly (vinyl chloride) or PVC

Poly (vinyl chloride) or PVC is manufactured from ethylene gas and table salt which makes it a very economic and resource-friendly raw material. It is never used in its pure format and is always compounded with other chemicals. This property results in many different PVC formulations with a broad property range. Flexible PVC imitates rubber properties and is used in medical tubing and IV sets, chemical hoses, imitation leather cloth and footwear. Rigid PVC is use predominantly in the building and construction industry due to its excellent weathering and fire-resistant properties and is found in water- and waste-water, plumbing and sewage pipes as well as gutters, window frames, skirting and cornices (Booyens 2012:45).

3.10.3. Polymer beneficiation (Downstream)

South Africa faces an enormous challenge of diversifying away from resource extraction towards value added manufacturing that will create jobs. This position seeks to ensure more value is added to domestic polymer products before export, so as to generate greater economic value and the creating of employment. Government has identified polypropylene, PVC and composite beneficiation as key pillars of South Africa's industrialisation push. The plastics sector is in many ways representative of the diversified manufacturing industry in which growth is necessary as part of broader-based economic development. The manufacture of plastic products is not ultra-labour intensive, but it is labour absorbing. It is not ultra-capital intensive but requires investment in the appropriate, relatively sophisticated, machinery and moulds if world-class products are to be made with the design and characteristics consumers expect. As such, it requires bringing together a set of production capabilities, along with ensuring the basic conditions are in place such as competitively priced inputs, access to finance and the ability to source appropriate machinery and moulds.

Research and comparisons worldwide indicate that the plastics sector is one of the engines of growth under industrialisation. Chen *et al.* (2013:9) reckoned that the following key areas of opportunity for growing the plastics sector might include: automotive, food packaging, medical products, construction pipes, flooring, building sheets, window and door frames, electrical and electronic cables, appliances and casing components, recycling and composites. The integration of plastics products with the initiatives of other sectors and cross-cutting areas are critical and could result in specific beneficiation programmes (Kaiser, Schmid & Schlummer 2018). Some of the advantages of

the South African plastics industry include sufficient and cost competitive propylene feedstock, owner-driven small and medium businesses with entrepreneurial spirits, globally competitive polymer production technology and facilities, industry location relative to the Southern African markets, well-developed downstream converter sector with widespread end-product applications and a large automotive sector. Shortages of critical infrastructure such as rail, water, ports and electricity supply have a material impact on sustaining current beneficiation initiatives and a major threat to future prospects of growth in the chemical value addition, research and development, skills sought for expediting local beneficiation, and access to international markets for beneficiated products (Karlsson., Arneborg., Broström., Almroth, Gipperth & Hassellöv 2018).

The downstream beneficiation of polymers should focus more on an enabling environment to truly leverage the benefits from any wins of the upstream (Mazzanti & Zoboli 2013). Some of the identified downstream challenges/issues that are deterring the growth of the plastics sector include customised incentive programmes for the industry needed, cost of input material, preferential procurement not assisting the plastics industry, compliance cost creates uneven playing field with international competitors, specifications used as protectionism (e.g. local plastics not specified in APDP), trade agreement not supporting local manufacturers, cost of labour, productivity unable to compete internationally, cost of electricity and reliability of electricity supply, skills shortage of engineers/technical management and innovation (Kaiser, Schmid & Schlummer 2018).

3.10.4. Critical success factors of plastics

The macro-economic environment has been challenging for the packaging industry in recent years, mainly due to pressure on both commercial and consumer spending. The combination of economic uncertainty and raw material and energy price inflation has also had a negative impact on packaging producers who rely on sophisticated printing and converting machinery to deliver the quality, efficiency and innovation that the market demands. Management needs to be skilled at determining how much to spend on maintaining and adding to the capabilities of their machine park (EYGM 2013). The need to get safe and nutritious food to millions of South Africans, most of whom live far from their rural roots, must be balanced with achieving world-class standards (especially for exporters), as well as complying with stringent environmental demands. First-world packaging is required for the convenience of the prosperous, meeting the demands of self-service retailing; yet affordable, efficient packaging is required for the safe transportation of basic foodstuffs consumed by the majority of the country's population. Alongside these apparently contradictory requirements is the need to

minimise the use of packaging materials for both economic and environmental reasons (IPSA 2012). Plastic manufacturers identified the challenges in the packaging industry to be skills shortages, high cost of administered services such as electricity and municipal services, increasing incidence of imported goods, all of which are already packaged, unreasonable customs and excise duties on South African packaging exports and high levels of product waste, which can be as high as 40 percent as a result of inadequate packaging materials and poor infrastructure (Booyens 2012:45).

3.11. SUMMARY

This chapter discussed various factors on the environmental management systems. It started with an overview of environmental management as well as the environmental standards in South Africa. The environmental policies were discussed from a plastic packaging point of view. Furthermore, the chapter briefly explained the product policies and their link with the environmental policies. It was also highlighted that most of the environmental policies were adopted from the EU policies that enforce countries to consider the environmental policies when manufacturing or doing business. The plastic industry globally was described with reference to several factors. The South African plastic industry was viewed from the manufacturing perspective. Given that this chapter focused on the sustainability in the plastic industry, the following chapter deals with the influence of the green manufacturing policies on business performance.

CHAPTER 4 GREEN SUPPLY CHAIN MANAGEMENT PRACTICES AND ORGANISATIONAL PERFORMANCE

4.1. INTRODUCTION

The current chapter provides a synopsis of green supply chain management and organisational performance. In order to understand the concept of green supply chain management, it is essential to define various concepts of supply chain management. The difference between the traditional supply chain and the current supply chain which is green supply chain management is elaborated on. The chapter also deals with supply chain frameworks by looking into those frameworks provided by previous researchers. Effective packaging waste management, looking at the current status and plastic pollution prevention, is also explained in this chapter. The chapter furthermore discusses the barriers of green supply chain management implementation and green management practices in South Africa.

4.2. SUPPLY CHAIN MANAGEMENT

Supply chain management is a cross-functional approach which includes the management of activities that procure materials and services, transforming them into intermediate goods and final goods or products and then delivering them through a distribution system from point of production to point of consumption (Du Toit & Vlok 2014:26-27). Various scholars have defined supply chain management (SCM). Nevertheless, with the vast development of the SCM concept and literature, it is not surprising that there have been many arguments and debates around the concept of supply chain management. Muysinaliyev and Aktamov (2014:2319) defined SCM as a network of facilities and distribution options that performs the functions of procurement of materials, transformation of these materials into intermediate and finished products and the distribution of these finished products to customers. Tate, Ellram and Golgeci (2013:264) stated that SCM consists of the integration activities taking place among a network of facilities that procure raw material, transform it into intermediate goods and then final products, and deliver products to customers through a distribution system. Thakkar, Kanda and Deshmukh (2011:313) further defined the supply chain as the network of organisations involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate customer. Most organisations are a part of at least one supply chain and competition is increasingly based on supply chain vs. supply chain (Soler, Bergstrom & Shanahan 2010:14).

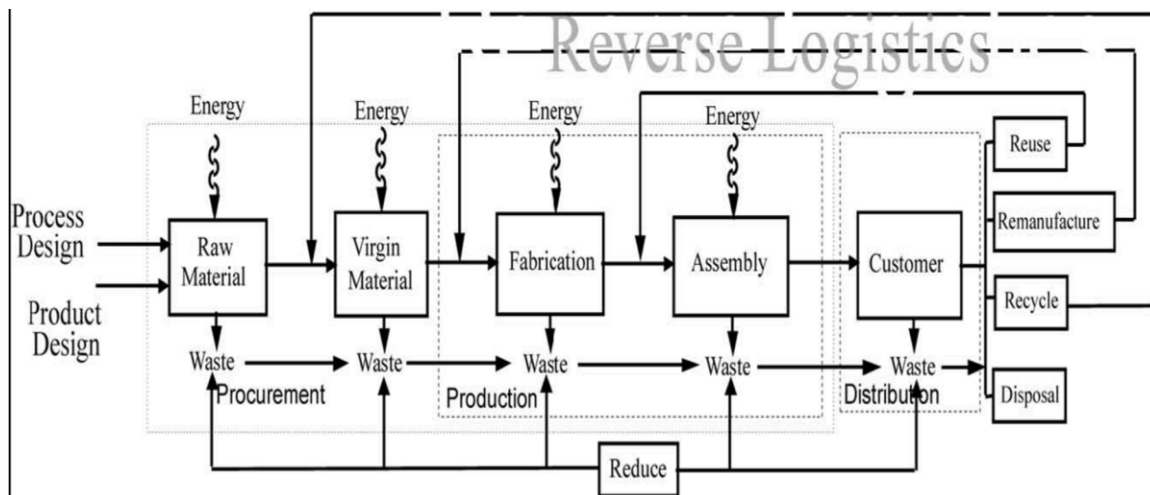
In addition, Seuring and Gold (2013:56) suggested that globalisation and recent economic trends have created highly complex supply chains and that is the reason the design, organisation, interactions, competences, capabilities and management of supply chains have become key issues among both scholars and businesses. It is not arguable that a supply chain includes all the activities, functions and facilities involved (either directly or indirectly) in the flow and transformation of goods and services from the material stage to the end-user (Walker & Jones 2012:15). In support, a traditional supply chain moves forward from raw materials to finished product (Diab, Al-Bourini & Abu-Rumman 2015) and encompasses all activities associated with the flow and transformation of goods from the raw materials stage (extraction), through to the end user, as well as the associated information flows (Tate *et al.* 2010:19). It is indicated in literature that the supply chain's performance should be measured not just by profits, but also by its impact on environmental and social systems (Pagell & Shevchenko 2014:50).

4.2.1. Conventional SCM versus green SCM

A traditional SCM is defined as an integrated manufacturing process whereby suppliers supply raw material or semi-finished goods to the manufacturer that manufactures or assembles it into the final product followed by the finished goods being sent to the wholesalers and then to retailers and finally delivered to the customers. The network consists of all parties involved such as supplier, manufacturer, distributor, wholesaler, retailer and customer directly or indirectly, in producing and delivering products or services to ultimate customers both in upstream and downstream sides through physical distribution, flow of information and finances (Nimawat & Namdev 2012:77). Ghobakhloo, Tang, Zulkifli and Ariffin (2013:86) submitted that traditional SCM has usually concentrated on economy and control of the final product, but hardly considered its ecological effects. It is necessary to measure performance by key performer indicators in the supply chain because it can be helpful to analyse the entire chain's ability to meet customer needs under permanent control of company boundaries.

In addition, the traditional supply chain comprises five parts: raw material, industry, distribution, consumer and waste. Each component in the supply chain can be a source of pollution, waste and other hazards to the environment. For example, a company may use environmentally harmful materials such as lead; however, organisations can put pressure on the suppliers to use more environmentally-friendly materials and processes. Akadiri, Chinyio and Olomolaiye (2012:127) correspondingly explained that both the product design and manufacturing processes present many opportunities to implement environmentally-friendly procedures and these procedures entail reducing waste, minimising pollution and utilising resources efficiently. In the distribution process, organisations can minimise packaging materials and stress reverse distribution (Meyer, Niemann, Mackenzie & Lombaard 2014:1-2). Figure 4.1 illustrates the green supply chain models.

Figure 4.1: The green supply chain model



Source: Mitra & Datta (2014:2085)

As illustrated in Figure 4.1, the green supply chain model shows the various points where wastes occur and opportunities exist to limit waste by reuse, recycling and remanufacturing. In a green manufacturing environment, the supply chain decisions include the possibility that a process can use certain renewable materials, the ability to utilise reusable or remanufactured materials and the reduction of wastes. Tseng and Chiu (2013:21) stated that environmentally friendly innovations may best be utilised during the manufacturing stage of the supply chain, as this part is the most internally focused and the organisation can more directly see the benefits of implementing environmentally-friendly processes.

Green supply chain management (GSCM) entails traditional supply chain management practices, which combine environmental issues, or concerns, into organisational procurement and strategic decisions with suppliers (Cao & Zhang 2011:163). A green supply chain aims at confining the wastes within the industrial system in order to conserve energy and prevent the dissipation of dangerous materials into the environment (Tseng & Chiu 2013:12). It recognises the disproportionate environmental impact of supply chain processes within an organisation. However, conventional and green chains differ in several ways (Ioppolo, Cucurachi, Salomone, Saija & Ciralo 2014:6362). First, conventional chains often concentrate on economic objectives and values, while green chains also consider ecological causes. When a conventional chain does take ecological standards into account, it is often limited in its optimisation scope. For example, conventional chains merely take human toxicological effects in consideration, leaving out the effects on the environment (Mitra & Datta 2014:2085). Furthermore, they often overly concentrate on controlling the final product, while allowing negative effects to occur during the production process. On the other hand, green, integrated, ecologically-optimised supply chains extend the scope not only to human toxicological effects, but also to ecologically

negative effects on the natural environment, as well as the entire value-adding process, resulting in low ecological impacts during production (Mohanty & Prakash 2014:1330). Ecological requirements are considered as key criteria for products and productions and at the same time the company must assure its economic sustainability by staying competitive and profitable (Mitra & Datta 2014:2085). The buyer and supplier selection criteria are fundamentally different in conventional and green chains. In conventional chains, the predominant standard is price. In green chains, ecological objective is a part of the supplier selection criteria (Wee, Lee, Jonas & Wang 2011:603). Putting these ecological criteria into practice requires careful supplier evaluation, based on long-term oriented relationships. The development of suppliers usually takes a long time and only a very limited number of suppliers meet the defined criteria, so any change of supplier selection cannot be implemented in a green chain as quickly as in a conventional chain (Dubihlela & Dhurup 2015). One of the main obstacles for successfully introducing green products in the market is their higher cost comparing to conventional ones. For the cost problems to be managed effectively, the efficiency of the entire supply chain must be evaluated. Compared to conventional chains, which have a large number of conventional materials and suppliers, green chains are relatively inferior in terms of speed and flexibility. These SCM differences are listed in Table 4.1 below.

Table 4.1: Difference between the conventional and green SCM

Characteristics	Conventional SCM	Green SCM
Objectives and values	Economic	Economic and ecological
Ecological optimisation	High ecological impacts	Integrated approach Low ecological impacts
Supplier selection criteria	Price switching suppliers quickly Short-term relationships	Ecological aspects (and price) Long-term relationships
Cost pressure and prices	High cost pressure Low prices	High cost pressure High prices
Speed and flexibility	High	Low

Source: Own compilation

As indicated in table 4.1 above, Corporations are typically responsible for the financial return of their shareholders but have not been dealing with the environmental problems. However, more and more corporations have begun to employ the green concepts to create a unique competitive edge. Eneizan, Wahab, Zainon and Obaid (2016) showed that an estimated 75 percent of the consumers claimed that their purchase power was influenced by the company's environmental reputation and that 80 percent would be willing to pay more for environmentally-friendly goods. By practising just a fraction of green concepts in supply chain management, many commercial organisations have achieved success. In the next four sections, green supply chain management opportunities in the areas of manufacturing, bio-waste, construction and packaging are discussed.

4.2.2. Green supply chain management frameworks

The development of green supply chain management frameworks is crucial, it should effectively consider all components. In most cases the Green supply chain management framework systems depends on the common green production network and the executives' procedure as it is applied in the technique models created by Eren-Erdogmus, Lak and Çiçek (2016) and Straube, Doch, Nagel, Ouyeder and Wuttke (2011:205). The beginning stage involves drivers which impact the coordination or may do as such in the event that no agreeing move makes spot, for example, re-planning the system. The constant observing of these drivers triggers the green supply chain design (GSCD) procedure which begins with the advancement of structure options. This stage begins with the exact meaning of the structure scope relying on the affecting drivers and plan destinations. The meaning of the extension likewise includes the inventory network division as per items, locales, or clients. These means help to decrease the multifaceted nature and farthest point of potential other options. The succeeding improvement of plan options is regularly bolstered by casual strategies, for example imagination procedures. Bell, Mollenkopf and Stolze (2013:351) posited that a green supply chain includes a number of organisations and their supplier with the aim to improve the environmental performance of products and manufacturing processes. For it to be effective, requires a paradigm shift from the conventional association of success around financial parameters and a move towards holistic environment concern (Battisti & Perry 2011:172). The management of the environmental performance entails addressing all levels and procedures of the supply chain as any activity may have a negative impact on the environmental chain (Banerjee 2010:143). Supply chain relationships have traditionally been dominated by cost, quality and delivery and the environment is rarely seen as critical when compared with these objectives (Battisti & Perry 2011:172).

4.2.3. Effective packaging waste management

Plastics have made a generous commitment in pretty much every field of human action at present such as agribusiness, clinical, transportation, funnelling, electrical and heat protection, bundling, assembling of family and electronic products, furniture and different things of day-to-day or explicit use (Guerrero, Maas & Hogland 2013:229). In the ongoing investigation of Punčocháňa, Rujb and Chatterjeeb (2012:10), it is featured that plastic has been fundamental in bundling of clinical items like expendable syringes, rangle pressing of tablets and cases, joint substitution prostheses, entomb venous liquid jugs, blood sacks, catheters, and heart valves which have essentially helped supporting human life comprise one of the most significant utilisations of plastics (Punčocháňa *et al.* 2012:11). Likewise, the adaptability of plastics has permitted making a proficient steal verification, sterile and financially savvy bundling of nourishment items like milk, flavours, edible oil, bread, desserts, rice, wheat flour, nibble food sources and different kinds of drugs (Gajanan 2015). The utilisation of plastic bundling has extended to toiletries, beauty care products and a host of other products. The use of of plastic, among others, is to ensure cleanliness, substance opposition, security, improving the timespan of usability.

Contribution of plastics to human health is difficult to ignore. Plastic-based packaging with the above-mentioned properties ensures reaching the best, hygienic and unadulterated product to the masses (Benjamin, Pradeep, Sarath, Kumar & Masai 2015:58). Apart from all these benefits, plastics packaging in general and plastic carry bags which are a part of the packaging system, are under the scanner. According to Down to Earth (2015:14), plastics are blamed for a series of health, safety and environmental problems. No biodegradability of plastics is attributed towards causing waste management problems and choking of the drains in urban cities (Klein, Worch & Knepper 2015:6). However, the solution to the waste management problem lies in segregation of dry and wet solid waste at the source for which an effective mass awareness campaign is very important. Creation of an efficient solid waste management infrastructure coupled with encouraging establishment of recycling centres would help address the mass solid waste problem (Kang, Kwon, Lee, Song & Shim 2015:4).

Plastics can be reused to create articles for mass use. Numerous helpful items have been created with reused plastics and an enormous number of individuals is utilised in these exercises in little, small scale and casual areas (Kang *et al.* 2015:55). A casual industry gauge put the reusing figure of India at around 1.5 million tons near 50 percent of plastics utilised for bundling applications. This is an exceptionally high reusing proportion. Reusing guarantees

that the undesirable and disposed of plastics do not stay on the side of the road, nor are they conveyed to the landfill (Pires, Martinho & Chang 2011:1033). Aside from the traditional reusing, which is becoming significant in South Africa, interchange procedures of plastic reusing are likewise required to be supported. For example, low-end, blended and coexisted plastics waste can be utilised securely for co-preparing in concrete furnaces, mechanical fuel and build black-top streets. Given that adhering to safe standards while reusing, as stipulated by the administrative specialists, is an absolute necessity, the utilisation of training, offices, motivating forces and mindfulness is important accomplish this objective.

However, some types of plastic waste like multi-layer laminates, expanded polystyrene, are not easily recyclable by conventional processes (Klumpp, De Leeuw, Regattieri & De Souza 2015 cited in Regattieri, Santarelli, Piana & Gamberi 2015:169). Sometimes when different types of plastic waste, which are otherwise easily recyclable individually, get mixed with different groups of plastics in the waste stream forming, what we call comingled plastic waste, recycling becomes difficult. Such types of plastic waste, generally, are abandoned by the waste pickers, creating waste management problems (Kramer, Preneta & Kilbride 2013:54). In South Africa, the infrastructure for handling of solid waste particularly in urban areas is woefully inadequate. Poor littering habits of the general public have aggravated the problem. Different state government authorities have indeed imposed restrictions on the use of thin plastic carry bags to contain the waste problem indirectly (Wever & Vogtlander 2017:18).

In addition, the conventional technology for plastic waste management involves recycling, landfilling and incineration. Recycling of plastics must be through environmentally sound processes. Recycling of plastics must be carried out in such a manner that it minimises the pollution level throughout the process and, as a result, increases the efficiency of the process and conserves energy (Regattieri, Santarelli, Gamberi & Mora 2014:6). Plastic recycling technologies have been divided into four general types, namely primary, secondary, tertiary and quaternary (Chen, Zhang & Sun 2011:992). Primary recycling includes processing of scrap waste into a product with features similar to the original product. Secondary recycling involves processing of waste plastics into products that have characteristics dissimilar from those of original plastic products. In tertiary recycling, basic chemicals and fuels are produced from plastic scrap as part of the municipal waste stream or as a segregated waste. Quaternary recycling reclaims the energy content of the scrap plastics by burning/incineration. This process is not in use in India. Steps involved in the recycling process are: the recyclers need to select the wastes that are suitable for recycling. The plastic waste needs to be segregated as per the codes stated in the BIS guidelines (BIS 14534:1998). Processing after selection and

segregation, the pre-consumer waste must be recycled directly. The post-consumer waste (used plastic waste) has to be washed, shredded, agglomerated, extruded and granulated.

Due to the environmental pollution that plastic materials cause, there have been, during the last couple of years, several initiatives to introduce and implement additives in plastics. The aim with this is to increase the biodegradability and moreover to produce bio-based and natural fibre composites. This, in combination with the fact that plastics are derived from non renewable feed stocks and have a high persistence during organic recycling, has fastened the development of finding plastic materials that not only can match the performance of conventional plastics, but that also have reasonable prices and are produced from renewable feed stocks. Finally, the new plastics could hopefully undergo a quicker biodegradation with the aim of not leaving toxic residues (Chen *et al.* 2011:993).

4.2.4. Green packaging management practices

The global market for green packaging is growing rapidly as consumers, retailers and both food and consumer product organisations seek to develop products for which they can make claims of being environmentally friendly or green (McKinnon 2015:345). This growth has prompted several private organisations to develop standards for green packaging and has also resulted in new or updated regulations and guidelines that impact the development of green packaging materials or claims made for them (Zhu, Geng, Fujita & Hashimoto 2010:380). The legal landscape is such that to avoid allegations of unfair or deceptive practices, organisations selling and marketing products as green must become familiar with applicable regulations and standards.

The Green Guides apply to all forms of environmental marketing, including labelling, advertising and promotional materials. Besides general environmental claims, the Green Guides address carbon offsets, certifications and seals of approval, compostable, degradable, ozone-safe and ozone-friendly, recyclable, recycled content, refillable, renewable energy, renewable materials and source reduction (McKinnon 2015:345). Additionally, the guides address nontoxic and ‘free of’ claims that can be relevant to food safety. The final guides do not address organic, sustainable, natural or bio-based claims. More details on specific guidelines impacting food packaging are provided below by McKinnon (2015:774).

General claims: General environmental benefit claims should be qualified by clear and prominent language, limited to the specific benefit and should not include any deceptive implications. Carbon offsets: The Federal Trade Commission (FTC) offers limited guidance

on these claims, noting that consumer perception of carbon offset and similar claims is still evolving. Use of appropriate accounting methods to avoid double-counting and use of qualifiers if the carbon reductions will not occur for at least two years are required. In addition, claims may not be made if the reductions are required by law.

Certifications and seals of approval: The FTC suggests that it will consider it deceptive to misrepresent that a package has been endorsed or certified by an independent third party, or to use an environmental certification or seal without clearly stating the basis for the certification (McKinnon 2015:14). A certification or seal should contain clear and prominent language to convey that it covers only specific and limited benefits and marketers must have substantiation for all claims communicated by third-party certifications (Regattieri *et al.* 2014:6). A material connection does not automatically include membership in industry trade associations offering certifications, so long as an independent certifier administers the trade association certification programme by objectively applying a voluntary consensus standard (Global Carbon Exchange (GCX) 2011:25).

Compostable: A material can be called compostable if it breaks down in a timely manner, which is defined as approximately the same time as other materials with which it is composted.

Degradable: The guides indicate that it is deceptive to make an unqualified degradability claim for items destined for landfills, incinerators or recycling facilities (Gonzalez-Torre, AdensoDiaz & Artiba 2014:100). Unqualified degradable claims should be based on reliable scientific evidence that the item will completely break down within one year of entering the solid-waste stream (Gonzalez-Torre *et al.* 2014:100).

Free-of claims: This type of claim may be deceptive if a new or substituted material poses the same or similar environmental risks as the original material, or if the substance has never been associated with the product. However, free-of claims may be acceptable if the item contains trace amounts of the material referenced if: (1) the level of the specified substance is no more than an acknowledged trace contaminant or background level; (2) the substance's presence does not cause material harm that consumers typically associate with that substance; and (3) the substance has not been intentionally added (Verghese., Lewis, Lockrey & Williams 2015:603).

Nontoxic claims: An unqualified nontoxic claim conveys that the product is nontoxic to both humans and the environment. The environment includes pets and domestic animals. The guides advise marketers to qualify nontoxic claims to the extent necessary to avoid deception. While

there is no allowance for trace toxicity of a substance, the FTC points out that a product could contain a toxic substance at a level that is not harmful to humans or the environment and therefore justify a claim of nontoxic. The commission gives the example, in the Green Guides: Statement of basis and purpose, that while apple seeds contain cyanide, which is toxic, the amount in an apple is so low that it is not harmful to humans; therefore, the apple may be labelled nontoxic (GCX 2011:25).

Recyclable: To make an unqualified claim that an article is recyclable, a product or package should be recyclable to a substantial majority of consumers or communities, which the FTC defines to mean at least 60 percent. Marketers may make qualifying claims for less than a substantial majority of consumers or communities by either stating the percentage of consumers or communities that have access to recycling facilities or using other qualifications. However, it is necessary to recycle and check to see disclosures without additional information are not adequate to qualify a recycling claim where facilities are not available to a substantial majority of consumers.

Recycled content: Both pre- and post-consumer recovered materials qualify as recycled content, but the materials must be diverted from the waste stream. A recycled content claim must be qualified if less than 100 percent of a package is made with recyclable content. For example, a package made from laminated layers of foil, plastic and paper may be labelled “one of the three layers of this package is made of recycled plastic” if the plastic layer is made entirely of recycled plastic. The FTC does not consider the claim deceptive, provided the recycled plastic layer constitutes a significant component of the entire package (McKinnon 2015:14).

Renewable materials: Made-with-renewable-materials claims should be qualified if less than 100 percent of the package is made with renewable content, excluding minor, incidental components. One way for marketers to minimise the risk of unintended, implied claims is to identify the material used and explain why it is renewable. The Green Guides provide the following example of an acceptable renewable materials claim: The packaging is made from 50 percent plant-based renewable materials. They turn fast-growing plants into bio-plastics, only half of our product is made from petroleum-based materials (Legal Information Institute (LII) 2018.).

Sustainable claims: In the Green Guides: Statement of Basis and Purpose, the FTC explains that it is not providing guidance on the use of the term sustainable due to the wide range of

meanings for the term. Nevertheless, the commission cautioned that marketers who use these claims should test them in the context of their advertisements to ensure they can be substantiated. Given the potential for confusion, this area is ripe for further consumer perception research and one that the commission will continue to monitor, the FTC stated (Hart 1995).

Bio-based claims: Concerning bio-based claims, the FTC cites the United States (US) Department of Agriculture's Bio Preferred voluntary labelling program and explains that it does not want to make marketers subject to potentially contradictory advice from two federal agencies (CIBD) 2011:142).

Taking a different approach from the US, the European Union (EU) does not have legislation specifically dealing with and harmonising environmental marketing claims. Instead, the EU has taken a command-and-control approach, in which it sets out the requirements for organisations to follow to reduce the use of packaging materials. In particular, the EU Packaging and Packaging Waste Directive (94/62/EC) contains essential requirements to prevent production of packaging waste and to increase recycling of packaging materials. While the goal is to minimise packaging waste, this needs to be done in a way that maintains: (1) the functionality of the package throughout the supply and user chain; (2) the safety and hygiene of the product (i.e. for food, keeps it safe); and (3) the acceptability of the packaged product to the user (CIBD 2011:142).

4.2.4.1. Green packaging management practices locally

Although a developing country, South Africa is the 12th biggest greenhouse gas emitter globally and the largest on the continent (Greenpeace Africa 2011:14) and it is acknowledged by government that should climate change fail to be mitigated it could potentially undo advances in South Africa's development goals and Millennium Development Goals (GCX 2011:24). One of the key strategies is prioritising mitigation in the energy, transport and industrial sectors, the largest contributors of emissions, specifically by stimulating new or more efficient industrial activities (GCX 2011:24). Other strategies relate to including climate change response into all planning; incentives and disincentives (e.g. carbon tax), regulation and measures to behaviourally encourage transition to a low carbon society and economy (GCX 2011:25). Trade measures from developed countries could apply to the trade of high carbon goods and thus sectors will be given time and support to change to lower carbon production (GCX 2011:25).

In South Africa, the JSE listed organisations are required to produce an integrated report for all-inclusive details of a company by including social, environmental and economic performance in conjunction with financial performance (Chartered Accountants Worldwide (CAW) 2008:19). There are, however, no set standards on integrated reporting, which has led to the formation of the Integrated Reporting Committee (IRC) with the aim to provide guidelines on good practice in integrated reporting (CAW 2008:19). The IRC will collaborate with the International Integrated Reporting Committee, which is an international collaboration of organisations including the International Federation of Accountants, the Global Reporting Initiative and the Prince's accounting for Sustainability Project (CAW 2008:19).

The JSE's Socially Responsible Investment Index for sustainability performance is a driver for increased attention to sustainable investment into the South African market (Hanningtone, Struwig & Smith 2013). The index recognises listed organisations that incorporate sustainability principles into business practices and serves as a tool for investors to assess this, thereby promoting sustainable business practices in South Africa (Hanningtone *et al.* 2013).

Further adoption of green principles is evident on a national level in the New Growth Path government policy (Hamann, Smith, Tashman & Scott Marshall 2017). Along with key drivers in the policy, specific focus is placed on sectors to generate an inclusive green economy (Hamann *et al.* 2017).

A green economy in the policy is targeted at a potential 300 000 in direct jobs by 2020 to over 400 000 by 2030 (South African Government 2011:65). The policy's main changes are energy efficiency support and renewable energy use with strategies to encourage domestic production of inputs (e.g. solar water heaters initially) (South African Government 2011:65). Core actions are geared towards renewable energy generation, development of green industrial measures, reductions in building energy and waste, social support in greening the economy, targeted skills development, driving environmental programmes (includes recycling and community cleaning) and policy to support green technologies for households and enterprises (South African Government 2011:65).

In May 2010, a Green Economy Summit was held by the South African government to formulate a Green Economy Plan that was aimed at building on its National Strategic Plan, National Framework for Sustainable Development and other national strategies (Hart 1995). The country's 2010 budget emphasised that green economy initiatives create opportunities for enterprise development, job creation and commercial and residential environments (Hart

1995). In 2011, the National Climate Change Response Green Paper was released with various business-related objectives. It stated that there will be 34 percent reductions in greenhouse gases by 2020 and 42 percent by 2025; the use of incentives and disincentives (e.g. a carbon tax). Also for a transition to a low carbon economy and society; time-based action plans for commerce and manufacturing industries will be measured, reported and verified, mandatory greenhouse gas emissions annual submissions, by significant perpetrators, to the National Atmospheric Emission Inventory by 2012; energy efficiency and electricity demand management schemes and initiatives (GCX 2011:27).

As shown in the evidence above, green business in South Africa is becoming more accepted and coordinated. In 2010, of the 100 top organisations on the JSE, 94 percent of 74 organisations were considered green for the voluntary submission of carbon emissions reports to the Carbon Disclosure Project (CDP) (Green Business Guide 2010:56). Questionnaires were sent to 450 025 corporations in 2010 that requested information on emissions, potential climate related risks and opportunities and management strategies (Green Business Guide 2010:56).

CDP is a global project supported by 534 institutional investors with trillions of US dollars in assets management (Green Business Guide 2010:56). A similar initiative run by the Green Building Council of South Africa has a Green Star SA certification as a best practice requirement and guideline scheme for public and private sector buildings (Construction Industry Development Board (CIBD) 2011:142). Clients are encouraged or required (if mandatory) to renovate, design, or construct according to the rating tools for certification of a green building (Ismael, Rose, Abdullah & Uli 2010).

At present, rating tools exist for an office, retail centre and multi-unit residential development (pilot stage) (Green Building Council of South Africa 2011:17). The objectives of the rating tools are to establish a standard for green building, promote whole-building design, increase green building benefit awareness, recognise environmental leadership and reduce developmental environmental impacts within a number of categories (Kao & Du 2019). The nine categories are management, indoor environment quality, energy, transport, water, materials, land use and ecology, and emissions and innovation (Wang 2016).

Many business sectors within South Africa are becoming green. The automotive component sector at a recent conference focused its aim of the global green economy on automotive component manufacturing (Media Club South Africa (MCSA) 2011:354). Manufacturers were encouraged to diversify as components manufactured for vehicles can also be used in the

renewable energy sector, and they were thus informed they needed to prepare themselves for change (Kim, Malek & Roberts 2019).

4.3. GREEN PACKAGING MANAGEMENT

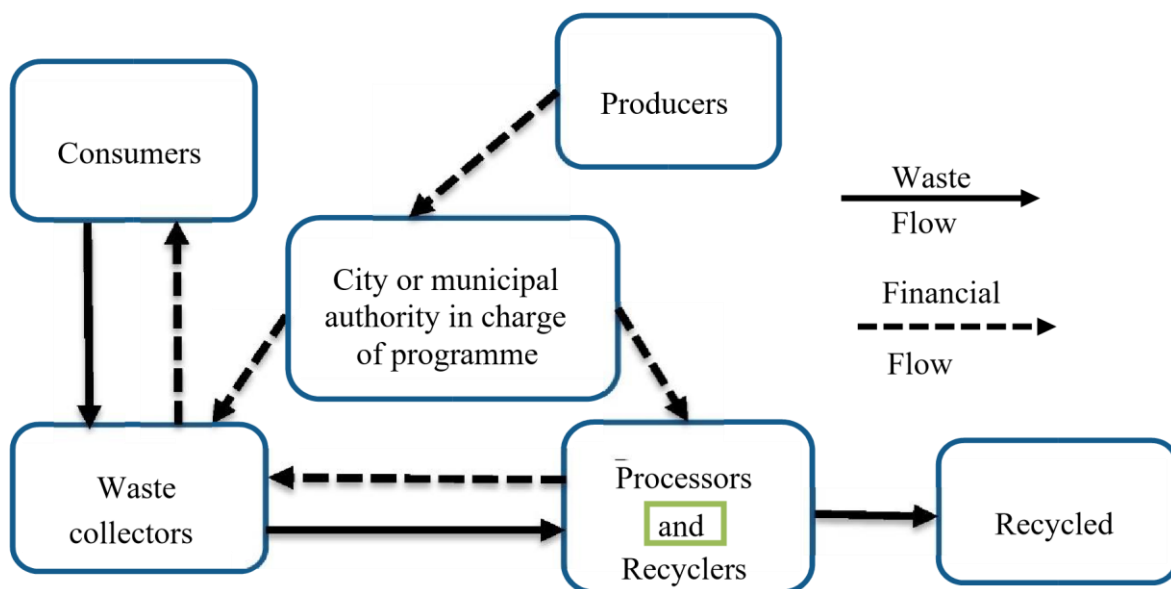
Examining current packaging can reveal possible changes and the potential of gathering leftover packaging or using less packaging (Gonzalez-Torre *et al.* 2014:100). Green packaging addresses all packaging issues including size, shape and materials. Because reverse logistics entail a process of continuously taking back products or packaging materials to avoid environmental damages, it entails not just the use of recycled or recyclable materials but also the impacts of packaging on distribution arrangements such as loading and handling efficiency and space utilisation. The packaging used must be less costly, easy to handle and environmentally friendly (Nikitaeva 2012). Finally, green packaging is the environmentally conscious packaging of a product to minimise the associated negative environmental impacts. Packaging contributes directly to product success in supply chains because it can enable the efficient distribution of products as well as lower environmental impacts due to spoilage or waste. Increased attention on global climate change has made green packaging a primary focus area to reduce waste and improve air quality because different packaging characteristics (e.g. size, shape, materials) have different impacts. Gonzalez-Torre *et al.* (2014:100) indicated that green packaging includes considerations of cost (materials and shipping), performance (adequate protection of the product), convenience (easy to use), compliance (with legal requirements) and environmental impact (Wu & Dunn 2016:29).

4.3.1. Barriers to green packaging management implementation

There are a number of challenges facing South Africa regarding waste management. These challenges include lack of adequate resources and inappropriate infrastructure for waste disposal (Dashore & Sohani 2013:2021). There are also challenges with disposal of hazardous and harmful waste resulting in pollution, especially in cases where illegal dumping of waste takes place. For a long time, the focus in South Africa was on waste disposal and impact control. This resulted in the lack of waste avoidance, reducing and cleaner production technology initiatives and regulatory initiatives to manage waste minimisation. Industry also has challenges in implementing waste minimisation initiatives. The following was said to be a problem affecting the implementation of waste prevention, minimisation and recycling in industry: Insufficient commitment to waste minimisation by management (Nikitaeva 2012) The amount of information targeted at management level should be increased and information on the techniques and benefits associated with waste reducing, recycling and cleaner

production should be made available; the prevalent perception that waste minimisation and recycling are cost factors rather than an opportunity for savings, should be rectified; the lack of knowledge about the availability of waste minimisation and recycling technology and existing case studies must be addressed; better training and appropriate courses in waste minimisation and recycling should be instituted as well as better training and appropriate courses in waste minimisation and recycling.

Figure 4.2: State or government run recovery system model 2011



Source: Dashore and Sohani (2013:2022)

As indicated in Figure 4.2 above, most of the plastic waste in South Africa is disposed of at landfills. However, in some instances there is lack of land for additional landfills (DEAT 2004). Industrial and domestic general wastes are both disposed of at general waste landfill sites. As the amount of waste generated increases, there is an increase in the number of landfill sites that are required. This has put pressure on municipalities to supply waste disposal facilities. The lack of adequate waste disposal facilities has led to dumping of waste on inappropriate areas resulting in land and ground as well as water pollution (Bhada-Tata 2012:119).

It was also reported in South African Government (2011:15) that plastic waste is frequently burnt in the streets by impatient communities awaiting service delivery. This can result in the release of harmful substances such as dioxins and furans as unintentional persistent organic pollutants. Many illegal waste disposal sites have developed for reasons including delayed collection services, long transport distances to formal disposal sites, the refusal by the public

or industry to pay landfill fees, an indifference to the environmental consequence of poor waste handling and disposal and the lack of waste education and awareness. DEAT (2004:41) also stated that illegal dumping and littering is a challenge in South Africa. Medical waste is sometimes disposed of at informal dumping sites. This creates the risk for informal salvagers, as well as the general public (especially young children), to contract diseases. Hoornweg and Bhada-Tata (2012:119) pointed out that unacceptable waste management practices are said to be common in developing countries.

Municipalities face the challenge of a lack of resources that will enable them to obtain the right technological solutions needed to solve some of the problems they are faced with. Municipalities still rely on revenue that is generated from waste disposal and this can be small, especially where there are large numbers of poor households. Lack of resources in the waste management context refers to staff know-how, and infrastructure and finances dedicated to developing and executing waste management services (Hoornweg & Bhada-Tata 2012:119). Financing and charges for waste management have been found to be challenges in South Africa (DEAT 2004:17). The 2000 White Paper on Integrated Pollution and Waste Management states that insufficient funds and human resources are allocated to waste management because it is not prioritised. According to Hoornweg and Bhada-Tata (2012:119), this is common in developing countries as waste management is given lower priority than water, food, shelter, roads, electricity and sanitation.

Besides the above-mentioned challenges that cause barriers to the implementation of green packaging management (GPM), it faces countless challenges that may hinder the progress. These barriers vary from those that are internal to the organisation to those that are external to the organisation. The barriers are explained below.

- Internal barriers

Internal barriers are endogenous in nature as they originate from within the organisation itself. Internal barriers can be in the form of environmental resources, attitude and perception barriers, risk adverse attitude, business practices and some technical barriers. Internal barriers can either delay the implementation and adoption of green packaging management or slow down the progress thereof (Badia., Orgaz, Verdugo & Ullan 2011:2055).

- Environmental resource barriers

Environmental resource barriers can be in the form of lack of resources or an internal environment that fails to accommodate, adopt or adapt green management implementation.

A study by Bey, Hauschild and McAloone (2013:43) on Malaysian manufacturers discovered that environmental resource barriers pose a negative effect on the adoption of green products, green processes, as well as green system innovation initiatives.

- Risk-averse attitude

Risk averse is the fear of risk or disinclination to take risks, unless otherwise if only associated with proportionally huge returns. Green packaging management is a new concept from the conventional packaging processes and there is not much information surrounding the concept (Devi, Goyal & Ravindra 2013:61). This makes it difficult for one to predict, with certainty or known probability, the rate of return on green management processes, which cultivates a risk adverse attitude among individuals. A risk adverse attitude will lead to hesitation towards implementation of green packaging processes.

- Attitudinal and perception barriers

Previous and past experiences may incline people towards imagining hypothetical boundaries and limitations that may lead to reluctance to attempt new challenges. Progress will only be witnessed by those who wean their mindsets from these imaginary boundaries. Those reluctant to change their minds will not attempt anything new (Hauschild & McAloone 2013:43).

It is only changes in organisational culture that can rebuild the attitude and perception of employees in organisations (Cameron & Green 2015:105). Small and medium industries may resist adopting innovation, which can lead directly to failure to adopt innovation initiatives such as green packaging management. Propensity to adopt green packaging management can only be witnessed should organisations improve the sufficiency of information, improve corporate culture and gain support from top management teams.

- Technical barriers

Technical information and knowledge are key in designing of new technologies, materials and industrial processes related to green packaging implementation (Molina-Besch & Pålsson 2016:50). Lack of technical expertise and know-how can pose a major drawback in the implementation of green packaging management. Considering the huge start-up costs in harnessing technology, the implementation of green packaging management is in most instances likely to be delayed. However, this is despite the first-mover advantages such as decrease in costs and increase in market share, derived from harnessing technology.

- External barriers

External barriers are those that are exogenous to the organisation as they originate from sources external to the organisation. External barriers include poor external partnerships, lack of government support, small markets and environmental commercial benefit.

- Poor external partnerships

Building external partnerships is very instrumental in spearheading green packaging implementation and initiatives. External relationships or alliances help in pooling funds together whilst sharing risk. This will encourage organisations to embark on green packaging initiatives and implementation.

- Lack of government support

The South African economy is debt-distressed, which makes it challenging for it to provide funding, grants, subsidies and support to green packaging initiatives. Therefore, organisations face the costs of implementing green packaging from their own funds and profits.

4.4. Organisational Performance

Organisational performance can be measured through its efficiency and ability to respond to its stakeholder's requirements. Therefore, to measure performance it is necessary to identify the organisation's stakeholders and its demands (Santos & Brito 2009:2). Mitchell, Agle and Wood (2014:854) highlighted that organisations that highly perform are the ones attending to the demands of investors, customers, employees, government and the society. According to Miller (2012:115), financial performance also represents organisational performance and it is represented by profitability, growth and market value. However, market value and profitability measure an organisation's future and past ability to generate returns, while growth is the increase in a firm's size.

An organisation has a competitive advantage when it can create more economic value than the marginal competitors of the same product market and they define economic value as the difference between the customers' willingness to pay and the economic cost of the company (Obura 2015:30; Organisation for Economic Co-operation and Development (OECD) 2013:8). If the company has a higher economic profit than its competitors do, it will experience higher profitability. On the other hand, if the customer surplus is higher when compared with the market, customers will prefer the firm that will manifest in higher growth rates. In this sense, growth is a complementary dimension to profitability (Elliott, Sieper & Ekpott 2011:27). Firm performance measurement is derived from a broad variety of disciplines, including accounting, economics, human resource management, marketing, operations management, psychology,

strategic management and sociology (Galbreath & Galvin 2010:110). Organisational performance measures are defined as metrics employed to quantify the efficiency or effectiveness of actions (Drasovic, Temperley & Pavicic 2009) and have always remained a problematic issue in business research (Fahy, Cotter, Sud & Subramaniam 2011:640).

4.5. SUMMARY

This chapter discussed various factors on the green supply chain management and organisational performance. It started by giving an overview of the supply chain management as well as the environmental standards in South Africa. The green packaging frameworks were also discussed. Furthermore, the chapter gave a brief explanation of the green packaging management barriers and practices both globally and in South Africa. The plastic industry globally, including various factors, was also discussed. The South African plastic industry was viewed from a manufacturing perspective. The following chapter discusses the methodologies and the design of the study, including more practical information about the previously raised challenges.

CHAPTER 5 RESEARCH DESIGN AND METHODOLOGY

5. INTRODUCTION

This chapter examines the different research methodologies usually applied in business logical examinations. Also, it portrays the pre-owned structure, looks into the approach and the philosophy selected to address this investigation. The strategies chosen were for information assortment as the exploration configuration will be portrayed. Research structure and system are the guide for arranging and executing an exploration study that a specialist follows in leading an investigation (Creswell & Clark 2017:89-92). The examination structure and approach chosen both concentrated on finding responsible responses to the exploration questions. The exploration configuration is the arranging of the examination and shows the sort of study attempted, while the examination strategies demonstrate the means taken, instruments utilised and methods executed to finish the examination procedure (Mouton 2001:53). In this way, every one of the strata on the exploration onion are examined, starting with the furthest stratum, that is, look into methods of reasoning. This part gives a clarification of the examination theory just as the epistemological and paradigmatic points of view educating the investigation.

5.1. THEORETICAL METHODOLOGY

This section focuses on the approach that was used to determine the methodology. The research philosophy, approach and design of the study are discussed and presented.

5.2. RESEARCH PHILOSOPHY

The research philosophy selected has many key assumptions about one's view on the world (Saunders, Lewis & Thornhill 2009:108). These assumptions are present throughout the research and determine the research strategy and the type of methods used (Ibid). In this section, the researcher discusses the different ontological and epistemological philosophies and argues for the philosophical choices used in this research. Each choice has important differences that can affect the thoughts about the research process and the researcher therefore compares and argue for the choices (Saunders *et al.* 2009:109). There are three views that form scientific knowledge and its acceptability: positivism, realism and interpretivism.

Punch (2013) explained that positivism and realism paradigms share two features: that natural and social sciences can apply the same data collection approaches and explanations and that there is an external reality. However, realism is a view that reality is independent of human perceptions and what the senses show us as reality is the truth and that objects are independent from the mind (Oppong 2013:565). Bryman and Bell (2011:16-17) pointed out that interpretivism argues that the social sciences are fundamentally different from the natural sciences and the subjective meaning of social actions need to be understood.

In other words, researchers need to understand the differences humans have as social roles. Rahman (2017:798) continued by explaining that social sciences need to study human behaviour and the meaning for them, as well as interpreting their actions from their social world and point of view. Saunders et al. (2009:116) stated that in an interpretivism paradigm that it is crucial that researchers adopt an empathetic stance and understand the world from the point of view of the research respondents. An interpretivism paradigm is often viewed as highly appropriate for qualitative studies which are subjective, naturalistic in nature (Saunders et al. 2009:116).

A positivism paradigm is the view that the methods of natural sciences can be applied to the study of social reality and that the surrounding world is objective whereas the elements vary between authors (Bryman & Bell 2011:15). If a theory cannot pass the test of observation, then it is not considered truly scientific; it must be able to be liable to observation (Ibid). The purpose of a positivism paradigm is to generate hypotheses that can be tested and to explain theories. Assertions need to be confirmable or unconfirmable to an objective reality in a positivism paradigm (Rozeboom 1960:360). That is to say that the role of research is to test theories to be able to aid in the development of new laws (Bryman & Bell 2011:15). Realism is another view that is similar to positivism. This study used a positivism paradigm since the study was quantitative in nature. Using the positivism paradigm, the researcher was able to develop hypotheses based on the research variables and confirm or fail to confirm the research hypotheses. The objectivity that comes with the positivism paradigm enabled the researcher to gather objective quantitative data for the study from the respondents regarding the research variables and how they influence each other.

5.2.1. Research ontology

Saunders *et al.* (2009:110) stated that ontology is the idea of the real world. The focal inquiry with respect to ontology is, as portrayed by Bryman and Bell (2011:20), regardless of whether social substances are outer to social entertainers or on the off chance that they are developed

from the view of social on-screen characters. While considering the idea of social elements there are two places that are treated as the focal perspectives: objectivism and constructionism (otherwise called subjectivism).

Objectivism is where social wonders are autonomous from social entertainers and no individual on-screen character can impact it, as indicated by Bryman and Bell (2011:21). From a hierarchical and social perspective, objectivism expresses that these social substances seem to be outside to the social entertainer and are nearly seen as an unmistakable reality (in the same place). This view, as indicated by Saunders *et al.* (2009:110), states that associations are basic with respect to the board and that administration is comparative in all associations.

Constructionism then again, suggests that social wonders are continually being changed and that social entertainers can impact the implications of the marvels (Bryman & Bell 2011:22). It contends that social substances don't have as high an imperative and that both authoritative and social perspectives are in a persistent condition of development and reproduction (in the same place). This examination was concerned with the green strategic practices inside associations and specifically their supervisors' perspectives and contemplations of the hindrances and motivating forces. Consequently, the researcher considered the natural and their perspectives on a specific ecological wonder. In this way, the researcher needed to investigate the abstract implications that are inspiring these activities of the social on-screen characters with the goal of having the option to understand their activities (Punch 2013:665).

An objectivist view would entail that this study would look at the organisations as a whole and that the managers would not be able to influence the decisions. However, this study looked at the meanings of the social phenomena from the view of the managers and therefore took the standpoint of social entities as constantly evolving. Since the emphasis of this research was on understanding green logistics from the perceptions of the managers, constructionism was a more appropriate ontological position.

Epistemological considerations are concerned with what is viewed as acceptable knowledge in a discipline as well as whether or not social studies can use the same principles as natural sciences (Bryman & Bell 2011:15). Furthermore, this is in alignment with Madill, Warhurst and McCabe (2017:1342) who stated that epistemology is the study of objective truth through empirical findings.

5.3. RESEARCH APPROACH

The approach used in this study is a deductive approach. A deductive approach is concerned with developing a hypothesis (or hypotheses) based on existing theory and then designing a research strategy to test the hypothesis (Etikan, Musa & Alkassim 2016:4). This study used a deductive approach as it adopted questions from previous studies, and since it also makes recommendations from the previous studies, a deductive approach was applicable. It has been stated that deductive means reasoning from the particular to the general. If a causal relationship or link seems to be implied by a particular theory or case example, it might be true in many cases (Hoy & Adams 2015:115). A deductive design tests to see if this relationship or link applies in more general circumstances and it can be explained by the means of hypotheses which can be derived from the propositions of the theory. In other words, a deductive approach is concerned with deducting conclusions from premises or propositions. Deduction begins with an expected pattern that is tested against observations, whereas induction begins with observations and seeks to find a pattern within them.

There are two basic perspectives on the connection between a hypothesis and research: deductive and inductive. Deductive thinking is method of reasoning where, in the event that the speculation can be demonstrated valid, at that point the end is that it is valid with respect to a specific marvel (Bryman & Bell 2011:13). In a deductive methodology, the social event of information is driven from the hypotheses and the speculation reasoned from it. Deductive thinking, in this manner, takes a gander at a particular hypothesis and tests it and afterward amends the hypothesis initially utilised and is along these lines regularly connected with the characteristic sciences (Saunders *et al.* 2009:124-125).

According to Johnson (1996:765), inductive thinking indicates being increasingly intricate and presents proof to show that the end is the most likely. An inductive methodology accepts that the hypothesis is a result of research, as indicated by Bryman and Bell (2011:13). This sort of thinking endeavours to discover examples to build up a theory and further form general speculations. Along these lines, inductive thinking is commonly connected with subjective research though quantitative research for the most part follows a deductive methodology. Criticisers of the reasoning would contend that it tends to have an inflexible philosophy that does not permit elective clarifications of the circumstance (Saunders *et al.* 2009:126). Moreover, Saunders *et al.* (2009:126) contended that there are three reasons why your exploration approach is significant. To begin with, it empowers you to settle on a superior educated choice for the examination plan. Second, it lets the scientist consider the examination methodologies and decisions that will work or not for the exploration. In conclusion, they

contended that it empowers scientists to adjust their examination plan in a manner that permits disposal of requirements.

5.4. ADVANTAGES OF DEDUCTIVE APPROACH

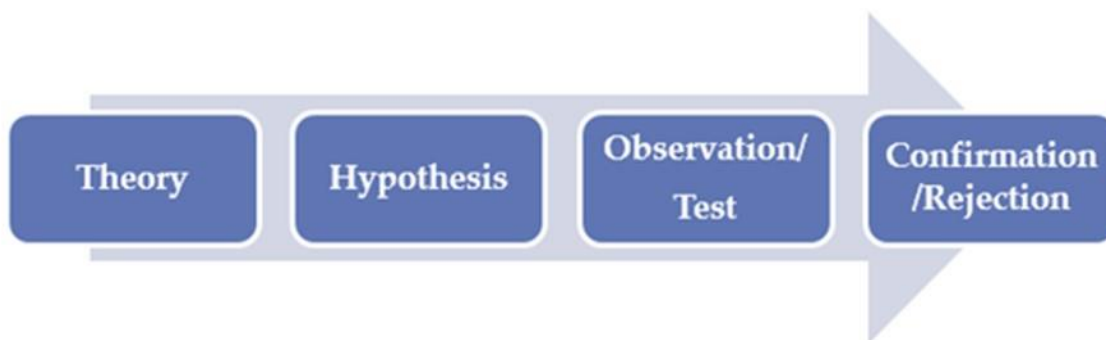
This study employed the deductive research approach as it has the following advantages:

- Possibility to explain causal relationships between concepts and variables
- Possibility to measure concepts quantitatively
- Possibility to generalise research findings to a certain extent.

5.4.1. Application of deductive approach (deductive reasoning) in business research

In studies with a deductive approach, the researcher formulates a set of hypotheses at the start of the research. Then, relevant research methods are chosen and applied to test the hypotheses in order to prove them right or wrong.

Figure 5.2: Application of deductive approach



Source: Bryman and Bell (2011:13)

The above figure 5.2 explains the deductive approach

Generally, studies using a deductive approach comprise the following stages:

- a. Deducing hypothesis from theory.
- b. Formulating hypothesis in operational terms and proposing relationships between two specific variables.
- c. Testing hypotheses with the application of a relevant method(s). These are quantitative methods such as regression and correlation analysis, mean, mode and median and others.

- d. Examining the outcome of the test and thus confirming or rejecting the theory. When analysing the outcome of tests, it is important to compare research findings with the literature review findings.
- e. Modifying theory in instances when hypothesis is not confirmed.

5.4.2. Research designs

A quantitative research generates quantifiable data and is primarily concerned with observable and measurable phenomena involving people, events or things, and establishing the strength of the relationship between variables, usually by statistical tests (Couchman & Dawson 1995: 40). It focuses on investigating phenomena that require precise measurement and quantification often involving a rigorous and controlled design (Polit & Beck 2004:729). Any quantitative research design should be fairly structured to enhance objectivity; and primarily rests upon numbers aggregated into statistics, to enable the researcher to interpret obtained data and draw conclusions (Cormack 1996:113). To achieve the research objectives and address the research problem, the current study followed both a descriptive and explanatory research design. The descriptive research design was used to describe the sample and firm profile, while the explanatory research design was used to explain the directional quantitative linear relationships between internal environmental management systems, green packaging management, green information systems and organisational performance.

Descriptive research is an innovative tool for researchers as it presents an opportunity to fuse quantitative data as a means to reconstruct a topic (Rahman 2017). This design has specific advantages and disadvantages. For instance, a skilled researcher can implement a descriptive research design to account for positive and negative variables while taking into account how those results may affect the research project's objective. According to Rahman (2017:552), some aspects of descriptive research which can be examined for advantages and disadvantages include data collection, life experiences, confidentiality, objectivity and error. Confidentiality is the primary weakness of descriptive research. Often subjects are not truthful as they feel the need to tell the researcher what they think the researcher might want to hear (Evergreen 2013). This can be particularly difficult during the filling in of questionnaires. Participants may also refuse to provide answers to questions they view to be too personal (Few 2012).

Below are some of the common forms of research design:

5.4.2.1. Causal-comparative design

This investigation utilised a causal-relative research structure. An easy-going near research configuration can be characterised as an examination that licenses scientists to contemplate normally happening circumstances and a logical results relationship through correlation of information from member bunches who show the factors of intrigue (McCusker & Gunaydin 2015:537). This plan was selected in light of the fact that causal-relative research can be contemplated, all things considered, since it endeavours to decide reasons or foundations for the current condition between or among gatherings of people (Mustafa 2010:64).

The belief that there “is order in the universe, that there are reasons why everything happens and that scientists, using the procedures of science, can discover what those reasons are” explains that researchers usually go on to examine the reasons why the observed pattern exists and what they suggest (Ahuja 2010:23). For this reason, the basic element of causal comparative approach involves starting with an effect and seeking for possible causes or vice versa. The basic approach, which involves starting with effects and investigating causes, is sometimes referred to as retrospective causal-comparative research (Mustafa 2010:64). Retrospective causal-comparative studies are much more common in educational research. Meanwhile, the variation which starts with causes and investigates effects is called a prospective causal-comparative research.

According to Daniel and Sam (2011:90), the cause and effect relationships may influence how a problem is formulated and a research design developed. Additionally, it can be said that the major purpose of causal-comparative research is to investigate potential cause-and-effect relationships that occur naturally without manipulation of variables (Kumar 2014:9). In this particular research design, researchers try to find the reasons why certain forms of behaviour occur.

5.4.2.1.1. The characteristics of causal-comparative research

As indicated by Babbie (2013:67), there are three primary qualities for causal-relative. Right off the bat, to deduce the presence of a circumstances and logical results relationship, the causal-similar research must show a relationship between the autonomous and ward variable. In this manner, it includes at least two gatherings and one free factor. What's more, it decides the reason or results of contrasts that as of now exists between or among gatherings of people. The gatherings are appointed to the medicines and the examination is completed. The people

are not arbitrarily relegated to treatment bunches since they were at that point chosen in bunches before the examination started.

Currently, it can be said that cause and impacts rely upon one another, whereby the reason may go before the impact or the other way around. Note that the autonomous factors in causal-near can't be controlled, ought not to be controlled, or just not controlled yet but could be controlled in light of the fact that the free factor has just happened. Hence, it is beyond the realm of imagination to expect to control the free factor.

Causal-relative research requires the examination to be non-deceptive. Right now, fake alludes to a causal connection between two factors. A false relationship is a fortuitous factual connection between two factors, demonstrated to be brought about by some third factor (Babbie 2013:67). Be that as it may, in causal-relative research, just two factors are required and not brought about by the activity of some third factor, and in this way, it is demonstrated that causal-near research is non-misleading.

There are two kinds of causes that add to this exploration plan, specifically vital and adequate causes. By and large, the term cause is expected to mean something that delivers an impact, result, or outcome. An important reason speaks to a condition that must be available for the impact to follow. Be that as it may, by just going to driving classes is definitely not an adequate reason for getting a permit. This is on the grounds that it is required to breeze through the driving assessment to get the driving permit.

On the other hand, an adequate reason speaks to a condition that, in the event that it is available, ensures the impact being referred to (Babbie 2013:67). It is not necessarily the case that an adequate reason is the main conceivable reason for a specific impact. Take the instance of the driving test referenced before; not going to the test would be an adequate reason for spoiling it; however, understudies could also spoil it in different manners. Along these lines, a reason can be adequate, however a bit much.

5.4.2.2. Design and procedure

The choice of the examination bunches is significant in causal-near technique. In spite of the fact that the autonomous variable isn't controlled, there are control systems that can be practised to improve the understanding of results (Ahuja 2010:23). The specialist chooses two gatherings of members, the trial and control gatherings, more precisely alluded to as correlation gatherings. These two gatherings may vary in two different ways; regardless of whether one

gathering has a trademark that is different or each gathering has the trademark, they are still in contrast regarding degrees and sums. The autonomous variable separating the gatherings must be obviously and operationally characterised, since each gathering speaks to an alternate populace. In structuring this examination, the irregular example is chosen from two previously existing populaces and not from a solitary populace.

A causal-relative structure is picked, for instance, when specialists need to contemplate the potential impacts of Montessori school enrolment on kids' numerical capacity. Analysts find a populace where a few degrees of numerical capacity are known to exist and afterward select an example of members (McNabb 2010:733). The analysts gather information from all members in proportion of scientific capacity and school enrolment. When they have gathered their information, they choose what number of levels of scientific capacity they wish to examine (Kothari 2010:31). Currently, the specialists need two gatherings. They could characterise the members' scores in like manner from most noteworthy to least and afterward find the centre score of the rundown. Every one of those members whose measures are over the centre score are assigned as high numerical capacity and those beneath it, low scientific capacity. Next, the specialists look at task execution scores in each gathering to see whether Montessori school enrolment seems to impact task execution. There are three potential outcomes that could rise out of the examination.

5.4.2.2.1. Advantages of causal-comparative research

Like other research structures, causal-comparative research has its quality and shortcomings. The principle reason that similar research was applied right now is that the causes are being examined after they apparently have applied their impact on another variable (Daniel & Sam 2011:91). The scientists controlled a poll to examine the causes or they can likewise do meetings and perception to discover the reason or impact identified with the exploration. For instance, a scientist may conjecture that a member in preschool instruction is the main consideration adding to contrasts in the social change of first graders. To analyse this speculation, the analyst would choose an example of first graders who had taken an interest in pre-school instruction and an example of first graders who had not and would then look at the social change of the two gatherings (Kothari 2010:31). In the event that the youngsters who took an interest in pre-school instruction displayed the more significant level of social change, the scientist's theory would be upheld. Along these lines, the essential causal-near methodology includes beginning with an impact and looking for potential causes.

Another advantage of the causal-comparative research method is that it allows researchers to study cause-and-effect relationships under conditions where experimental manipulation is difficult or impossible (Hammersley & Traianou 2012:234). In addition, causal-comparative studies help to identify variables worthy of experimental investigation (Maxwell 2012:787). In fact, causal comparative studies are conducted solely to identify the probable outcome of an experimental study. In other words, many relationships can be studied in a single research study (Creswell 2013:456).

5.4.2.2.2. Disadvantages of causal-comparative research

Despite its many advantages, causal comparative research has some serious limitations to take caution of. In causal comparative research, the researcher has limited control over the study and extreme caution must be applied in interpreting results (Etikan *et al.* 2016:4). This is because the groups are already formed at the beginning of the study. An apparent cause-effect relation may not be as it appears. The alleged cause of an observed effect may in fact be the effect itself, or, a third variable may have caused both the apparent cause and the effect (Hoy & Adams 2015:74).

5.4.2.3. *Correlational research design*

Correlation is one of two major means of conducting a study. The other is experimentation. In most cases, experimentation is preferred because the experimenter is able to manipulate the variable of interest and directly measure the outcome. For example, a researcher looking at the influence of rowing on weight loss can determine the exact time and technique of rowing and then measure the outcome after a set amount of time; also, the researcher is able to control for extraneous variables that could affect the outcome. Correlational research, on the other hand, has no such control (Kothari 2013:78).

5.4.2.3.1. Principles of correlation research

Correlation measures the relationship between two variables. Unlike in experimentation, the relationship is observed in a more natural environment. There is no experimenter to control variables; rather, variables interact outside of the laboratory. Because there is no experimenter to control how variables interact, no correlational study can determine how a phenomenon is caused (Maher, Markey & Ebert-May 2013:354).

5.4.2.3.2. Advantages of correlation research

Correlational research allows researchers to collect much more data than experiments (Oppong 2013:202). Furthermore, because correlational research usually takes place outside of the lab, the results tend to be more applicable to everyday life. Another benefit of correlational research is that it opens up a great deal of further research to other scholars (Williams 2007:65). When researchers begin investigating a phenomenon or relationship for the first time, correlational research provides a good starting position. It allows researchers to determine the strength and direction of a relationship so that later studies can narrow the findings down and, if possible, determine causation experimentally.

5.4.2.3.3. Disadvantages of correlation research

Correlation research only uncovers a relationship; it cannot provide a conclusive reason for why there is a relationship. A correlative finding doesn't reveal which variable influences the other (Rahman 2017:102). For example, finding that wealth correlates highly with education doesn't explain whether having wealth leads to more education or whether education leads to more wealth. Reasons for either can be assumed, but until more research is done, causation can't be determined. Also, a third, unknown variable might be causing both.

5.4.2.3.4. Objectivity and error

Descriptive research also presents the possibility for error and subjectivity. For example, when a researcher designs a questionnaire, questions are predetermined and prescriptive. Additionally, the study may contain errors as the researcher may record only what they want to hear ignoring data that do not conform to the research project's hypothesis. Overcoming a research bias is an extreme difficulty for descriptive research practitioners. Therefore, those who choose to use a descriptive research approach must be aware of their own influence on the outcome of the research.

5.5. TARGET POPULATION

A target population is defined as the total collection of elements the study seeks to make some inferences about (Blumberg *et al.* 2008:42). The target population in this study was the plastic packaging and plastic manufacturing organisations in southern Gauteng. The main reason for focusing on these manufacturing organisations is that they are large in size, have a significant impact on the environment and contribute to the high emissions and environmental pollution in South Africa, for example burning 1 kg of oil creates about 3 kg of carbon dioxide. From the chosen organisations ten general managers, ten operational managers, five supervisors and

225 employees who fall under the manufacturing department were selected for participation. Although it was easy to get the organisations from packaging SA, the researcher had challenges getting access to the organisations due to their tight schedules and meetings; however access to some of the organisations was obtained by means of emails.

5.6. SAMPLING FRAME

A sampling frame is a list of all those within a population who can be sampled and may include individual households or institutions (Cooper & Schindler 2008:170). The sampling frame of this study comprised the plastic packaging manufacturing organisations listed under Plastics SA. This is because this sector has a variety of large and small manufacturing organisations that contribute to the major plastic supply in the nation.

5.7. SAMPLING METHOD

There are two types of sampling techniques, namely probability and non-probability sampling (Hair *et al.* 2010:20). This study used probability sampling. A probability sample is one in which each element of the population has a known non-zero probability of selection (Armstrong & Kotler 2007:111). Probability sampling is also referred to as random sampling or representative sampling. In probability sampling every member of the population has a known (non-zero) probability of being included in the sample and some form of random selection can be used and the probabilities can be assigned to each unit of the population objectively. These techniques need the population to be very precisely defined. Above all, it cannot be used for a population that is too general.

5.7.1. Types of probability sampling methods

1) Simple random sampling

In this type of sampling each and every element of the population has an equal chance of being selected in the sample and the population must contain a finite number of elements that can be listed or mapped (Alvi 2014:54). In simple random sampling every element is ensured to be mutually exclusive, for example, is able to be distinguished from one another and does not have any overlapping characteristics (Alvi 2014:54). The population must be homogenous, i.e. every element contains same kind of characteristics that meet the described criteria of target population.

Method: Before taking a sample, the population needs to be defined. In other words, one must know what characteristics constitute the population of interest. A list of all the elements of the population is required and the researcher needs to prepare the list if one is not already available.

2) Systematic random sampling

This type of sampling is also used for a homogenous population and is a bit different from simple random sampling. Unlike simple random sampling, there is not an equal probability of every element being included and for the type of sampling the elements are selected at regular interval (Alvi 2016:12-16).

Method: Before taking a sample the population needs to be defined. In other words, one must know what characteristics constitute the population of interest. In a case where an exhaustive list of elements of the target population is available, the list is arranged and numbered in an order 1 to N (Alvi 2016:13).

3) Stratified random sampling

Stratified random sampling is a method of sampling that involves the division of a population into smaller groups known as strata. In stratified random sampling, or stratification, the strata are formed based on members' shared attributes or characteristics (Graff Zivin & Neidell 2012:77).

A simple random sampling method was used for this study; therefore, each element in the population had an equal probability of selection and each combination of elements had an equal probability of selection. There are various reasons why the researcher prefers probability sampling. First, it ensures that the researcher will be able to represent not only the overall population, but also key subgroups of the population, especially small minority groups (Hair *et al.* 2010:20). If one wants to be able to talk about subgroups, this may be the only way to assure doing so effectively. If the subgroup is extremely small, one can use different sampling fractions (f) within the different strata to over-sample the small group randomly (although you will then have to weigh the within-group estimates using the sampling fraction whenever overall population estimates are required) (Hair *et al.* 2010:20).

5.8. SAMPLE SIZE

A sample size is the actual number of individuals in the population that is going to be surveyed. In this study, a final sample size of 230 was drawn from the proposed plastic packaging industry database. The questionnaire was distributed to various plastic packaging and

manufacturing firms. The questionnaire was designed to target operational managers, supervisors and employees. In this case, a total number of 15 managers and 15 supervisors participated and a total of 200 operational employees participated in this study. The involvement of managers, supervisors and employees in this study was vital. Firstly, the managers understand the internal environmental systems and supervisors monitors the implementation of these systems. However, the operational employees also have to understand these systems of green supply chain management. The present study employed the historical evidence approach to determine the sample size for the quantitative study. In previous similar studies conducted by Chan *et al.* (2012:630), it was indicated that the more data collected the better, as statistical power is improved by increasing the sample size. While the larger the sample the lesser the likelihood that findings will be biased does hold, diminishing returns can quickly set in when samples are over 200 which need to be balanced against the researcher's resources. Razavi, Talebi, Zareinejad and Dehghan (2015:481) also indicated that a sample size of 200 is deemed to be valid when using SPSS.

5.9. DATA COLLECTION AND MEASUREMENT INSTRUMENTS

Data collection is defined as the actual systematic gathering of information that is relevant to the research problem (Murthy & Bhojanna 2010:241). Primary data were collected using a self administered questionnaire. The structured questionnaire comprised five sections. Section A consisted of questions on the demographic profile of the employees. Section B contained questions on internal environmental management systems with five measurement items were used which were adopted from Chen (2009:269). Section C was based on questions on total quality management where four measurement items were used. Section D comprised four questions on green information systems adopted from Graff Zivin and Neidell (2012:77). Section E presented five questions on organisational performance, and a five-point Likert scale was used for sections B, C, D, E. The questionnaire was pre-tested to check the suitability of questions and the general attitude of the respondents towards the survey. A pilot study was conducted with 30 respondents to establish the reliability of the questionnaire. Thereafter, the questionnaire was refined for use in the main survey. Based on the pilot study, ten operational managers, ten general managers and ten general employees from 30 plastic manufacturing organisations in the Gauteng province were chosen. From the results gathered it was very evident that the questionnaire had been correctly designed in terms of the structure and the manner in which the questions were presented.

5.9.1. Administering and collection of the questionnaire

Considerable thought was given to the type of email questionnaire. A key factor was the large number of questions involved in the study which affected the length of the questionnaire. Previous research on both online and mail surveys emphasises the relationship between length and response rate/quality. It is known that shorter questionnaires tend to attract more responses than longer questionnaires. In this study, data was collected using a closed-ended questionnaire distributed via mail, email and through face to face drop off to improve the response rate. 50 questionnaires were distributed via mail (courier), 20 were emailed to the participants and 180 were distributed through a face to face drop off and collect method. Table 5.2 presents the advantages and disadvantages of using various methods of distributing the questionnaire to the participants.

Table 5.2: Ways in which questionnaires were distributed

Questionnaire	Advantages	Disadvantages
By mail (courier)	The questionnaire was distributed to the participants via mail to the respective addresses and it was easy to administer; control over visual quality of the instrument, which was then made professional.(Lathman 2007)	There was inability to control whether the individual will return or complete the questionnaire, or fill in the questions in the right order (Few 2014).
By email	It was even easier to administer and less costly than mail surveys; participants were more likely to fill in than a mail questionnaire (Few 2014).	There was no guarantee to anonymity (Few 2014).
Face to face drop off	It was easier to show visual material than with an email questionnaire and not very costly, fast and improves the response rate (Kothari & Garg 2014).	High printing and transportation costs (Kothari & Garg 2014).

Source: Own compilation

Table 5.2 above presents the different ways in which a questionnaire can be distributed as well as the advantages and disadvantages of the different ways.

5.10. PILOTING THE INSTRUMENT

Piloting means testing effectiveness and efficiency of an instrument in measuring intended constructs and determining whether participants will easily understand the questions (Feeley, Cossette, Côté, Héon, Stremler, Martorella & Purden 2009:85). The instrument was distributed to 20 organisations. It was distributed randomly and the changes suggested by the selected respondents were taken into account to refine the instrument. Entry was directly into the Statistical Package for Social Sciences (SPSS) program, with specific codes used for each questionnaire item. Data were then analysed using SPSS version 24. The analysis was mainly descriptive, with data about age, number of employees, plus other items, being analysed for their mean, median, modal, minimum and maximum values. To compare the categorical variables such as number of employees and type of business, a χ^2 test of association or a Fisher exact test was used.

5.11. DATA ANALYSIS PROCEDURE AND STATISTICAL APPROACH

The data analysis commenced with the coding of the data from the questionnaire into the Microsoft Excel spreadsheet. Descriptive statistics with Statistical Package for Social Sciences (SPSS) version 24.0 and path modelling with Analysis of Moment Structures (AMOS 24.0) were formed subsequently for SEM. SEM demonstrates and tests the theoretical linkages of a proposed study and the significance of the relationships between the constructs (Hair *et al.* 2010:20). SEM stipulates a technique where separate relationships are allowed for each set of dependent variables and it provides an estimation technique for a series of separate multiregression equations to be estimated simultaneously. By assessing each relationship simultaneously, rather than separately, an incorporation of all the multi-scale items can be used to account for measurement errors within each scale (Hair *et al.* 2010:20).

The Kruskal-Wallis and Mann-Whitney U tests were utilised to establish whether respondents varied in terms of green packaging management. The fitness of the measurement and structural model was examined using absolute fit indices that included the chi-square value over degree of freedom, the GFI, RMSEA and incremental fit indices, that is, the CFI and TLI.

5.12. RELIABILITY, VALIDITY

Reliability refers to the extent to which an experiment, test, or measuring procedure yields the same results on repeated trials (Baines *et al.* 2012:87). Validity refers to the degree to which the measurement item actually measures what it claims to measure (Nakano & Nguyen 2010:597). This section comprises methods used to measure reliability and validity of the

measurement instruments. For reliability testing, the researcher used Cronbach's alpha value and composite reliability value. As for validity, both convergent and discriminant validity were checked. Convergent validity was checked using item-to-total correlation, item loadings and AVE values. However, discriminant validity was assessed using AVE values, compared to shared variance and the inter-construct correlation matrix.

5.12.1. Research model fit assessment

A CFA was done to establish whether the model was fit for the conceptualised research model. Model fit indicators such as chi-square degrees of freedom, GFI, AGFI, NFI, IFI, TLI, CFI and RMSEA were used to assess the model fit.

5.13. ETHICAL ISSUES

For most professions, ethical codes in research are an integral part of their overall ethics, though some research bodies have evolved their own codes (Kumar 2014:216). In research, ethical issues can be examined as they relate to participants, researchers and sponsoring organisations. According to Kaufmann *et al.* (2012:216), the participants, the researcher and the sponsoring organisations all have ethical issues, which should be considered when conducting a research study. For this study, the researcher obtained a letter, indicating that permission had been granted to conduct a study on the mentioned company. Collecting organisational operational data is a very sensitive issue and thus when collecting data it is imperative to seek permission from owners or managers of the business and the employees concerned to obtain the information that is needed. Hence, participation was voluntary and anonymity of the respondents and confidence of information were guaranteed. A researcher should always demonstrate respect in terms of all their interactions with participants including not judging them, not discrediting them, in ensuring that their views are faithfully recorded and given due consideration in the assessment process. Part of this respect is implied by the terminology of 'participant' (rather than 'respondent' or 'subject'). An important dimension of this respect relates to ensuring the protection of persons with diminished autonomy and those who are marginalised or vulnerable. Special recognition and procedures may also be required in the case of Indigenous peoples (see below).

- Informed consent – Cooperation ought to be the intentional decision of the members and ought to be founded on adequate data and sufficient comprehension of the exploration and the outcomes of their interest. This infers the specialist must unveil all

pertinent data and any potential dangers of investment, particularly any issues around what will befall the information acquired.

- Voluntary participation and no coercion – As implied by the principle of informed consent, participation must be voluntary and not subject to any coercion or threat of harm for non-participation. Non-coercion is not taken to mean that there should not be payments for participation; however, any such payment should be commensurate with the amount of time and normal income expectations of the participants and should not be excessive such that it would constitute a bribe or inappropriate inducement.
- Right to withdraw – Consistent with the principle of voluntary participation, participants must know that they can withdraw at any time and have any of their data already recorded removed from the analysis where this is possible.
- Full disclosure of funding sources – An implication of the principle of informed consent is that there must be full disclosure of the sources of funding for the research.
- No harm to participants – It is fundamental that no harm must come to participants as a result of their participation in the research. This means not only that participants must not be exposed to pain or danger in the course of the research (such as in a psychological experiment or medical trial), but also that there must be no adverse consequences to a person as a result of their participation. This latter issue can be complicated. For example, a researcher cannot guarantee that an employer would not take action against an employee for their participation or for comments they might make, although such a risk should be addressed by ensuring the anonymity and/or confidentiality measures discussed below. At the very least, the researcher must do their utmost to protect participants from any harm and ensure under the principle of informed consent that the participant is fully appraised of all possible risks from participation. Sometimes, participation in social research will necessarily cause a participant to reflect on personal issues, bringing about emotional distress. Here the researcher's obligation is to ensure that the research interaction does not finish until there is some resolution of the emotional distress that has arisen and that there is recourse to follow-up assistance or counselling.
- Avoidance of undue intrusion – Respect for participants means that there will be discussion only of those matters that are relevant to the issues under research and that enquiries should be confined to those issues. It implies a respect for the personal lives of participants and that researchers should be cognisant of what is personal and private.

CHAPTER 6 DATA ANALYSIS AND INTERPRETATION

6.1. INTRODUCTION

In the previous chapter the research methodology, research design, target population, sample size, sampling methods and data collection were presented. The current chapter starts by providing the data analysis procedures. The presented data are based on the quantitative data, which were collected from the chosen plastic manufacturing and recycling organisations in the Gauteng region in South Africa. The demographic frequency tables and charts illustrate the conducted analysis by providing information regarding the type of organisation, the size of the organisations, ownership and number of employees. The second part of the analysis presents data on the pollution prevention plans of the chosen organisations. Furthermore, the chapter provides information on internal management systems and organisational performance. The chapter also provides information on the reliability and validity of the study as well as regression weights using CFA. The hypothesis and path modelling are presented using SEM. The chapter concludes with a summary of the analyses.

6.1. Response rate

In survey research, the response rate, also known as completion rate or return rate, is the number of people who answered the survey divided by the number of people in the sample. It is usually expressed in the form of a percentage. The term is also used in direct marketing to refer to the number of people who responded to an offer. In this study, a total number of 800 plastic packaging organisations listed under Plastics SA were deemed to be a good sample frame. From the 800 organisations, 250 organisations were chosen randomly based on the accessibility and permission from the directors of the organisations. Of the 250 distributed questionnaires, only 230 were usable. Therefore, a 92% percent response rate was achieved in the current study.

6.2. DEMOGRAPHIC INFORMATION

6.2.1. Number of employees

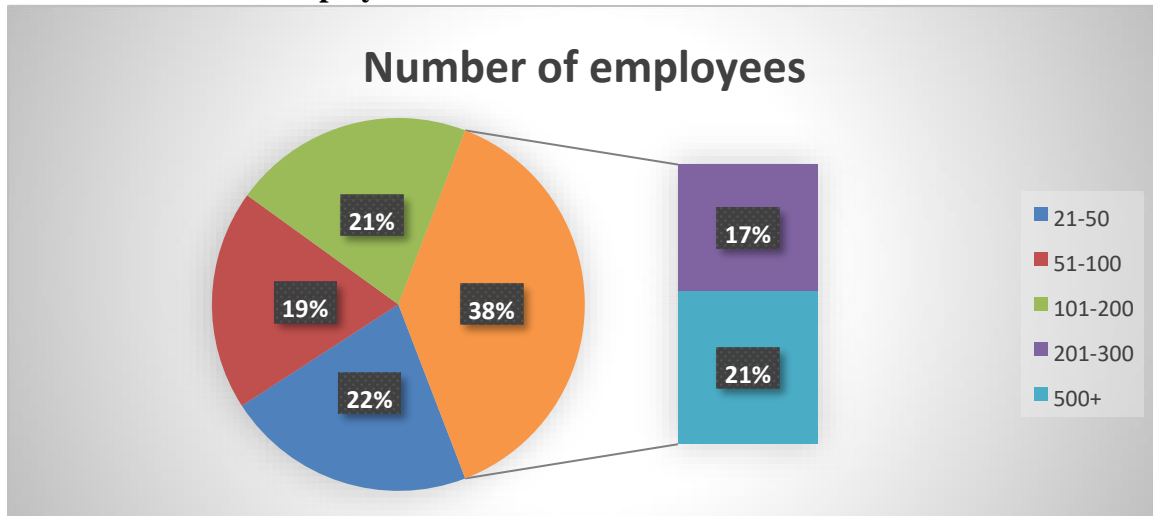


Figure 6.1: Number of employees Take to the top

Source: Own compilation

In Figure 6.1, the results for the number of employees employed by the surveyed plastic manufacturing and packaging organisations in the Gauteng region in South Africa are provided. A maximum number of 230 organisations were chosen as a sample size. The results clarify that out of the 230 participating organisations, 21 percent (10 organisations) employ a maximum number of 50 employees, 19 percent of the organisations employ a maximum of 100 individuals, 21 percent of the organisations employ a maximum of 200 employees and 20.9 percent of the organisations employ 98 individuals. Given the above results, the majority (38) of organisations are certified to be large organisations as they employ more employees than other organisations. According to Chen *et al.* (2013:234), a company's size is determined by the number of its employees. Therefore, the above information stipulates that the majority of the recycling and plastic manufacturing organisations in Gauteng are large organisations rather than SMMEs.

Fig 6.2

6.2.2. Type of business

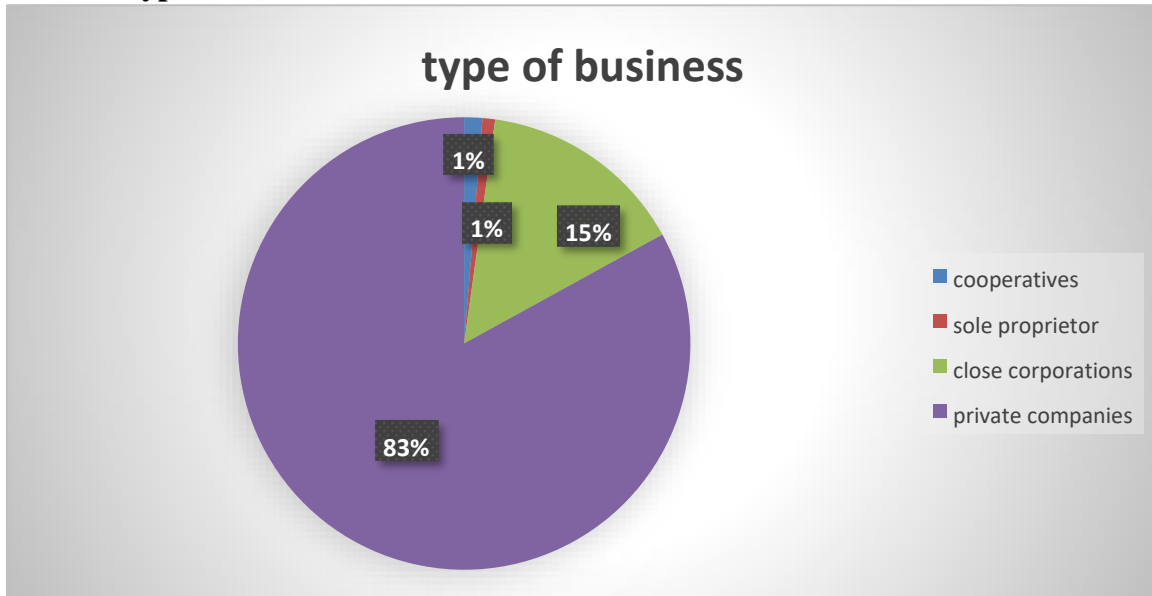


Figure 6.2: Type of ownership

Source: Own compilation

Figure 6.2 presents information on the type of business of the sampled organisations for this study. It is evident from the results that the lowest number of the organisations that participated in the current survey are sole proprietors and corporative, which constitutes the lowest percentage of 1 percent, followed by close corporations which constitute a valid percentage of 15 percent. Lastly, the majority of the organisations are private organisations with a valid percentage of 83 percent. Given these figures and results, it can be concluded that the majority of the plastic packaging and manufacturing organisations in the Gauteng region are privately owned.

6.2.3. Nature of the business

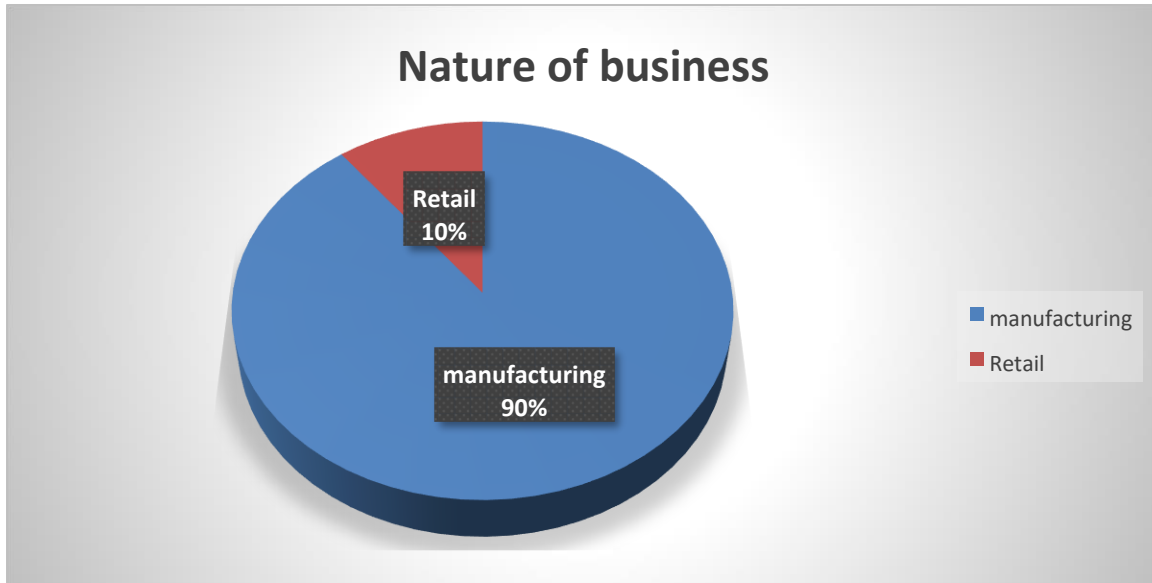


Figure 6.3: Nature of business Title on top of the Fig

Source: Own compilation

Figure 6.3 presents the results on the nature of the business from those organisations which were sampled in this study. It is evident from the figures presented above that the majority of the organisations are manufacturing organisations with a valid percentage of 90 percent compared to the retail organisations which only amount to ten percent of the 230 that participated. Based on the above figures it is evident that the majority of the sampled plastic packaging organisations are manufacturing and recycling organisations rather than retail outlets. Additionally, the results may be useful in clarifying the fact that there is an increase in recycling of plastic materials and this has opened opportunities for both small and large business in expanding their markets in South Africa. Secondly, with Gauteng being the bread basket of the Southern African economies it is important to note that the majority of manufacturing and recycling organisations are situated in this region.

6.3. ANALYSIS OF VARIABLES

6.3.1. Pollution prevention plan

Table 6.1: Pollution prevention plans

Item	Description	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
PPP1	Environmental preservation is a high-priority activity in our firm.	148(64.35) 30(13.04)	39(16.96)		8(3.48)	5(2.17)
PPP2	In our firm, environmental preservation is largely an issue of maintaining a good public image.	133 (58)	32(13.7)	46 (20)	15(6.5)	4(1.8)
PPP3	It is difficult for our firm to be successful and preserve the	8(3.5)	14(6.1)	49(21.3)	29(12.3)	130(56.5)
PPP4	environment at the same time. Our firm has a clear policy statement urging environmental awareness in every area.	127(55.2)	28(12.2)	56(24.3)	11(4.8)	8(3.5)
PPP5	We evaluate our environmental efforts by their economic benefits to our firm	126(54.8)	39(17.0)	52(22.6)	9(3.9)	4(1.7)

Source: Own compilation

The Information in Table 6.1 indicates that among the 230 respondents, two respondents for every three strongly agreed with setting environmental preservation as a high priority activity in their respective organisations. Over and above, 81 percent of the respondents either agreed or strongly agreed that environmental preservation is a high priority activity in their organisations. The motive behind prioritising environmental preservation can be explained by the responses given in item PPP2 in Table 6.1. Under PPP2, almost 72 percent of the respondents either agreed or strongly agreed that environmental preservation is chiefly an issue of maintaining a good public image. Following this, one can conclude that environmental preservation is used as a public relations exercise.

Accordingly, environmental preservation is not only highly prioritised as a way of creating a good public image but also as a key driver for economic benefits. This is substantiated by the responses obtained in items PPP3 and PPP5. Approximately 72 percent (n = 165) of the respondents either agreed or strongly agreed that they evaluate their environmental efforts by the economic benefits. In support of this, almost 32 respondents disagreed that success of an organisation and environmental preservation are mutually exclusive events. The majority of the respondents concurred that success of an organisation and environmental preservation are positively correlated.

Approximately 70 percent (n = 165) of the respondents either strongly agreed or agreed that their organisations have dedicated a clear policy statement urging environmental awareness in every area. This further confirms that the majority of these organisations place a high priority on environmental preservation in line with the high response rate in item PPP1. Drawn from the literature, it is evident that most plastic manufacturing organisations are starting to apply strategies for ways of pollution prevention as this serves them either to avoid higher costs incurred from government penalties or loss of business.

6.3.2. Total quality management

Table 6.2: Total quality management

Item	Description	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
TQM1	There is specificity of quality goals within our organisation.	127(55.0)	46(20.0)	18(8.0)	14(6.0)	25(11.0)
TQM2	Training and development of staff down to floor level is integral to effective TQM implementation in our organisation.	136(59.0)	36(15.7)	46(20.0)	9(3.8)	3(1.5)
TQM3	Employee involvement is critical to successful TQM implementation in our company.	120(52.0)	39(17.1)	49(21.3)	17(7.4)	5(2.2)
TQM4	Continuously monitoring performance improvement measures is essential for carrying out the steps required for defined quality processes and principles in TQM philosophies.	128(55.5)	28(12.1)	56(24.3)	11(4.8)	8(3.3)
TQM5	It is essential to integrate quality undertakings with TQM business strategy which will indeed realise value-added business performance.	129(55.9)	36(15.8)	48(20.8)	13(5.7)	4(1.8)

Source: Own compilation

Table 6.2 is a statistical summary based on total quality management responses from the respondents. For every item under total quality management, more than 60 percent of the respondents either agreed or strongly agreed with the questions posed. None of the questions asked were in contrast with others.

The majority of the respondents either agreed or strongly agreed that there is specificity of quality goals in their respective organisations. As a quality enhancing technique, Anjard (1998:80) concurred that employee involvement is essential in ensuring adherence to minimum set requirements. From the 230 respondents, 69 percent either strongly agreed or agreed that employee involvement is critical to successful total quality management implementation in their organisations.

Although employee involvement is key and critical in the implementation of total quality management, it is of paramount importance to also train and educate the employees. Approximately 75 percent (n = 172) of the respondents either agreed or strongly agreed that training and development of all staff is integral to effective total quality management implementation in an organisation.

Goetsch and Davis (2010:117) admitted that total quality management is not an event, but a process that needs consistent monitoring and integration of all business units within an organisation. Monitoring is done as a way of minimising defects. A majority of 129 (55.9 percent) respondents either agreed or strongly agreed that consistent monitoring of performance improvement measures as well as integration of business units is essential for performance improvement in total quality management. The results show that the majority of the respondents are in support of the control of total quality management to reduce pollution without compromising the quality of the products.

6.3.3. External environmental audits

Table 6.3: External environmental audits

Item	Description	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
EEA1	Our organisations' procedures are compatible with our supply chain partners' business procedures.	49 (21.3)	39(17.1)	120(52)	5(2.2)	17(7.4)
EEA2	Our firm runs environmental audits often.	57(24.7)	66(28.9)	74(32)	16(7.1)	17(7.3)
EEA3	The goals and objectives of our firm are compatible with supply chain partners in business dealings.	66(28.8)	74(32.3)	45(19.3)	16(7.1)	29(12.5)
EEA4	Managers from our firm and those of our supply chain partners have compatible approaches in business dealings.	131(56.8)	53(23.2)	2(1)	30(13)	14(6)

Source: Own compilation

Table 6.3 presents the results of responses based on external environmental audits obtained from the respondents. There was a sharp decline in positive responses to most of the items in this section compared to other sections. Half of the respondents were neutral about whether their organisations' procedures were compatible with that of their supply chain partners. Furthermore, less than 40 percent either agreed or strongly agreed that their organisations' procedures are compatible with those of the supply chain partners. This is probably because organisations may operate differently from how their competitors operate.

Although the respondents generally disagreed that their organisations' procedures are compatible with their partners' procedures, in contrast, 80 percent (n=184) of them either strongly agreed or agreed that their managers of their organisations and those from their supply chain partners have compatible approaches in business dealings. This is not usually the case. It is rare for managers of a supply chain to have compatible approaches in their business

dealings but follow different procedures. It is possible that the organisations may be following different procedures that lead to the same outcome, thereby making it compatible.

Furthermore, substantiating the high consensus among the respondents confirming compatibility in organisations' procedures, more than two-thirds of the respondents also confirmed that the goals and objectives of their organisations are compatible with those of their supply chain partners. Summarily, this points out that these organisations pursue similar goals and objectives with their supply chain partners, but follow different procedures.

6.3.4. Green packaging management

Table 6.4: Green packaging management

Item	Description	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
GPM1	We have increased the usage of environmentally friendly raw materials and components in our packaging.	149(63.3)	62(27.4)	12(5)	5(2.17)	5(2.17)
GPM2	We have designed our products and/or services so that their materials can be recycled.	88(38.2)	66(28.7)	49(21.4)	21(9.2)	6(2.5)
GPM3	Being environmentally conscious is an integral part of our corporate culture.	129(56.2)	61(26.5)	28(12.1)	6(2.6)	6(2.6)
GPM4	We plan the deliveries of the company to minimise the environmental impacts.	96(42.1)	65(28.4)	43(18.5)	14(6)	12(5)

Source: Own compilation

Table 6.4 presents the results on the green packaging management from those organisations which were sampled in this study. More than 90 percent (n = 211) of the respondents either strongly agreed or agreed to have increased the usage of environmentally friendly raw materials and components in their packaging. This can be partly due to environmental laws that has been passed not only in South Africa but the world over. Organisations' own consciousness to the

environment can also be the other reason for the increased usage of environmentally friendly raw materials. A paltry four percent (n = 10) of the respondents have not increased usage of environmentally friendly raw materials. This can be due to high costs of replacing their machineries to cater for environmentally-friendly raw materials.

Although 90 percent of the respondents have increased the use of environmentally-friendly materials, less than 70 percent of the respondents indicated that they have designed their products for recycling. The decrease in the proportion of organisations that are designing their products for recycling can be due to the expensive start up to change their manufacturing plants to produce recyclable materials. It is also partly due to the fear that customers may not be used to the new products that the organisations may start producing.

Asked if being environmentally conscious is an integral part of their corporate cultures, approximately 83 percent (n = 190) of the respondents either agreed or strongly agreed. This could be substantiated by the increase in environmental awareness by non-governmental and governmental organisations the world over. As a follow-up question, the respondents were also asked if they plan their organisations' deliveries to minimise environmental impacts. There was a significant decrease in the number of respondents who either agreed or strongly agreed. Approximately 71 percent (n = 161) of the respondents agreed or strongly agreed that they plan their organisations' deliveries to minimise environmental impacts.

There was a 12 percentage point slump in respondents who agreed or strongly agreed that they plan their company deliveries to minimise environmental impacts compared to those who either agreed or strongly agreed that they are environmentally conscious. This 12 percentage point slump can be explained by the factors that are exogenous and beyond the organisations' control.

This can be due to the country's transport infrastructure which may hinder organisations' efforts to minimise environmental impacts.

6.3.5. Green information system

Table 6.5: Green information system

Item	Description	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
GIS1	Information on quality performance is readily available to employees.	173(75.2)	28(12.1)	5(2)	19(8.2)	6(2.5)
GIS2	Having easy access to information about green spaces in our organisation will encourage us to be more involved in its planning and management.	170(74.1)	43(18.6)	12(5)	2(1.0)	3(1.3)
GIS3	We use the green information systems in our organisation to improve performance.	145(63)	40(17.5)	5(2.3)	20(8.9)	19(8.3)
GIS4	In our organisation we would support keeping the existing green information systems as they would increase our property value.	154(67)	42(18.2)	6(2.7)	19(8.2)	9(3.9)

Source: Own compilation

Table 6.5 depicts responses about green information system. Approximately 90 percent of the respondents either agreed or strongly agreed that information on quality performance is readily available to employees. Employee inclusion is keen to quality improvement. Although employee improvement is necessary, it is not sufficient in quality improvement unless otherwise substantiated with readily available quality performance information to employees. Only 11 percent of the respondents either disagreed or strongly disagreed that information on quality performance is not readily available to employees.

There is a notion that having easy access to information about green spaces in an organisation can encourage involvement in planning and management. Asked about this, approximately 93 percent (n = 213) of the respondents either agreed or strongly agreed, while a meagre 2.3 percent objected. Planning and management survive on easy access to information as this will encourage involvement.

Ninety percent of the respondents either agreed or strongly agreed that information on quality performance is readily available to employees and having easy access to information about green spaces in their respective organisations will encourage them to be more involved in their planning and management; however, contrary to this, only approximately 80 percent either strongly agreed or agreed that they use green information systems in organisations to improve performance. This discrepancy can be explained by the possibility that respondents may agree with the concept of making information readily available to employees and improved access, but not all organisations are using green information systems as a performance improvement tool in their organisations.

Approximately nine out of every ten respondents either supported or strongly supported keeping the existing green information systems as a way of increasing their property values. Most businesses the world over are going green and this has proved to be a cost cutting measure that results in an increase in property values (Eichholtz, Kok & Quigley 2010:2492).

6.3.6. Organisational performance

Table 6.6: Organisational performance

Item	Description	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
OP1	Carbon dioxide emissions considering the volume of production have decreased.	145(63.2)	40(17.4)	3(1.4)	23(9.9)	19(8.1)
OP2	Waste considering the volume of production has decreased.	134(58.3)	44(19.2)	4(1.5)	29(12.5)	19(8.5)
OP3	Energy consumption considering the volume of production has decreased.	92(40)	58(25.4)	3(1.3)	66(28.9)	10(4.4)
OP4	Consumption for hazardous materials considering the volume of production has decreased.	157(68.4)	56(24.5)	3(1.3)	5(2.3)	8(3.6)

Source: Own compilation

Table 6.6 summarises the responses obtained pertaining to organisational performance. Slightly more than eight for every ten respondents either agreed or strongly agreed that carbon dioxide emissions in relation to production volumes have decreased. On the other hand, only two of every ten respondents objected that carbon dioxide emissions have decreased. The decrease in carbon dioxide emissions is mainly explained by strict government policies on emissions.

As organisations are on a drive to increase use of recyclable raw materials and producing recyclable products, the volumes of waste have since been significantly decreasing (Lee & Paik 2011:1159). Almost 80 percent of respondents either agreed or strongly agreed that ratio of waste volumes to production volumes has decreased whilst only 21 percent (n = 48) either objected or strongly objected. The number of respondents who objected could be those who have not yet engaged the use of recyclable raw materials in their production processes.

Energy is one of the most inelastic goods that is not easily replaceable and technology has not yet advanced to replace use of energy in most production processes (Eerhart, Faaij & Patel 2012:6407). In line with the study by Eerhart *et al.* (2012:6407), only 150 of the 230 respondents either strongly agreed or agreed that they have reduced energy consumption in their production processes. Decrease in energy consumption can only be experienced if organisations harness technology that increases efficiency in production processes, thereby saving on energy consumption. However, the start-up costs of acquiring the technology is quite high and this may limit the rate at which energy is saved in production processes. This may explain the high rate of respondents who neither agreed nor strongly agreed to have experienced a decrease in energy consumption.

Ninety-three percent of the respondents either strongly agreed or agreed that there is a significant decrease in the consumption of hazardous materials expressed in relation to volumes of production. The remainder either objected or were neutral. Use of hazardous materials is detrimental to the health of the workers who are involved in the production processes. Health organisations have been running campaigns and awareness on the detrimental effects from the use of hazardous materials in production. Use of these materials would come at a steep cost of compensating the society to insure against the detriment of their health statuses. This would increase the propensity by organisations to cut on the use of these substances.

6.3.7. Reliability tests

Reliability refers to the similarity of results provided by the independent but comparable measures of the same object or construct, or an index of consistence (Iacobucci & Churchill 2010:258). In this study, the researcher employed item-total correlation values, Cronbach's coefficient alpha (α), Composite Reliability (CR) and Average Variance Extracted (AVE) to check the measurement validity. A test is seen as being reliable when it can be used by a number of different researchers under stable conditions, with consistent results. Reliability reflects consistency and replicability over time. Furthermore, reliability is seen as the degree to which a test is free from measurement errors, since the more measurement errors occur the less reliable the test (Fraenkel & Wallen 2003:456). In the same way, Maree (2007:149) for example questioned how far the same test would produce the same results if it was administered to the same children under the same conditions. This helps the researcher and educator to make comparisons that are reliable. The more errors found in an assessment the greater its unreliability and visa-versa. Reliability is a very important factor in assessment and is presented as an aspect contributing to validity and not opposed to validity. Messick (1989:7) transformed the traditional definition of validity with reliability in opposition – to reliability becoming unified with validity. Thereby, Messick (1989:7) accepted a unified concept of validity, which includes reliability as one of the types of validity; thus contributing to the overall construct validity. As Messick (2012:200) stated: Hence, construct validity is a *sine qua non* in the validation not only of test interpretation but also of test use, in the sense that relevance and utility as well as appropriateness of test use depend, or should depend, on score meaning.

6.3.8. Cronbach's coefficient alpha

The Cronbach's alpha value is an index that is used to measure the internal consistency of all the items that measure the same construct. It reflects on the method of domain sampling.

According to Iacobucci and Churchill (2010:259), the Cronbach's coefficient α is one of the most common internal stability approaches that determine the mean reliability coefficient for all possible ways of splitting a set of items in half. Accordingly, Cronbach α is the most commonly used approach for assessing the reliability of a measurement scale with multi-point items. The value of α , which ranges from zero to one, signifies the level of reliability in the measurement. The closer the value of α is to one, the higher the level of reliability.

Alternatively, where the value of α is low, there may be too few items or little homogeneity among the items, although there are no fixed rules for evaluating the magnitude of reliability coefficients and, as such, it depends on the purpose of the study (Iacobucci & Churchill

2010:259). The coefficient α for the different constructs in this study was computed using the reliability procedure in the SPSS (version 24) software.

The researcher tested the internal reliability of each construct using the standardised Cronbach's coefficient alpha, where a higher level of Cronbach's coefficient alpha showed higher reliability of the measurement scale. Higher item-total correlations were employed in complement with the Cronbach's coefficient alpha and they revealed statistical agreement among the measured items. The results of scale reliability tests are shown in Table 6.7.

Table 6.7: Accuracy analysis statistics: Cronbach's coefficient

CONSTRUCT	CRONBACH ALPHA VALUE
Pollution prevention plan (PPP)	0.879
Total quality management	0.854
External environmental audits	0.896
Green packaging management	0.823
Green information system	0.754
Organisational performance	0.861

Source: Own compilation

Table 6.7 listed information on reliability statistics. In lieu of the current study's purpose, the Cronbach alpha value was used to measure the internal consistency of all the items that measure organisational performance. An average threshold of 0.7 was used to check the internal consistency of the constructs. Evidently, Nunnally and Bernstein (1994:24) observed that if the Cronbach alpha value exceeded the recommended threshold of 0.7 it satisfies the reliability of the research measures. It is shown in Table 6.7 that pollution prevention plans (PPP) have a value of 0.879 while TQM constitutes a value of 0.854. Although all the constructs exceeded the recommended threshold, external environmental audits generated the highest alpha value with a valid value of 0.896 whilst green packaging management (GPM) constitutes a value of 0.823. GIS have a value of 0.754 and lastly organisational performance has 0.861. Additionally, in the study, the tests revealed that all constructs have Cronbach's alpha values above 0.8, which means that all constructs have good internal consistency. Thus, refining the items to increase reliability of the study was not required.

6.3.9. Composite reliability

Composite reliability (CR) index is collectively used to check the internal consistency of the measurement model. It is calculated using the following formula:

$$(CR): CR_{\eta} = \frac{(\sum \lambda_{yi})^2}{[(\sum \lambda_{yi})^2 + (\sum \epsilon_i)]}, \text{ where } CR_{\eta} = CR, (\sum \lambda_{yi})^2 = \text{square of the summation of the factor loadings; } (\sum \epsilon_i) = \text{summation of error variances}$$

(Hair *et al.* 2010:22).

The resultant coefficient is then compared with and must be similar to that of the Cronbach's α . Consequently, it is recommended that the threshold for the CR value be 0.7 (Hair *et al.* 2010:22).

In this study, CR was performed using an index test to evaluate the internal reliability of each construct. Previous studies by Nunnally and Bernstein (1994:23) and Hair *et al.* (2010:50), advocated that a CR index that is greater than 0.7 depicts an adequate internal consistency of the construct. Using the formula given earlier to calculate composite reliability, the results were found and are tabulated in Table 6.8.

Table 6.8: Composite reliability

Accuracy analysis statistics: Composite reliability research construct	Composite reliability
Pollution prevention plan (PPP1; PPP2; PPP3; PPP4)	0.76
Total quality management (TQM1; TQM2; TQM3; TQM4; TQM5)	0.87
External environmental audits (EAU1; EAU2; EAU3; EAU4)	0.75
Green packaging management (GPM1; GPM2; GPM3; GPM4)	0.88
Green information system (GIS1; GIS2; GIS3; GIS4)	0.78
Organisational performance (OP1; OP2; OP3; OP4)	0.86

Source: Own compilation

6.3.9.1. Validity tests

Validity is concerned with whether an instrument or test actually measures the attributes that it is supposed to measure, given the context in which it is applied. It can be defined as the extent to which differences in observed scale scores reflect true differences between objects on the characteristics being measured, rather than systematic or random error. Validity is concerned with the accuracy of a measurement. Since one never has direct evidence of the true value of

the concept under measurement, validity assessment is a complex issue. Hence, there are three basic approaches employed to estimate the validity of an instrument: content validity, predictive validity and construct validity. However, for the purposes of this study, the focus is primarily on testing construct validity

6.3.9.2. Construct validity

Construct validity lies at the very heart of scientific and pragmatic progress (Iacobucci & Churchill 2010:257). It is concerned with the extent to which a measure relates to other measures to which it should be related (Hair *et al.* 2010:45). To establish this type of validity, two categories of construct validity normally need to be determined: convergent validity and discriminant validity. Factor analysis is a common evaluator of both convergent and discriminant validity. Factor analysis is an interdependence analysis tool that simplifies data analysis by taking advantage of the correlations among the p-variables, extracting the data that overlap and reducing the problem to just a few core variables (Iacobucci & Churchill 2010:491). Convergent validity is an element of construct validity.

6.3.9.3. Convergent validity

Convergent validity refers to the extent to which the scale items show homogeneity within the same construct being measured. Preferably, an item is expected to highly correlate with other items that measure the same constructs (convergent validity). In contrast, it is expected that these items do not correlate too highly with items which measure different constructs (discriminant validity) (Iacobucci & Churchill 2010:258). Convergent validity was assessed by checking whether individual item loadings for each corresponding research construct were above the recommended value of 0.5. The results are shown in Table 6.9.

Table 6.9: Accuracy analysis statistics: factor loadings

Research construct		Factor loading	CR	AVE	Research construct		Factor loading	CR	AVE
Pollution prevention plans	Pp5	0.735	0.867	0.43	External environmental audits	EEA5	0.856	0.870	0.25
	PP4	0.628				EEA4	0.636		
	PP3	0.783				EEA3	0.704		
	PP2	0.773				EEA2	0.837		
	PP1	0.681				EEA1	0.754		
Total Quality management	CP4	0.899	0.918	0.73	Green Packaging management	GP5	0.766	0.870	0.64
	CP3	0.845				GP4	0.842		
	CP2	0.895				GP3	0.864		
	CP1	0.791				GP2	0.705		
						GP1	0.742		
Green information system	GI4	0.756	0.880	0.65	Organisational performance	OP4	0.785	0.812	0.53
	GI3	0.845				OP3	0.689		
	GIS2	0.786				OP2	0.769		
	GIS1	0.847				OP1	0.674		

Source: Own compilation

Table 6.9 indicates the factor loadings which range from 0.62 minimum to 0.89 maximum value. Therefore, all the items finally used had a loading of more than the recommended threshold of 0.6, indicating acceptable individual item convergent validity, as more than 60 percent of each item's variance was shared with its respective construct. This evidence supported the convergent validity of all scale items. Furthermore, the CR was above the recommended threshold of 0.6, which further validates the existence of convergent validity. Convergent validity complements discriminant validity.

6.3.9.4. Discriminant validity

Discriminant validity can be defined as the extent to which scale items show heterogeneity between different constructs and it ensures that measures of unlike constructs load on separate constructs. This study employed the correlation matrix and the chi-square CFA test methods to check the discriminant validity of the research constructs.

6.3.9.5. Correlation matrix:

When research concepts are different their correlation value should be less than one (1.0). Yet, a correlation value between constructs of less than 0.7 is advocated for in the empirical literature to confirm the existence of discriminant validity (Nunnally & Bernstein 1994:10). Otherwise, discriminant validity related to the correlation matrix can be tested by checking whether the AVE for two constructs is greater than the square of the correlation between the constructs. The discriminant validity of the research constructs in this study was checked by evaluating whether the correlations among the latent constructs were less than 1.0. Table 6.10 provides examples of assessing discriminant validity.

Table 6.10: Correlations between constructs

	PPP	TQM	GIS	EIA	GPM	OP
PPP	1.00					
TQM	0.797***	1.00				
GIS	0.878***	0.738**	1.00			
EIA	0.732	0.729	0.612	1.00		
GPM	0.851***	0.863***	0.545**	0.529	1.00	
OP	0.751**	0.743**	0.745**	0.829	0.758	1.00

Note: PPP=pollution prevention plans, TQM=total quality management, GIS=green information systems, EIA=environmental internal audit, GPM=green packaging management, OP=organisational performance

Source: Own compilation

As indicated in Table 6.10, the intersection of a row and column shows the correlation between the variable listed for the row and the variable listed for the column. For example, the intersection of PPP and TQM shows a correlation of 0.797. The footnote states that the three *** after 0.797 indicate the relationship was statistically significant at $p < .001$. The intercorrelation values for all paired latent variables are less than 1.0, thus, confirming the existence of discriminant validity. However, since the correlation value of all the variables i.e. (0.759) was close to 1.0, it exceeded the recommended threshold value of 0.7 (Nunnally & Bernstein 1994:12) (see Table 6.10 above). The range of values for the correlation coefficient is -1.0 to 1.0. In other words, the values cannot exceed 1.0 or be less than -1.0 whereby a correlation of

-1.0 indicates a perfect negative correlation and a correlation of 1.0 indicates a perfect positive correlation. Whenever the correlation coefficient, denoted as r , is greater than zero, it is a

positive relationship. Conversely, whenever the value is less than zero, it is a negative relationship. A value of zero indicates that there is no relationship between two variables.

6.4. CONFIRMATORY FACTOR ANALYSIS (CFA) MODEL FIT/ACCEPTABILITY

Prior to the testing of the hypotheses, CFA was performed to observe scale accuracy (i.e. reliability, convergent validity and discriminant validity) of the multiple-item construct measures using AMOS 24. To provide an acceptable model fit, as well as the resultant scale accuracy, some items in the construct scales were deleted because their factor loadings were below the recommended threshold value of 0.7.

As stated in Chapter 5, scale items were chosen to measure firm competitiveness. One scale item was deleted (FC1) to improve the validity of the questionnaire (Our enterprise procedures are compatible with our supply chain partners' business procedures). Of the six previously selected scale items used to measure firm performance, one item was deleted (OP1). (Our enterprise has the ability to reduce the time between the receipt of a customer order and final delivery to as close to zero as possible).

Various model fit criteria have been developed to help in understanding the CFA and SEM in diverse model-building assumptions. For example, in the case of other multivariable procedural statistical approaches, such as the analysis of variance, multiple regression and discriminant analysis, the establishment of model fit in CFA and SEM is complex. CFA and SEM fit indices apparently have no single statistical check of significance that determines a correct model for specified sample data. This is because alternative models can exist and they would yield the exact same data to model fit. Consequently, the researcher employed a different model fit criteria as a combination of assessing model fit (Hair *et al.* 2010:43). This study employed six model fit criteria to check the overall fit of the research model starting with the chi-square index.

Subsequently, the CFA model fit acceptability was indicated by the following indices: chi-square value over degree of freedom (χ^2/df) of value between 1 and 3, the values of comparative fit index (CFI), incremental fit index (IFI) and Tucker-Lewis index (TLI) equal to or greater than 0.90 and the RMSEA value to be equal to or less than 0.08 (see Table 6.11).

Table 6.11: Model of fit criteria and acceptable fit level

Goodness of fit criterion	Acceptable level	Level interpretation
Chi-square (χ^2)	Low χ^2 value (relative to degrees of freedom) with significance level < 0.05	Value greater than 0.05 reflects acceptable fit Values between 0.05 and 0.20 indicate a good fit. Non-significant & small values show good fit. Significant and large values show poor fit.
Chi-square/df or CMIN	Ratio 2:1 or 3:1	Values close to 1 reflect good model fit, values. < 3 reflect acceptable fit.
Goodness of fit index (GFI)	0.90 or higher	Values > 0.90 reflect good fit. Shows the amount of variances explained by model. It is the equivalent of R ² in multiple regressions.
GFI (AGFI)	0.90 or higher	Adjusted for the degrees of freedom Values > 0.90 reflect a good fit. Adjusts model fit for the degrees of freedom relative to the number of variables.
Akaike information criterion (AIC)		Small positive values relative to independence model indicate model parsimony.
Hoelter's Critical N (CN)		Gives a sample size below which the model is acceptable and above which the model becomes poorly fitting.
Root mean square residuals (RMSR) or RMS or RMR	0.08 or lower	Values close to 0 reflect good fit, marginal acceptance level is 0.08. Reflects the average amount of variances and covariances not accounted for by the model.
Model comparison and relative fit measures		

Note: *c* significance level - ****p*-value<0.001, *b* significance level- ***p*-value<0.05, *a* significance level- **p*value<0.1.
Source

Table 6.11 outlines the levels of acceptance and the interpretation for six out of the eight model fit indices employed in this study. Model chi-square (χ^2). The chi-square value is the traditional measure for evaluating overall model fit and assesses the magnitude of discrepancy between the sample and fitted covariance matrices. A good model fit would provide an insignificant result at a 0.05 threshold. The RMSEA is the second fit statistic reported in the LISREL program. The RMSEA tells us how well the model, with unknown but optimally chosen parameter estimates, would fit the population's covariance matrix. The GFI was created by Jöreskog and Sorbom as an alternative to the chi-square test and calculates the proportion of variance that is accounted for by the estimated population covariance.

Table 6.12: CFA model fit results

Fit index	Results
Chi-square/ d. f.	2.173
CFI (Comparative fit index)	0.975
RMSEA (root mean square error of approximation)	0.063
NFI (Normal fit index)	0.097
TLI (Tucker Lewis index)	0.949
IFI (Incremental fit index)	0.878
GFI (Goodness of fit indices)	0.811

Source: Own compilation

Table 6.12 indicates that the measurement model yielded a ratio of chi-square value to degree of-freedom of 2.173 and, NFI, IFI, TLI, CFI and RMSEA of 0.063, 0.895, 0.878, 0.949, 0.975, 0.961 respectively. Table 6.12 reveals the overall-model assessment and acceptable model fitness of the overall measurement model to the specified sample data. The study then proceeded to the hypothesis testing stage through the SEM using Amos 24 software, after obtaining an acceptable CFA measurement.

6.5. SEM CONCEPTUAL MODEL FIT ASSESSMENTS

The following section presents SEM, which starts by establishing an acceptable model fit using the same indices as in CFA. These are discussed in detail below and the results are shown in Table 6.13. The chi-square receives attention in the next section.

6.5.1. Chi-square (χ^2)

Chi-square is a very useful index in SEM, which is used to evaluate differences between observed and estimated covariance matrices. The main aim in SEM is to achieve a non statistical significance, which reveals a small difference between the sample variance covariance matrix and the reproduced implied covariance matrix. The difference between these two covariance matrices is enclosed in a residual matrix. A chi-square value of zero signifies a perfect fit or no difference between the values in some covariance matrix and the reproduced implied covariance matrix. Thus, when the chi-square value is close to zero or non-significant, the residual values in the residual matrix are close to zero, revealing that the theoretically specified model fits the sample data. Therefore, a smaller chi-square value (less than 3) and a larger p-value (>0.05) are preferred and recommended.

6.5.2. Goodness-of-fit index (GFI)

GFI ranges between zero and one. Nevertheless, the index in theory can produce meaningless negative values. Relatively, it is the percentage of observed covariance explained by the model. GFI is similar to R square in multiple regression, except that it cannot be interpreted as the percentage of error explained by the model. In other words, while R square in multiple regression deals with error variance, GFI on the other hand, deals with error in reproducing the variance-covariance matrix. GFI value increases when the sample grows larger. In principle, an acceptable model fit is reached where the GFI value is equal to or greater than 0.90.

6.5.3. Root mean square residual (RMR)

RMR stands for the average residual value those results from the fitting of the variance-covariance matrix for the posited model to the variance-covariance matrix of the sample data. These residuals are difficult to interpret, since they are relative to the sizes of the observed variance and covariances. Consequently, these residuals are best interpreted in the metric of correlation matrix. The outcome from the matrix embodies the average value across all standardised residuals and varies from zero to one. Therefore, an RMR value that is closer to zero for the tested model improves the model fit.

6.5.4. The norm fit index (NFI)

NFI was developed originally to CFI. It ranges from zero to one, with one representing a perfect fit. NFI reveals the proportion by which the researcher's model improves fit compared to the null model (random variables). In principle, NFI values below 0.90 show a need to re-specify the model.

6.5.5. The comparative fit index (CFI)

CFI is commonly referred to as the Bentler comparative fit index. It is used to compare the existing model fit with a null model that assumes that the latent variables in the model are uncorrelated. The CFI index compares the covariance matrix posited by the model to the observed covariance matrix. In addition, it evaluates the null model with the observed covariance matrix in order to estimate the percentage of lack of fit which is accounted for by going from the null model to the researcher's SEM model. CFI varies from zero to one. A CFI value close to one indicates a very good model fit. In principle, CFI should be equal to or greater than 0.90 to accept the model, showing that 90 percent of the covariation in the data can be reproduced by the given model (Hair *et al.* 2010:37).

6.5.6. The incremental fit index (IFI)

IFI is computed in the same way as the NFI, except that it takes into consideration the degrees of freedom. IFI deals with the NFI-related limitations in the issues of parsimony and sample size. The recommended value for IFI that gives an acceptable model fit should be greater or equal to 0.9. However, the IFI value can also exceed one, under certain circumstances (Hair *et al.* 2010:39).

6.5.7. Root mean square error of approximation (RMSEA)

RMSEA is an index of which the value answers the question of how well the research model will fit the population covariance matrix if it were available, with unknown but optimally chosen parameter values. It takes into consideration the error of approximation in the population. RMSEA expresses such discrepancies per degree of freedom, hence sensitising the index to the number of estimated parameters in the model. The recommended threshold value for RMSEA that yields a good model of fit should be less than or equal to 0.05. However, a value of less than, or equal to, 0.08 for the RMSEA index gives an adequate model fit. Table 6.13 shows the results.

Table 6.13: SEM model fit results

Fit index	Results
Chi-square/ d. f.	1.899
CFI (comparative fit index)	0.974
RMR (root mean square residual)	0.078
CFI (comparative fit index)	0.972
RMSEA (root mean square error of approximation)	0.065
NFI (normal fit index)	0.944
TLI (tucker lewis index)	0.962
IFI (incremental fit index)	0.973
GFI	0.877
AGFI	0.901

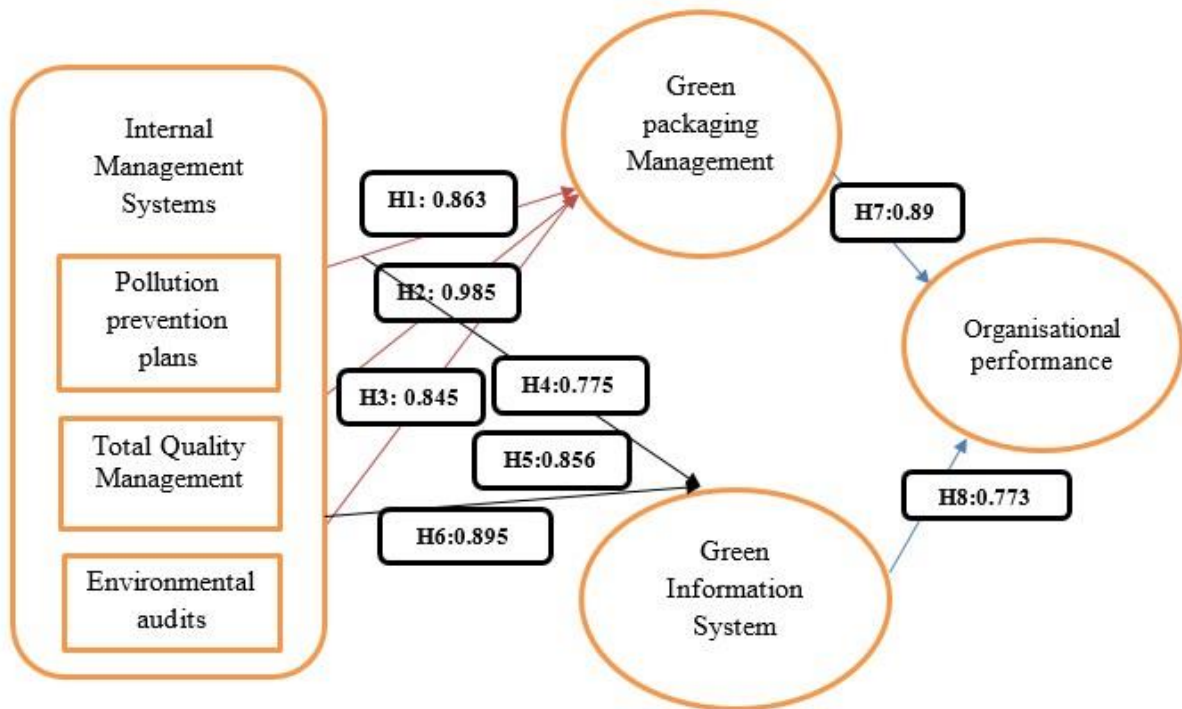
Source: Own compilation

Table 6.13 shows that the ratio of chi-square over degree-of-freedom is 1.899. This value is less than the recommended threshold of less than 3.0 and therefore, the model fit. Additionally, GFI, NFI, RMR, IFI, CFI, TLI and RMSEA values were 0.874, 0.944, 0.078, 0.973, 0.972, 0.962 and 0.065. All these model fit measures were above the recommended marginally accepted threshold of greater than 0.8 for GFI, NFI, RFI, IFI, CFI, TLI and less than 0.08 for RMSEA, which suggested that the proposed conceptual model converged well and could be a plausible representation of the underlying empirical data structure collected in the Gauteng. Since the model fit was acceptable, the study proceeded to test the research hypotheses, which are both linear and nonlinear as shown in the conceptual model in the next section.

6.6. SEM RESULTS AND THE CONCEPTUAL MODEL

This section focuses on the linear relationships hypothesised between internal management systems (pollution prevention plans, total quality management and environments), green packaging management, green information system and organisational performance; as shown in Figure 6.4. The hypotheses testing and results are also discussed.

Figure 6.4: The research conceptual model



Source: Own compilation

Figure 6.4 shows the eight linear relationships proposed between internal management systems (pollution prevention plans, total quality management and environments), green packaging management, green information system and organisational performance.

6.6.1. The hypotheses testing stage and results

In this section, the four tested hypotheses are stated and their validation or non-validation is addressed, based on the SEM results tabulated in Table 6.13. After the modification of the full conceptual model and results were obtained from it, the rest of the hypotheses were proved. The following are the results of all the hypotheses. Results are shown in Table 6.14. Table 6.14 below shows the eight hypothesised linear relationships which are discussed after the table.

Table 6.14: Hypothesis testing and path-efficiency

	HYPOTHESIS	PATH-COEFFICIENT	SIGNIFICANCE
H1: Pollution prevention plans and green packaging management	PPP → GPM	0.863 Significant	***Supported
H2: Total quality management and green packaging management	TQM → GPM	0.985 significant	***Supported
H3: Environmental audits and green packaging management	EAU → GPM	0.845 significant	***Supported
H4: Pollution prevention plans and green information systems	PPP → GIS	.972 significant	***Accepted
H5: Total quality management and Green information systems	TQM → GIS	0.856 significant	****Supported
H6: Environmental audits and green information systems	EAU → GIS	0.895 significant	***Supported
H7: Green packaging management and Organisational performance	GPM → OP	0.897 significant	***Supported
H8: Green information system and Organisational performance	GIS → OP	0.773 significant	**Supported

Structural model fits: $\chi^2/df=1.899$; GFI=0.874; NFI=0.944; RFI=0.923; IFI=0.973; TLI=0.962; CFI= 0.972; RMSEA=0.065. Note: c significance level - ***p-value<0.001, b significance level- **p-value<0.05, a significance level- *p-value<0.1, ns significant level- insignificant (p-value>0.1).

Source: own compilation

6.6.2. The impact of pollution prevention plans on green packaging management

This conclusion concerns the primary hypothesis (H1), which states that *Organisational pollution prevention plans have a positive influence on green packaging management*. The results in Table 6.14 and Figure 6.4 show that pollution prevention plans are mainly set to respond to the environmental problems that managers have always viewed as being a no-win proposition for their organisations. Pollution prevention plans are aligned with strategic goals of organisations, which help them to obtain new common wisdom that promises the ultimate reconciliation of environmental and economic concerns. In this new world, both business and the environment can win. Being green is no longer a cost of doing business, it is a catalyst for innovation, new market opportunity and wealth creation. Therefore, organisations create pollution prevention plans that allow and direct them to the unique and innovative green design of their packaging materials. Long-term plans allow organisations to choose the most effective green packaging that benefits both the organisations and the environment. The idea that a renewed interest in environmental management will result in increased profitability for business has widespread appeal. In a new green world, managers might redesign a product so that it uses fewer environmentally harmful or resource-depleting raw materials. This is an effort that if successful could result in cuts in direct manufacturing costs and inventory savings. Therefore, as hypothesised and suggested by this study, it is concluded that the successful pollution prevention plans of organisations lead to green packaging management.

6.6.3. The impact of total quality management and green packaging management

The second hypothesis (H2) states that *Total quality management has a positive influence on green packaging management*. This hypothesis investigated the existence of a positive linear relationship between total quality management and green packaging management of organisations. The empirical findings presented in Table 6.14 and Figure 6.4 confirmed the existence of a significant (p-value less than 0.05) linear relationship between total quality management and green packaging management. The results validated and supported H2 since the two criteria of significance level and positive factor loading were met. Today, the need to address sustainability arises from several different areas, including global resource depletion and raw material scarcity, stakeholder demands for information and accountability, the consumer's concerns, the deterioration of human rights and government policies and regulations (Beske & Seuring 2014:322; Seuring 2004). Similar to quality, sustainability can be positively related to company reputation (Driessen & Hillebrand 2013) and failure to meet

sustainability requirements may lead to a company not being selected as a supplier. Today, sustainability is a global requirement. For example, the EU current and future legislation focuses on creating regulations requiring sustainability integration similar to the EU requiring ISO9000 in the past, which increased the global pressure to implement quality (Zhu & Sarkis 2014:270). ISO14000 (environmental sustainability) and ISO26000 (social sustainability) encourage global sustainability efforts (Gmelin & Seuring 2014:7). Therefore, as hypothesised and suggested by other previous studies, this study concludes that total quality management has a positive influence on green packaging management.

6.6.4. The impact of environmental audit on green packaging management

The third hypothesis (H3) states that *Environmental audits have a positive influence on green packaging management*. This hypothesis was derived from an objective that seeks to ascertain whether environmental audits by organisations affect green packaging management of those organisations. Therefore, a positive linear relationship was posited between environmental audits and green packaging management. A positive linear relationship between these two constructs was established from a positive factor loading of 0.895, the p-value of less than (significant*** of < 0.001) rendered the positive relationship significant (see Table 6.14 and Figure 6.4). In other words, environmental audits are conducted by most organisations. Typically, this may be done to get a broad understanding of how much is being consumed, where and at what price to the consumer and what cost to the environment. These audits should be able to pinpoint inefficiencies, high costs and environmentally damaging activities. It is an essential step of a green journey to a sustainable way of working. In addition, when organisations consider thorough environmental audits on their operations, they will tend to implement environmentally friendly designed products and packaging. In other words, the design of their packaging material will be usable and recyclable. Therefore, this hypothesis is supported and considered valid.

6.6.5. The impact of pollution prevention plans on green information systems

The fourth hypothesis (H4) claims that *Firm's competitiveness has a positive influence on their firm performance*. This hypothesis was derived from an objective that seeks to ascertain whether firm competitiveness impacts on firm performance of SMEs. As such, a positive linear relationship was posited between firm competitiveness impact and firm performances. Also, a positive linear relationship between firm competitiveness and firm performance was established from a positive factor loading of 0.972 (significant*** p-value of less than 0.001) that rendered the positive relationship significant (refer to Table 6.14 and Figure 6.4). This

means that sustainable development and sustainability are concepts promoted as the basis for sound future development and economic growth. They are also terms shaping much of the mainstream environmental movement. Pollution prevention should be recognised as a core part of sustainable development and long-term planning. Fusing these two movements or worldviews can make both more successful in solving environmental problems. Approaches and technologies can assist businesses and communities in implementing sustainability. Therefore, pollution prevention plans influence the adoption of green information systems by organisations.

6.6.6. The impact of total quality management on green information systems

Hypothesis 5 (H5) was dedicated to check the nature of influence that GIS has on TQM. It was anticipated that if organisations implement total quality management they intend to consider more advanced and effective GIS. This hypothesis was supported by the correlation between the level of GIS implementation and the level of GIS impact on TQM dimensions was evaluated. If GIS has an impact on TQM, then it is reasonable to suppose that when GIS is employed intensively, the perceived impact on TQM has to be greater. The findings presented in Table 6.14 and Figure 6.4 confirm this hypothesis because all the measures of the dimensions of GIS are positive and significantly correlated ($p < 0.01$) with the measures of GIS impacting on TQM dimensions. Therefore, as hypothesised, there is a positive relationship between green information systems and total quality management.

6.6.7. The impact of environmental audits on green information systems

Hypothesis 6 (H6) intended to measure the nature of influence of environmental audits on green information systems. The findings in Table 6.14 and Figure 6.4 show that when conducting environmental audits, organisations check various aspects including saving resources, green products, clean production and environmental production. The growth of environmental auditing represented a growing recognition, on the part of business, of the need to develop and employ more effective internal tools to control environmental performance. An environmental audit is done to safeguard the environment and minimise risks to human health. The results of the audits have a positive and significant influence on the adoption of green information systems by organisations (see Table 6.14 and Figure 6.4). In other words, this study discovered that environmental audits direct and control the technological systems that they should adopt and reject. Therefore, this hypothesis is valid and supported.

6.6.8. The influence of green packaging management on organisational performance

The seventh hypothesis (H7) predicted the nature of influence of green packaging management on organisational performance. The hypothesis intends to articulate the nature of the relationship between the two constructs. The current research found that green packaging management positively and significantly influences organisational performance (refer to Table 6.14 and Figure 6.4). In other words, most organisations have started to benefit from green management. The findings further illustrate that green packaging is being used as a marketing tool by organisations to gain competitive advantage. Green packaging offers a unique look and definition to the existing products, which leads to customer satisfaction as well as a positive effect on the environment. Based on the research done previously, much has been done on green packaging management. Some scholars hold negative views that, given the obvious externality, using green packaging management in implementing environmental management may damage a company's economic interests or reduce its competitive power. While society may gain benefits, the company itself bears all costs of environmental management practices (Stanwick & Stanwick 2017:195). In practice, some organisations are unwilling to implement environmental management programmes, risking fines and prosecution, by ignoring or circumventing increasingly strict environmental protection regulations. Other researchers have published contradictory research demonstrating that green packaging management could improve not only environmental but also economic performance of a company (Hart & Ahuja 1996).

6.6.9. The influence of green information systems on organisational performance

The last hypothesis, H8, was dedicated to measure the nature of the influence that green information systems have on organisational performance. The findings in Table 6.14 and Figure 6.4 show that implementing green information systems positively and significantly influences both operational and financial performance. Green information systems (GIS) play an increasingly important role to promote organisational reform and improve ecological efficiency. Due to both economic and environmental pressures, corporations in emerging economies are eager to enhance their sustainability with GIS implementation (Heeks, Subramanian & Jones 2015). GIS implementation utilises all kinds of information and communication technologies (ICT), such as environment auditing systems, automation systems, groupware and teleconferencing, to reduce negative impacts on the environment by optimising business activities. The adoption of green information systems helps organisations to operate in a manner that supports the environmental conservation policies. In addition, green

information systems eliminate environmental threats by providing technologies that support processing in a cost-effective way. Therefore, this hypothesis was supported.

6.7. SUMMARY

Chapter 6 dealt with six main issues, namely normality and linearity, descriptive analysis, testing for measurement accuracy and checking that the models fit to the specified sample data. It also addressed the testing of the proposed hypotheses by using SEM. Generally, the measures were found to be adequately acceptable, and therefore, reliable and valid. In addition to this, the findings of the research model constituting this study indicate that the specified sample data fit the conceptualised model well. The study assessed the influence the internal environmental management on green packaging, green information systems and organisational performance. The implications of these research findings and an overall conclusion are provided in Chapter 7.

CHAPTER 7 CONCLUSION AND RECOMMENDATIONS

7.1. INTRODUCTION

This chapter presents the final goal of the research study, which is the theoretical and practical implications of the findings. The chapter starts with a summary of all the preceding chapters and subsequently provides the researcher's assessment of the implications of the findings in relation to the body of theory, for future studies. This is followed by policy implications and recommendations to plastic manufacturers and customers. The chapter concludes by highlighting areas in which no general consensus is reached and which need further research in future.

7.2. SUMMARY OF THE THESIS CHAPTERS

The resolve of the study was to investigate the influence of internal environmental management systems on green packaging management, green information systems and organisational performance of plastic manufacturing, packaging and recycling organisations. The study was partitioned into seven distinct chapters, each serving a different purpose. The first chapter presented a preliminary justification to the study by providing expositions on the background to the study, the statement of the problem, the primary, theoretical and empirical objectives, a summary of research hypotheses, the delimitations of the study, the research design, statistical analysis and ethical considerations. The second chapter resumed by an extensive review of the literature, which focused on the internal environmental management covering pollution prevention plans of organisations, total quality management and environmental audits. The third chapter of the study was dedicated to the analysis of the literature focusing on green packaging management and green information systems. The range of the thesis spanned through a spectrum of various factors of green packaging management and green information systems exposed to these organisations. In the fourth chapter, attention was directed to the organisational performance of the organisations. A concise review of the literature concluded in the formulation of a null hypothesis and an alternative hypothesis. The apex of this chapter was the expansion of a conceptual framework summarising the proposed matrix of relationships. In the fifth chapter of the study, an in-depth analysis of all methodological considerations employed in the study was conducted. This chapter serves as a clear guide of all actions taken from the commencement to the completion of the study. Then Chapter 6 gave an exposé of the analysis of data as well as the interpretation of the results emanating from the study. In the seventh chapter, the study is concluded with emphasis on conclusions, overall

policy implications, contributions of the study, realisation of objectives, limitations of the study and implications for future research.

7.3. CONCLUSIONS BASED ON THE THEORETICAL OBJECTIVES

This section discusses conclusions deduced from the theoretical objectives that were set for the study.

7.3.1. Conclusions drawn from the review of literature on internal environmental management

The first theoretical objective was dedicated to discuss the literature focusing on the nature of the concept of internal environmental management, which was addressed in Chapter 2. The study acknowledges the existence of various dimensions of definitions for internal environmental management. However, after considering the various definitions of internal environmental management, there were several commonalities that were clearly visible in all sub elements. These include the views that it stresses on organisations' elements within the organisation, including current employees, management and especially corporate culture, which defines employee behaviour and organisational behaviour. The study also concedes that organisations are beginning to focus not only on organisational performance but on the environmental aspects, which contribute to the overall performance of an organisation. Nevertheless, the literature on organisations reflects that there is lack of detailed pollution prevention plans on strategic levels of management and this affects the adoption of green information systems and green packaging management. In addition, it was established that TQM is a management philosophy that seeks to integrate all organisational functions (marketing, finance, design, engineering and production, customer service, etc.) to focus on meeting customer needs and organisational objectives.

TQM views an organisation as a collection of processes. It maintains that organisations must strive to continuously improve these processes by incorporating the knowledge and experiences of workers. The simple objective of TQM is doing the right things right the first time, every time. TQM is infinitely variable and adaptable. Although originally applied to manufacturing operations and for a number of years only used in that area, TQM is now becoming recognised as a generic management tool, just as applicable in service and public sector organisations.

There are a number of evolutionary strands, with different sectors creating their own versions from the common ancestors. It was also found that there is no single theoretical formalisation

of total quality, but it is a discipline and philosophy of management, which institutionalises planned and continuous improvement and assumes that quality is the outcome of all activities that take place within an organisation, that all functions and all employees have to participate in the improvement process and that organisations need both quality systems and a quality culture.

7.3.2. Conclusions drawn from the review of literature on green packaging management and green information systems

The second theoretical objective was dedicated to satisfy the parameters of green information systems and green packaging management. Based on the findings, it was found that the environment is deteriorating because of human activity and disturbance and there is a very real need to address this problem, because it puts at serious risk the basis of human civilisation. In this essence, green information systems (GIS) have been identified as a key enabler for transforming organisations and society towards more environmental sustainability. Additionally, GIS are expected to create an impact on individual beliefs about environmental sustainability and enable more sustainable work practices through virtualisation and remote work, which will enable organisations to meet compliance imperatives and social norms or increase resource efficiency amongst others. It was argued that GIS plays an important role in reducing pollution and waste but not as strategy but most organisations are enforced to adopt these GIS which thus far makes most of these organisations benefit whilst some still suffer. It was also found that growing environmental concerns have been raised within society, which is also affecting packaging strategies of organisations. However, it was found in the literature that not all organisations follow this exclusive demand for returnable packages. Mostly, the manufacturers (suppliers) have an impact on the design and the durability of the packaging materials and retailers make use of what they are supplied by their suppliers. In addition, most manufacturing organisations have sufficient size and financial power to exert sufficient influence on retailers to go along with the organisations' preferred packaging solutions. However, packaging was found to be a marketing tool, which has an influence on the needs and satisfaction of customers. Therefore, there is need also to check from a marketing perspective when addressing the issue of green packaging management.

7.3.3. Conclusions drawn from the review of literature on organisational performance

Organisational performance is reflected from the perceived benefits expected from the integration of environmental management in a business operation. The literature identified that organisations can enhance their environmental performance and business efficiency by

implementing the ISO 14001 EMS. Among the perceived benefits argued in the literature are enhancing good corporate image, reducing waste, minimising cost, increasing customer satisfaction, increasing productivity, better goodwill, increasing market share and of course profitability. In support, the literature viewed the investment of the green product innovation and green process innovation to be contributing a positive impact to the organisations. According to Johansson (2012:12) the product development project success is measured by the profit, sales and market share. In the same way, Doran and Ryan (2012:427) concluded that an eco-innovation has a positive and significant impact on the organisations' performance. Various studies (e.g. Hwee 2009:408) discuss whether implementing the environmental strategy and certification of ISO 14001 EMS has a positive influence on the organisations' performance, but despite the number of studies in this area, none emphasised the influence of green innovation and green promotion on the organisations' performance in detail. Punitha and Mohd Rasdi (2013) highlighted the benefits and advantages that organisations will achieve by being part of a green businesses, such as superior financial and market performance. Therefore, it can be concluded that the economic performance and operational performance (aspects that relate to the improvement of green manufacturing process or method) are the most common dimensions used to measure the overall organisational performance.

7.4. SUMMARY AND CONCLUSION TO THE STUDY

The current study targeted plastic manufacturing and plastic packaging organisations; those who manufacture plastic packaging products and those who sell or use plastic packaging. A quantitative approach was used to resolve the impact of internal environmental management (pollution prevention plans, total quality management and environmental audits) on green packaging management, green information systems and organisational performance. It is anticipated that the study will contribute towards the body of theoretical work available on the topic for future studies; it is also anticipated that it will assist plastic manufacturers by providing the vital role of environmental management in their overall performance.

In this study, six main constructs were focused on, namely pollution prevention plans, total quality management, environmental audits as predictor variables of green packaging management and green information systems; whereas green information systems and green packaging management mediated organisational performance. A theoretical framework was developed using the resource-based view theory and the institutional theory. The theoretical frameworks built a strong foundation on the relational situation among pollution prevention

plans, total quality management, environmental audits, green packaging management, green information systems and organisational performance.

The following four reliability tests were used to measure reliability: standardised Cronbach's coefficient alpha, which measured the internal consistency of each research construct; higher item-total correlations, which revealed the statistical agreement among the measured items; composite reliability, which was used to check internal consistency of the measurement model used in this study; and higher average variance extracted estimates, which were used to check how well each construct was represented in the model.

Convergence validity was measured using positive factor loadings above the recommended threshold of 0.5. This was complemented by the higher composite reliability values. In addition, discriminant validity was measured using the correlation matrix, which checked whether the correlations among latent constructs were less than 1. This was complemented by the CFA chi-square values.

The linearity relationships among the five research variables were measured by conducting the CFA and SEM tests using Amos 24. Both CFA and SEM employed the following seven measurement indices: the chi-square, which measured how well the theoretically specified research model fits the sample data in this study. Goodness fit index dealt with the errors in reproducing the variance-covariance matrix. RMR revealed the average residual value that resulted from fitting the hypothesised model to the variance-covariance matrix of the sample data. Norm fit index showed the proportion by which the researcher's hypothesised model improves fit compared to the null model. Incremental fit index was used to deal with the NFI-related limitations in issues of sample size and parsimony. Comparative fit index evaluated and compared the null model with the observed covariance matrix in order to estimate the percentage of lack of fit accounted for by going from the null model to the researchers' hypothesised structural equation model. The RMSEA answered the question of how well the research model fitted the population covariance matrix if it were available with unknown but optionally chosen values. In addition to these indices, SEM employed p-values and factor loadings to validate or invalidate the research hypothesis. The validation of each hypothesis under SEM depended on two main criteria. The first was concerned with factor loadings, therefore, the hypothesised positive linear relationships were validated by positive factor loadings above 0.5, while posited negative relationships were confirmed by negative factor loadings. The second criteria required that the relationships tested have at least one star (*), two stars (**) or three stars (***). The stars indicated significance at three levels, which are:

(***) for p-value less than 0.001, (**) for p-value less than 0.05 (*) for p-value less than 0.1. The next sections focuses on the hypotheses individually.

The hypotheses were formulated in the first chapter. Below are the results based on the findings.

7.5. CONCLUSIONS

Based on the objective and the findings, this study, therefore, concluded that the use of environmental management tools such as internal environmental auditing, total quality management, green information systems, pollution prevention plants and green packaging allow organisations to anticipate and to avoid problems in a proactive rather than reactive way. They assist with analysis and reporting of performance and with day-to-day management, which requires timely feedback to make appropriate adjustments. The tools are important for the allocation of scarce resources. There is a wide diversity of approaches, which is slowly being narrowed. The CSA and the ISO are playing important roles at the national and international levels in developing environmental management tools and pollution prevention guidelines. The problem now faced by the very rapid application of the tools is preferable to the earlier stages in which there was a slow acceptance of the need for such tools. The tools are now being used, despite their imperfections, with the understanding that the users of the tools are learning how to improve them. This continuous improvement dictates that environmental researchers (scientists, social scientists and humanities scholars) must not only refine their classical research skills, but also their skills in negotiation and public engagement.

7.6. CONTRIBUTION OF THE STUDY TO THE PLASTIC MANUFACTURING ORGANISATIONS

The findings of the study are mostly essential to plastic packaging organisations. The study provides a better understanding to plastic packaging organisations on the importance of green manufacturing on organisational performance. The study emphasised the internal environmental management of the plastic packaging organisations analysing it from the internal environment management perspective. This study contributes much knowledge, which is vital and beneficial to the plastic packaging organisations. First, it discovered that pollution prevention plans serve as an effective public relations tool. In other words, a company that demonstrates an active commitment to reducing its environmental impacts will have a more positive relationship with the local community and with its customers. This capitalises that it is important for these organisations to align their strategic goals with environmental goals for

them to gain a competitive advantage. Secondly, the study contributes by providing knowledge on the predicament of total quality management and green package management. Although previous studies (Emaseasy 2013) have done much on environmental management, this study used total quality management for the first time to measure green packaging management. The results indicated that total quality management, which is an internal aspect of an organisation, greatly influences green packaging management. In this view, it can be précised that the view of total quality management supports the design of the plastic packaging materials, and it also supports the uniqueness of a product, which will stimulate consumer satisfaction and result in an organisation expanding their markets and improving their competitive advantage. Therefore, these findings are important, as they create awareness of the advantages of considering environmental management from an internal organisational perspective. Thirdly, given the environmental policies by the government, it is difficult for plastic manufactures to compete effectively due to the nature of the plastic industry. Therefore, this study provides information on the use of internal environmental audits. This explains the essence on why plastic packaging organisations should investigate their manufacturing processes, skills, products and goals for them to achieve their long-term goals as well as environmental goals. The study also contributes to the body of knowledge as it has identified that the aspects of GIS complement each other: environmental management is a system aspect that makes policies about what organisations should do. If organisations implement green accounting completely in accordance with policies, it is inferred from the factors that many costs increase and the production technology is to be solved. The method of green information systems can also increase the resource productivity. It is suggested in the study that if organisations are willing or are required by the government to implement green information and green packaging management in the future, a green design method can be adopted. It can deal with the problem of energy savings plus production increases. In addition, it can achieve the goal that has been recognised of green design in preventing environment deterioration and maintaining sustainable corporate operation.

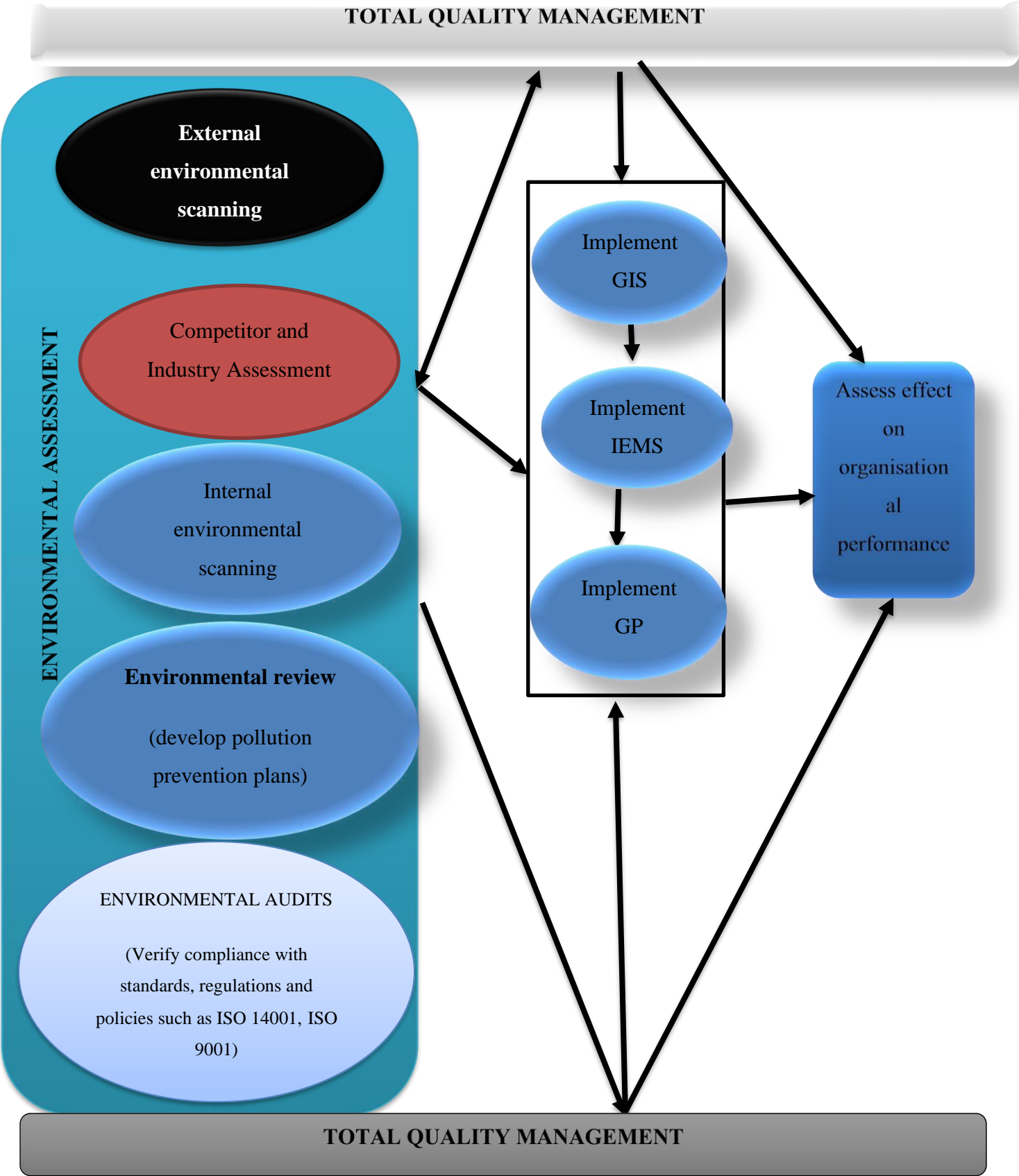
The increasing importance of sustainability requires efforts in every field of research and application. Supply chain design as the top level of supply chain planning offers great potential for the improvement of ecological logistics performance. The respective strategic decisions comprise the structural and conceptual design of a supply chain network including its material and information flow processes. Classic approaches consider logistics costs and performance as primary objectives, whereas modern approaches integrate ecological objectives and, thus, are considered as green supply chain design (GSCD) approaches. The goal of this study was to identify current scientific contributions to GSCD, discuss their applicability and to identify

an outline of an ideal GSCD framework. Hence an extensive academic literature research was conducted comprising drivers, objectives and measurement systems as well as the respective models, frameworks and instrument.

7.7. THE ENVIRONMENTAL MANAGEMENT FRAMEWORK

One of the key objectives of this research was to create an environmental management framework. The existing environmental management frameworks and policies provide a direction towards the future frameworks. In this case, this study proposes the internal environmental management framework, which is suggested to be more effective for most organisations. Given the increasing pressure by government, organisations should consider their internal environmental management systems and align them with the vision and mission. Therefore, this study provides a five-stage managerial framework that is aimed at the pillars of environmental management as shown in Figure 7.1.

Figure 7.1: Environmental management framework



Source: Own compilation

Stage 1: Foster and adopt total quality management systems and culture

In a total quality management effort, all members of an organisation should participate in improving processes, products, services and the culture in which they work. This stage suggests that managers should align their quality control systems with the environment, which means that everything a company does, from training employees to buying new tools, should be done with the environment in mind. Employees must be empowered to work toward common environmental goals and allowed to operate in a workplace free from pollution. Processes must be integrated into one larger process and everyone must be on the same page, buying into the company's vision, mission and guiding principles. The SWOT analysis should be adopted for the purpose of identifying the strengths, weaknesses, opportunities and threats of the organisation. Organisations should check if they have competent skills that will enable them to utilise total quality management as a tool and strategy to boost the organisation's performance, check their short-term and long-term financial plans, including their financial position. Strong employee attitudes, excellent customer service, large market share, personal relationships with customers, leadership in product innovation, highly efficient and low-cost manufacturing, reduce waste and improve continuously, reduce resource depletion, reduce or eliminate environmental pollution, design products for minimal environmental impact in production, use and disposal, control environmental impact of raw material sourcing, control environmental impact of new developments, promote environmental awareness among employees and promote environmental awareness within the community.

The weakness will be identified through benchmarking. This can be benchmarking of processes, strategies, management principles and procedures, technology and production processes and competitive advantage in products. It may also include an assessment of environmental management systems (EMS), management performance, environmental accounting, resource and waste management, product environmental quality, environmental education and training, customer relations and emergency response. The opportunity and threat analysis is carried out by examining external factors in domestic and export markets. This is usually broken down into environmental factors and competitors, including technological factors, economic challenges, political factors, local issues, governmental issues, employee demands and workplace diversity.

Stage 2: Assess the organisational environment

One of the first steps that plastic packaging managers should consider in the environment assessment process generally involves identifying the organisation's strengths, weaknesses,

opportunities and threats (the SWOT analysis). This will help them to build a strong foundation of knowledge to ensure the development of a strategic plan that remains relevant, meets the needs of the changing client population and makes the best of the available resources. Internal assessment is an inventory of the strengths and weaknesses of the organisation's operations. It includes a survey of human and physical resources, an analysis of the satisfaction of clients and stakeholders and an assessment of the effectiveness of the Board and of the staff. The result of an internal assessment reveals the strengths and weaknesses that confront the organisation. External assessment, or an external environmental scan, is an inventory of the political, economic, social and technological forces that influence the mission and goals of an organisation and how it functions. It involves analysis of the current environment and the trends that may affect it. It also includes an analysis of competitive and collaborative forces and agents. The result of an external assessment reveals the opportunities and threats that confront the organisation.

Stage 3: Control for quality

To implement an effective quality control programme, plastic managers should first create and document the approach to quality control. This document should focus on the manufacturing process. In most cases, it is advisable that plastic managers should focus on the quality of raw material. For example, recyclable and non-hazardous raw materials should be considered.

Above all, the document should focus on the following sub-steps:

- Defining the quality standards for each product
- Selecting the quality control method
- Defining the number of products that will be tested
- Creating and training employees for quality control
- Creating a communication system for reporting defects or potential issues.

Next, they should create procedures for handling defects and they should consider the following:

- Will batches be rejected if defective items are found?
- Will there be further testing and potential repair work involved?
- Will production be halted to ensure that there are no more defective products created?
- How will new product versions be handled?

Step 4: Assessing the environmental risks

This stage entails that top management should establish long-term environmental plans by enhancing effective institutional structures and mechanisms within the organisation that will enable them to achieve sustainable developments. This refers to giving effect to applicable policy directives, agreements and protocols aimed at ensuring global sustainability. An environmental risk assessment allows the organisation to assess the likelihood of its business causing harm to the environment. This includes describing potential hazards and impacts before taking precautions to reduce the risks. It uses similar techniques to the health and safety risk assessment the organisation already has to perform:

- identify any hazards, which includes possible sources of harm
- describe the harm they might cause
- evaluate the risk of occurrence and identify precautions
- record the results of the assessment and implement precautions
- review the assessment at regular intervals.

Checking waste storage and disposal, for example making sure that proper containers are used and are located away from drains and watercourse emissions, dust and other substances to the air use and disposal liquid waste drainage and disposal environmental impact of raw materials, such as potentially toxic metals or other materials environmental impact of packaging. In addition, a PESTLE analysis may help when assessing the risk arising from the impact of external factors on a charity, particularly when working internationally. Political factors may be altered by the government's influence on a country's infrastructure. This may include tax policy, employment laws, environmental regulations, trade restrictions, tariffs, reform and political stability. Charities may need to consider where a government does not want services or goods to be provided. Economic factors include economic growth, interest rates, exchange rates, inflation, wage rates, working hours and cost of living. These factors may have major impacts on how charities operate and make decisions. Social factors include cultural aspects, health and safety consciousness, population growth rate and various demographics. Technological factors include ecological and environmental aspects and available products and services. Charities may need to innovate, having considered the compatibility with their own technologies and whether they are transferable internationally. Legal factors include any law, which may impact on the environmental and organisational performance. Environmental factors include an awareness of climate change or seasonal or terrain variations, which may affect charities' service delivery methods.

Perform environmental audits and scanning:

In this stage, management should create overall time schedules of when they plan to audit each process that will be audited for system conformance. The cycle should be on a yearly basis and the frequency of audits on any given process should be linked to criteria like the environmental importance of the process and past audit conformance. The audit schedule should be available to employees and managers. After confirming the audit with the process owner, the auditor should make preparations for the audit itself. Review of the process is critical, as is understanding the environmental aspects associated with the process. This is the key difference between an internal audit for a QMS and an internal audit for an EMS. While a QMS audit will look at a process and how well it is performing against the plans for the product or service of the company, an EMS audit will look at how well the process is performing against the plans for the environmental aspects associated with the process. A good audit plan will ensure the availability for all the right data to support these process plans. Environmental scanning is a process that systematically surveys and interprets relevant data to identify external opportunities and threats. An organisation gathers information about the external world, its competitors and itself. The company should then respond to the information gathered by changing its strategies and plans when the need arises.

The environmental scanning process encompasses several steps. The first step is for an organisation to gather information about the world in which it operates, including information about the economy, government, laws and demographic factors such as population size and distribution. Next, the organisation should focus on its competitors. The next step is to conduct an internal scan of the organisation. Examine the company's strengths and weaknesses. Consider where the company is now and where it plans to be in five or ten years and interview or survey leaders of the company.

Sometimes an organisation also might decide to gather information from community services and religious groups and interview the leaders of the groups or use surveys. This might help a company decide, for example, whether it should try to work with the other organisations and what activities to pursue. When conducting an environmental scan, a variety of methods should be used to collect data, including publications, focus groups and leaders inside and outside the organisation, media, civic associations and the library. After the data are collected, the final step is to analyse the data and identify changes that can be made.

Step 5: Establish pollution prevention plans

Pollution prevention planning is a process to examine current operations and develop a plan to eliminate or reduce pollution at the source. Reducing pollution can make a company more efficient. Pollution is often the result of process inefficiency and can be thought of as raw material that is not becoming a marketable product. A pollution prevention plan is similar to any other business plan. Management and staff need to have a clear understanding of why the plan is being implemented, what will be done and who will do it. Such plans can target a specific pollutant, an entire production process, or the whole facility. The process should include policy statements that summarise the company's commitment to pollution prevention. This statement should be endorsed by the owner and distributed to all employees and it should be assigned to a senior staff member to lead the programme. Product reformulation, process modification, equipment redesign, recycling and reuse of waste materials should all be considered. Pollution prevention planning should focus on organisational commitment towards the environment, baseline review of the processes, planning, implementation, monitoring, reporting, reviewing, evaluating and improving.

Stage 6: Develop a green information management system

Green information management systems aim to minimise the negative impact of IT operations on the environment by designing, manufacturing, operating and disposing of computers and computer-related products in an environmentally-friendly manner. The main focus of managers at this stage should be reducing the use of hazardous materials, maximising energy efficiency during the product's lifetime and promoting the biodegradability of unused and outdated products. Managers should also use the information systems to create green packaging material that will be environmentally friendly. Such materials can be recyclable. The development of green packaging will enable packaging of lightweight, recyclable, re-use, recycling, biodegradable materials and to prevent the use of non-ecological materials.

7.8. MANAGERIAL IMPLICATIONS AND RECOMMENDATIONS

7.8.1. Managerial implications to the plastic manufacturing managers

This examination gives signs to managers who look to execute environmental practices as they could improve operational performance and even supply chain performance. Given the developing consideration paid by driving worldwide managers to the selection and execution of corporate ecological techniques, it is important that they understand key green practices and that sustainability affects operational performance. Practices developed with suppliers such as

mutual understanding of environmental responsibilities and working together to solve environmental problems and share know-how can help develop unique environmental competencies by enhancing the value chain. These practices may involve awareness raising seminars on the importance of cleaner production, as well as guidance from suppliers to set up the environmental programmes that need to be developed. In a similar fashion, customer practices can improve environmental capabilities as well as corporate reputation and thus help the company gain greater market share. Mutual understanding in this case may be accompanied by the provision of information on ecological issues concerning products and production methods.

Other practices are also important when developed along with customers, such as improvement of packaging, eco-labelling, recovery of end-of-life products, use of environmentally-friendly transport and packaging collection. In relation to environmental certifications, ISO standards can help to develop unique organisational capabilities that have not been captured by other measures adopted by the organisation. The requirement for environmental certification ensures the commitment of companies to continuously improve environmental management systems, facilitating the choice of suppliers through environmental criteria. However, at this point, it is necessary to verify the reliability of this instrument, eliminating doubts about its efficacy and reducing the possibility of adopting it in a symbolic behaviour.

It is equally important that there be consolidated practices in which both top management and others are committed to and aligned with the environmental objectives in order to strengthen a company's ability to communicate the environmental performance and impact of their products. Thus, managers who can understand the supplier-customer relationship and the need for environmental management in companies need to consider external green integration as a critical factor in the implementation of an effective green supply chain management system. In addition, a company can achieve multiple objectives by combining several different green practices, simultaneously leading to sustainable value for all involved.

7.8.2. Managerial implications to the plastic manufacturing sector.

Mutual understanding of environmental responsibility can be understood as a joint analysis of the initial data needed to produce a product and its environmental impact. Lifecycle analysis is used to understand product life, reduce obsolescence, and find solutions that extend the lifecycle using eco-efficient features. Based on this, companies will develop cleaner products and processes, achieve product performance and meet customer requirements. In addition, assessments and reports that describe the environmental performance of suppliers and

consumers can generate trust and commitment to define and develop established environmental objectives. The paper industry is one of the sectors analysed, and this type of industry-wide understanding includes deforestation and potential loss of biodiversity, air and water emissions from pulp and paper, and chemicals in the process. It was able to identify environmental impacts such as the generation of waste and the production of waste and sludge. With the understanding and environmental responsibility of the partners involved in the paper supply chain, a possible solution is to prove the origin of the fibre (APEO). It is necessary to establish standards for the use of hazardous substances in fabric softeners, lotions, perfumes and additives during the manufacturing phase and to create systems for managing industrial waste. For example, collaboration to mitigate the impact of environmental activities, such as investing in research and innovation, is also an important part of environmental integration, identifying problems and solutions, and launching new products.

7.9. SUGGESTIONS FOR FUTURE RESEARCH

The study only targeted the plastic packaging organisations and a few enterprises in other sectors of the economy. It is difficult to generalise the findings across all the economic sectors, as industries have varying policy regimes. The research also only targeted plastic packaging organisations in the Gauteng province in South Africa, ignoring enterprises in other regions. Although this was necessary in the face of time and financial constraints, it is difficult to generalise the findings across all the provinces. This is partly because the researcher focused on the backbone of the manufacturing sector. Gauteng has the majority of the manufacturing organisations with a high population size compared to other provinces, therefore, the researcher minimised the sample size to Gauteng. It is therefore recommended that future research targets other sectors to determine whether similar results can be attained. Future researchers must also undertake research in other provinces of the country such as North West, Northern Cape, Eastern Cape, Western Cape, Free State and Limpopo. This study acknowledges a number of limitations that need to be addressed. If the sample size was large enough, it would be beneficial to advance the diversified statistical techniques to improve validity and reliability of the results and increase accuracy of prediction. Secondly, potential future research could examine the different influences of different dimensions of internal environmental management on organisational performance and the relationship between green information systems and green packaging management.

7.10. CHAPTER SUMMARY

This chapter provided the potential extracted by the research data findings. It underlined that the study has both theoretical and practical implications, with the intention that plastic packaging organisations should benefit from the study. In line with non-linear relationships between variables, the study recommends the following to the plastic packaging organisations: to create pollution prevention policies and strategies to improve organisational performance by eliminating pollution and avoiding penalties from the government. Pollution prevention plans, total quality management and environmental audits were used as independent variables to measure organisational performance. In line with the linear relationship between the adoption of green packaging management and organisational performance, it is recommended to the plastic packaging organisations that enterprises facing slow-moving sales growth, profitability and general performance challenges, should use green technologies as a remedy for their problems.

REFERENCES

- ABBASI, M. & NILSSON, F. 2012. Themes and challenges in making supply chains environmentally sustainable. *Supply Chain Management: An International Journal*, 17(5):517-530.
- ABD AZIZ, N.N. & SAMAD, S. 2016. Innovation and competitive advantage: Moderating effects of firm age in foods manufacturing SMEs in Malaysia. *Procedia Economics and Finance*, 35:256-266.
- ABID, G., KHAN, B., RAFIQ, Z. & AHMED, A. 2014. Theoretical perspectives of corporate governance. *Bulletin for Business and Economics*, 3(4):166-175.
- ADLO, F, NECKEL, S. 2019. Futures of sustainability as modernization, transformation, and control: A conceptual framework. *Journal of Sustainable Science*, 14:1015–1025.
- AHI, P. & SEARCY, C. 2013. A comparative literature analysis of definitions for green and sustainable supply chain management. *Journal of Cleaner Production*, 52:329-341.
- AHUJA, S. 2010. Intellectual property crime: The urgent need for global attention. *Global Policy*, 1(3):318- 320.
- AKADIRI, P.O., CHINYIO, E.A. & OLOMOLAIYE, P.O. 2012. Design of a sustainable building: A conceptual framework for implementing sustainability in the building sector. *Open access buildings*, 2:126-152. [Online]. Available at: <https://www.mdpi.com/journal/buildings>. Accessed: 26/04/2019.
- ALLOGGIO, S. & THOMAS, K. 2013. Resisting the lure of deferral: Realising the South African National Development Plan. *Social Dynamics*, 108-110.
- ALMARRI, K. & GARDINER, P. 2014. Application of resource-based view to project management research: supporters and opponents. *Journal of Social and Behavioural Sciences*, 119:437-445.
- ALVI, M. 2014. *A manual for basic techniques of data analysis and distribution*. MPRA Paper. Munich: University Library of Munich.
- AMPUERO, O. & VILA, N. 2006. Consumer perceptions of product packaging. *Journal of Consumer Marketing*, 23(2):102-114.

- ANDERSON, S.W., DALY, J.D. & JOHNSON, M.F. 1999. Why firms seek ISO 9000 certification: Regulatory compliance or competitive advantage? *Production and Operations Management*, 8(1):28-43.
- ANJARD, R. 1998. Process mapping: a valuable tool for construction management and other professionals. *Facilities*, 16(3):79-81.
- ANTONIOLI, D., MANCINELLI, S. & MAZZANTI, M. 2013. Is environmental innovation embedded within high-performance organisational changes? The role of human resource management and complementarity in green business strategies. *Research Policy*, 42(4):975-988.
- ARMSTRONG, G. & KOTLER, P.T. 2007. *Marketing: An introduction*. 8th ed. North Carolina: Pearson.
- ARSECULERATNE, D. & YAZDANIFARD, R. 2014. How green marketing can create a sustainable competitive advantage for a business. *International Business Research*, 7(1):130-137.
- ATEN, K., HOWARD-GRENVILLE, J. & VENTRESCA, M.J. 2012. Organisational culture and institutional theory: A conversation at the border. *Journal of Management Inquiry*, 21(1):78-83.
- BABBIE, E. 2013. *The basics of social research*. 5th ed. Canada: Wadsworth Cengage Learning.
- BADIA M, ORGAZ BM, VERDUGO MA, ULLAN AM & MARTINEZ M.M. 2011. Personal factors and perceived barriers to participation in leisure activities for young and adults with developmental disabilities. *Res Dev Disability*. 2011;32(6):2055–2063.
- BAINES, T., BROWN, S., BENEDETTINI, O. & BALL, P 2012. Examining green production and its role within the competitive strategy of manufacturers. *Journal of Industrial Engineering and Management*, 5(1):53-87.
- BANERJEE, S.B. 2010. Who sustains whose development? Sustainable development and the reinvention of nature. *Journal of Organization Studies*, 24:143-180.
- BARNEY, J. B., KETCHEN, D.J & WRIGHT, M 2011. The future of resource-based theory: Revitalization or decline? *Journal of Management*, 37(5):1299-1315.

- BARNEY, J.B. 1991. Firm resources and sustained competitive advantage. *Journal of Management*, 17(1):108-109.
- BARNEY, J.B. 2001. Is the resource-based theory a useful perspective for strategic management research? Yes. *Academy of Management Review*, 26(1):41-56.
- BARNEY, J.B. 2002. *Gaining and sustaining competitive advantage*. 2nd ed. Upper Saddle River, New Jersey: Prentice-Hall.
- BATTILANA, J. 2006. Agency and institutions: The enabling role of individuals' social positions. *Journal of Management*, 13(5):653-676.
- BATTISTI, M. & PERRY, M 2011. Walking the talk? Environmental responsibility from the perspective of small-business owners. *Corporate Social Responsibility and Environmental Management*, 18:172-185.
- BAUMANN-PAULY, D., WICKERT, C., SPENCE, L.J. & SCHERER, A.G. 2013. Organizing corporate social responsibility in small and large firms: Size matters. *Journal of Business Ethics*, 115(4):693-705.
- BELL, J.E., MOLLENKOPF, D. & STOLZE, H.J. 2013. Natural resource scarcity and the closed loop supply chain: A resource-advantage view. *International Journal of Physical Distribution & Logistics Management*, 43:351-379.
- BENJAMIN, S., PRADEEP, S., SARATH, J.M., KUMAR, S. & MASAI, E.A. 2015. Monograph on the remediation of hazardous phthalates. *Journal of Hazard Matter*, 6:298:58-72.
- BERGER, P.L. & LUCKMANN, T. 1967. *The social construction of reality*. New York: Doubleday.
- BERNDT, A. & PETZER, D. 2011. Environmental concern of South African cohorts: An exploratory study. *African Journal of Business Management*, 5(19):7899-7910.
- BESKE, P. & SEURING, S. 2014. Putting sustainability into supply chain management. *Supply Chain Management: An International Journal of Economics*, 19(3):322-331.
- BEY, N., HAUSCHILD, M.Z. & MCALOONE, T.C. 2013. Drivers and barriers for implementation of environmental strategies in manufacturing companies. *CIRP Annals*, 62(1):43-46.

- BHAT, S.A., DARZI, M.A. & PARREY, S.H. 2014. DEVELOPING GREATNESS 2013. A driver for green brand equity and sustainable development. *The International Journal of Humanities & Social Studies*, 2(12):331-337.
- BLUMBERG, B., COOPER, D.C. & SCHINDLER, P.S. 2008. *Business research methods*. 7th ed. London: McGraw-Hill.
- BODANSKY, D.M. 2010. *The Art and Craft of International Environmental Law*. Cambridge, MA: Harvard University Press.
- BOOYENS, I. 2012. Creative industries, inequality and social development: Developments, impacts and challenges in Cape Town. *Urban Forum*, 23(1):43-60.
- BOS-BROUWERS, H.E. J 2010. *Corporate sustainability and innovation in SMEs: Evidence of themes and activities in practice*. *Business Strategy and the Environment*, 19(7):417-435.
- BRAUNSCHEIDEL, M.J., HAMISTER, J.W., SURESH, N.C. & STAR, H. 2011. An institutional theory perspective on Six Sigma adoption. *International Journal of Operations & Production Management*, 31(4):423-451.
- BRINK, A.V., BRUNS, D., TOBI, H. & BELL, S. 2017. *Research in landscape architecture: Methods and methodology*. New York. Sage Publication.
- BROUTHERS, K.D., BROUTHERS, L.E. & WERNER, S. 2013. Real options, international entry mode choice and performance. *Journal of Management Studies*, 45(5):936-960.
- BROWNHILDER, N. 2016. Examining the moderating effect of environmental hostility on the entrepreneurial orientation-performance relationship. *Journal of Economics and Behavioural Studies*, 8(6):6-18.
- BRYMAN, A. & BELL, E. 2011. *Business research methods*. 3rd ed. New York: Oxford University Press.
- BUSINESS INNOVATION AND SKILLS (BIS). 2015. *Mapping local comparative advantages in innovation*. London: Department for Business Innovation and Skills.
- BÜYÜKÖZKAN, G. & ÇİFÇİ, G. 2012. A novel hybrid MCDM approach based on fuzzy DEMATEL, fuzzy ANP and fuzzy TOPSIS to evaluate green suppliers. *Expert Systems with Applications*, 39(3):3000-3011.

- CAMERON, E. & GREEN, M. 2015. *Making sense of change management: A complete guide to the models, tools and techniques of organizational change*. Philadelphia, PA: Kogan Page Publishers.
- CAMISÓN, C. & VILLAR-LÓPEZ, A. 2014. Organisational innovation as an enabler of technological innovation capabilities and firm performance. *Journal of Business Research*, 67(1):2891-2902.
- CANEPARI, B. 2015. *Environmental performance management in multinational corporations*. Masters dissertation. Rome, Italy: Department of Business and Management, Libera Università Internazionale degli Studi Sociali.
- CANT, M.C. & WIID, J.A. 2014. Establishing the challenges affecting South African SMEs. *The International Business & Economics Research Journal*, 12(6):707-716.
- CAO, M. & ZHANG, Q. 2011. Supply chain collaboration: Impact on collaborative advantage and firm performance. *Journal of Operation Management*, 29:163-180.
- CARELSE, S.L. 2016. *A system for integrated environmental management in local authorities to inform departmental decision-making: The case of Hessequa municipality*. Masters Thesis in Public Administration. Stellenbosch: Stellenbosch University.
- CARTER, C.R. & LIANE EASTON, P. 2011. Sustainable supply chain management: Evolution and future directions. *International Journal of Physical Distribution & Logistics Management*, 41(1):46-62.
- CHAHAL, H., DANGWAL, R. & RAINA, S. 2014. Antecedents and consequences of strategic green marketing orientation. *Journal of Global Responsibility*, 5(2):338-362.
- CHAN, L. & BISHOP, B. 2013. A moral basis for recycling: Extending the theory of planned behaviour. *Journal of Environmental Psychology*, 36:96-102.
- CHAN, R.Y.K., HE, H., CHAN, H.K. & WANG, W.Y.C. 2012. Environmental orientation and corporate performance: The mediation mechanism of green supply chain management and moderating effect of competitive intensity. *Industrial Marketing Management*, 41(4):621-630.
- CHANETA, I. 2012. Marketing: Packaging and branding. *Journal of Comprehensive Research*, 8(1):19-30.

CHARTERED ACCOUNTANTS WORLDWIDE (CAW). 2008. *The South African Institute of Chartered Accountants (SAICA)*. [Online]. Available at: <<https://charteredaccountantsworldwide.com/the-south-african-institute-of-charteredaccountants/>>. Accessed: 30/01/2019.

CHEN, A., LEVENT, B., MORTELMANS, B., FILKINA, V. & DINH, P. 2013. *Handbook. A blueprint for the Eco-sup-Port III*. Helsinki: Haaga-Helia.

CHEN, C., HABERT, G., BOUZIDI, Y. & JULLIEN, A. 2010. Environmental impact of cement production: Detail of the different processes and cement plant variability evaluation. *Journal of Cleaner Production*, 18(5):478-485.

CHEN, J., ZHANG, Y.L. & SUN, J. 2011. An overview of the reducing principle of design of corrugated box used in goods packaging. *Procedia Environmental Science*, 10:992-998.

CHEN, J.Z. 2009. Material flow and circular economy. *Systems Research and Behavioral Science*, 26(2):269-278.

CHUKWUMA, A.I., EZENYILIMBA, E. & AGBARA, V.N.O. 2018. 2016. Effect of product packaging on the sales volume of small and medium scale bakery firms in South East Nigeria. *International Journal of Academic Research in Business and Social Sciences*, 8(6):988-1001.

CHUMCHAL, M.M., DRENNER, R.W. & ADAMS, K.J. 2016. Abundance and size distribution of permanent and temporary farm ponds in the southeastern Great Plains. *Inland Waters*, 6(2):258-264.

COMOGLIO, C. & BOTTA, S. 2012. The use of indicators and the role of environmental management systems for environmental performances improvement: a survey on ISO 14001 certified organisations in the automotive sector. *Journal of Cleaner Production*, 20(1):92102.

CONG, R.G. & WEI, Y.M. 2010. Potential impact of (CET) carbon emissions trading on China's power sector: A perspective from different allowance allocation options. *Journal of Energy*, 35(9):3921-3931.

CONSTRUCTION INDUSTRY DEVELOPMENT BOARD (CIDB). 2011. [Online]. Available at: <<http://www.cidb.org.za/publications/Documents/Annual%20Report%2020112012.pdf>>. Accessed: 19/02/2019.

- COOPER, C.R. & SCHINDLER, P.S. 2008. *Business research methods*. 10th ed. Boston: McGraw-Hill.
- COYLE, J.J., THOMCHICK, E.A. & RUAMSOOK, K. 2015. Environmentally sustainable supply chain management: An evolutionary framework. In *Marketing Dynamism & Sustainability: Things Change, Things Stay the Same* (pp. 365-374). Chamberlains: Springer.
- CRESWELL, J.W. & CLARK, V.L.P. 2017. *Qualitative inquiry and research design: Choosing among five approaches*. Thousand Oaks, CA: SAGE Publications.
- CRESWELL, J.W. 2013. *Research design: Qualitative, quantitative, and mixed methods approaches*. Thousand Oaks, CA: Sage Publications.
- DAMANPOUR, F. & ARAVIND, D. 2012. Managerial innovation: Conceptions, processes, and antecedents. *Management and Organisation Review*, 8(2):423-454.
- DANGAYACH, G.S., PATHAK, S.C. & SHARMA, A.D. 2005. Managing innovation. *Asia Pacific Tech Monitor*, 22(3):30-33.
- DANIEL, P.S. & SAM, A.G. 2011. *Research methodology*. California: Sage Publications.
- DASHORE, K. & SOHANI, N. 2013. Green supply chain management-barriers & drivers: A review. *International Journal of Engineering*, 2(4):2021-2030.
- DAUGHTRY, K. 2014. *Environmental management systems: A review of available standards and a survey on implementation in Swedish organisations*. Masters Thesis. Sweden: Gothenburg University.
- DEVIS, GOYAL S, RAVINDRA S. 2013. Evaluation of environmental barriers faced by wheelchair users in India. *Journal of Disability*,24(3):61-74.
- 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.
- DEMIREL, P. & KESIDOU, E. 2011. Stimulating different types of eco-innovation in the UK: Government policies and firm motivations. *Journal of Ecological Economics*, 70:15461557.
- DEPARTMENT OF ENVIRONMENTAL AFFAIRS (DEA). 2015. *Annual report*

2015/2016. [Online]. Available at:

https://www.gov.za/sites/default/files/gcis_document/201612/201516environmentalaffairsannualreport.pdf>. Accessed: 12 April 2019.

DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM (DEAT). 2004. Policy. *Linking EIAs and Environmental Management Systems. Integrated Environmental Management Information Series 20*. Pretoria: Department of Environmental Affairs and Tourism (DEAT).

DHANARAJ, C. & BEAMISH, P.W. 2013. Effect of equity ownership on survival of international joint ventures. *Strategic Management Journal*, 25:295-305.

DIAB, S., AL-BOURINI, F. & ABU-RUMMAN, A. 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):149-198.

DIMAGGIO, P.J. & POWELL, W.W. 1983. The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, 48:147-160.

DORAN, J. & RYAN, O.L. 2012. External interaction, innovation and productivity: An application of the innovation value chain for Ireland. *Spatial Economic Analysis Journal*, 6(2):427-480.

DOWN TO EARTH. 2015. Plastic waste management rules in South Africa. In: *5th conference*, Durban.

DRASKOVIC, N., TEMPERLEY, J. & PAVICIC, J. 2009. Comparative perception(s) of consumer goods packaging: Croatian consumers' perspective(s). *International Journal of Management*, 11(2):154-163.

DRENNER, L. 2016. *Research of green packaging based on green logistics*. Beijing: Beijing Jiaotong University.

DRIESSEN, P.H. & HILLEBRAND, B. 2013. Integrating multiple stakeholder issues in new product development: An exploration. *Journal of Production and Innovation Management*, 30(2):364-379.

- DU PLESSIS, A. & NEL, J. 2015. An introduction. In: DU PLESSIS, A (ed.), *Environmental Law and Local Government in South Africa*. Cape Town: Juta.
- DU TOIT, D. & VLOK, P.J. 2014. Supply chain management: a framework of understanding. *South African Journal of Industrial Engineering*, 25(3):25-38.
- DUBEY, R., GUNASEKARAN, A., PAPADOPOULOS, T., CHILDE, S., SHIBIN, K.T. & FOSSO, W.S. 2017. Sustainable supply chain management: Framework and further research directions. *Journal of Cleaner Production*, 142(2):1119-1130.
- DUBIHLELA, J. & DHURUP, M.R. 2015. Determinants of and barriers to market orientation and the relationship with business performance among SMES. *Journal of Applied Business Research*, 31(5):1667-1678.
- EERHART, A.J.J.E., FAAIJ, A.P.C. & PATEL, M.K. 2012. Replacing fossil based PET with biobased PEF: Process analysis, energy and GHG balance. *Energy & Environmental Science*, 5(4):6407-6422.
- EICHHOLTZ, P., KOK, N. & QUIGLEY, J.M. 2010. Doing well by doing good? Green office buildings. *American Economic Review*, 100(5):2492-2509.
- ELLIOT, L., SIEPER, H. & EKPOTT, N. 2011. *Redefining business in the New Africa: Shifting strategies to be successful*. Charlotte, NC: Conceptualee, Inc.
- EMASEASY. 2013. *Brochure on the webpage of EMASEasy.eu*. [Online]. Available at: <<http://www.emaseasy.eu/downloads.html>>. Accessed: 15 April 2019.
- ENEIZAN, B.M., WAHAB, K.A., ZAINON, M.S. & OBAID, T.F. 2016. Prior research on green marketing and green marketing strategy: Critical analysis. *Arabian Journal of Business and Management Review (Oman Chapter)*, 6(2):46-64.
- EPSTEIN, M.J. 2018. *Making sustainability work: Best practices in managing and measuring corporate social, environmental and economic impacts*. UK: Routledge.
- EREN-ERDOGMUS, I, LAK, H.S. & ÇIÇEK, M. 2016. Attractive or credible celebrities: Who endorses green products better? *Procedia-Social and Behavioral Sciences*, 235:587-594.
- ETIKAN, I., MUSA, S.A. & ALKASSIM, R.S. 2016. Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, 5(1):1-4.

- EUROPEAN COMMISSION (EC). 2011. *EMAS Factsheet: EMAS and ISO 14001: Complementarities and differences*. Belgium: Publications Office.
- EUROPEAN COMMISSION (EC). 2013a. Improving the business environment: starting, running and growing a business. [Online]. Available at: http://ec.europa.eu/enterprise/policies/sme/business-environment/files/main_report_en.pdf>. Accessed: 03/02/2019.
- EUROPEAN COMMISSION (EC). 2013b. EU industrial structure report 2013: Competing in Global Value Chains. [Online]. Available at: http://ec.europa.eu/enterprise/policies/industrial-competitiveness/competitivenessanalysis/eu-industrial-structure/files/report_euis_2013_final.pdf>. Accessed: 03/02/2019.
- EVERGREEN, S. D. H. 2013. *Presenting data effectively: Communicating your findings for maximum impact*. Los Angeles, CA: SAGE Publications.
- EYGM. 2013. *Bring your own device: Security and risk considerations for your mobile device program*. [Online]. Available at: [https://www.ey.com/Publication/vwLUAssets/EY__Bring_your_own_device:_mobile_security_and_risk/\\$FILE/Bring_your_own_device.pdf](https://www.ey.com/Publication/vwLUAssets/EY__Bring_your_own_device:_mobile_security_and_risk/$FILE/Bring_your_own_device.pdf)>. Accessed: 03/02/2019.
- FAHY, E., COTTER, D., SUD, M. & SUBRAMANIAM, S. 2011. Lipid classification, structures and tools. *Biochimica et Biophysica Acta (BBA) – Molecular and Cell Biology of Lipids*, 1811(11):637-647.
- FEELEY, N., COSSETTE, S., CÔTÉ, J., HÉON, M., STREMLER, R., MARTORELLA, G. & PURDEN, M. 2009. The importance of piloting an RCT intervention. *Canadian Journal of Nursing Research*, 41(2):85-99.
- FERDOWS, K. 1997. Making the most of foreign factories. *Harvard Business Review*, 75:73-91.
- FEW, S 2012. *Show me the numbers: designing tables and graphs to enlighten*, 2nd ed. Oakland, CA: Analytics Press.
- FITZGIBBON, B. 2015. *Making prosperity: Creating a sound economy through advanced manufacturing with advanced materials, robust supply chains and exports*. Research prepared for the Advanced Manufacturing Jobs and Innovation Accelerator Challenge Grant,

Innovations in Advanced Materials and Metals Manufacturing Project, and the Greater Portland Export Initiative. [Online]. Available at: https://static1.squarespace.com/static/53fcd546e4b09b99036a0e5f/t/55566ca2e4b08c2f72689379/1431727266756/IntroReport_FINAL.pdf. Accessed: 02/05/2018.

FRAENKEL, J.R. & WALLEN, N.E. (eds). 2003. Observation and interviewing. In: *How to design and evaluate research in education, part 5* (pp. 444-476). New York, NY: McGraw-Hill.

GAJANAN, R. 2015. A study on sustainable marketing practices for gaining competitive advantage. *Elk Asia Pacific Journal of Marketing and Retail Management*, 6(4):1-9.

GALBREATH, J. & GALVIN, P. 2010. Firm factors, industry structure and performance variation: new empirical evidence to a classic debate. *Journal of Business Research*, 61:109117.

GALENDE, J. & DE LA FUENTE, J.M. 2003. Internal factors determining a firm's innovative behaviour. *Research Policy*, 32(5):715-736.

GALLIANO, D. & NADEL, S. 2015. Firms' eco-innovation intensity and sectoral system of innovation: The Case of French Industry. *Industry and Innovation*, 22(6):467-495.

GHOBAKHLOO, M., TANG, S.H., ZULKIFLI, N. & ARIFFIN, M.K.A. 2013. An integrated framework of green supply chain management implementation. *International Journal of Innovation, Management and Technology*, 4(1):86-89.

GLIEM, J.A. & GLIEM, R.R. 2013. Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales. *2003 Midwest Research-to-Practice Conference in Adult, Continuing, and Community Education*, pp. 82-88. [Online]. Available at: <<https://scholarworks.iupui.edu/bitstream/handle/1805/344/Gliem+&+Gliem.pdf?sequence=1>>. Accessed: 03/05/2019.

GLOBAL CARBON EXCHANGE (GCX). 2011. *Carbon and other biogeochemical cycles*. [Online]. Available at: <https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_Chapter06_FINAL.pdf>. Accessed: 17/01/2019.

GMELIN, H. & SEURING, S. 2014. Determinants of a sustainable new product development. *Journal of Cleaner Production*, 69(1):1-9.

GOETSCH, D.L. & DAVIS, S.B. 2010. Quality management for organization excellence introduction to total quality. *American Economic Review*, 2(2):115-118.

GONZALEZ-TORRE, P., ADENSO-DIAZ, B. & ARTIBA, H. 2014. Environmental and reverse logistics policies in European bottling and packaging firms. *International Journal of Production Economics*, 88(1):95-104.

GORDON, M. 2013. *A Dictionary of Sociology: Research design*. [Online]. Available at: Encyclopedia.com. Accessed: 03/02/2019.

GRAFF ZIVIN, J. & NEIDELL, M. 2012. The impact of pollution on worker productivity. *American Economic Review*, 102(7):73-365.

GREEN AMERICAN. 2013. *Green America come together*. [Online]. Available at: <https://www.greenamerica.org/sites/default/files/2018-10/GAM93_AprilMay2013_Digital_Final.pdf>. Accessed: 02/02/2019.

GREEN BUSINESS GUIDE. 2010. *About us*. [Online]. Available at: <<https://www.greenbusinessguide.co.za/about-us/>>. Accessed: 06/02/2019.

GREENPEACE AFRICA. 2011. *Greenpeace Africa submission on the draft National Climate Change Response Green Paper*. [Online]. Available at: http://pmg-assets.s3-websiteeu-west-1.amazonaws.com/docs/110309greenpeace_0.pdf>. Accessed: 02/03/2019.

GREENWOOD, R., OLIVER, C., LAWRENCE, T.B. & MEYER, R.E. (eds). 2017. *The Sage handbook of organizational institutionalism*. New York: Sage Publishing.

GUAN, C.C., AMEA, S., ARIFFIN, S. & MCKAY, A. 2016. Environmental sustainability drivers: A study on Malaysian Palm Oil Industry, IAFOR. *Journal of Sustainability, Energy and the Environment*. 3(1):14-29.

GUERRERO, L.A., MAAS, G. & HOGLAND, W. 2013. Solid waste management challenges for cities in developing countries. *Waste Management*, 33(1):220-232.

GUNDAY, G., ULUSOY, G., KILIC, K. & ALPKAN, L. 2011. Effects of innovation types on firm performance. *International Journal of Production Economics*, 133(2):662-676

HAIR, J.F., BABIN, B.J., ANDERSON, R.E. & TATHAM, R.L. 2010. Antecedents and outcomes of consumer environmentally friendly attitudes and behaviour. *Journal of Multivariate Data Analysis: A Global Perspective*. 7(2):20-52.

- HAMANN, R., SMITH, J., TASHMAN, P. & SCOTT MARSHALL, R. 2017. Why do SMEs go green? An analysis of wine firms in South Africa. *Business & Society*, 56(1):23-56.
- HAMMERSLEY, M. & TRAIANOU, A. 2012. *Ethics in qualitative research: Controversies and contexts*. London: Sage.
- HANNINGTON, J.G., STRUWIG, M. & SMITH, E.E. 2013. Creating a sustainable competitive advantage at a high performing firm in Kenya. *African Journal of Business Management*, 7(21):2049-2058.
- HART, G.W. & COPELAND, R.J. 2010. Glycomics hits the big time. *International Journal of Business Management*, 143(5):672-676.
- HART, S.L. & AHUJA, G. 1996. Does it pay to be green? An empirical examination of the relationship between emission reduction and firm performance. *Business Strategy and the Environment* 5: 30-37.
- HART, S.L. & DOWELL, G.A. 2010. A natural-resource-based view of the firm: Fifteen years after. *Academy of Management Review*, 20(4), 986-1014.
- HART, S.L. 1995. A natural-resource-based view of the firm. *Academy of Management Review*, 20(4):986-1014.
- HEEKS, R., SUBRAMANIAN, L. & JONES, C. 2015. Understanding e-waste management in developing countries: Strategies, determinants, and policy implications in the Indian ICT sector. *Information Technology for Development*, 21(4):653-667.
- HENRI, J.F. & JOURNEAULT, M. 2014. Environmental performance indicators: An empirical study of Canadian manufacturing organisations. *Journal of Environmental Management*, 87(1):165-176.
- HILLARY, R. 2009. *Evaluation of study reports on the barriers, opportunities and drivers for small and medium sized enterprises in the adoption of environmental management systems*. London: Department of Trade and Industry.
- HILLEBRAND, B., NIJHOLT, J.J. & NIJSSEN, E.J. 2011. Exploring CRM effectiveness: An institutional theory perspective. *Journal of the Academy of Marketing Science*, 39(4):592-608.

- HOORNWEG, D. & BHADA-TATA, P. 2012. What a waste: A global review of solid waste management. *Urban Development Series: Knowledge Papers*, 15. Washington DC: World Bank.
- HOY, W.K. & ADAMS, C.M. 2015. *Quantitative research in education: A primer*. 2nd ed. California: SAGE Publications.
- HWEE, N. 2009. The influence of ISO 14000 on firm performance. *Social Responsibility Journal*, 5(3):408-422.
- IACOBUCCI, D. & CHURCHILL, G.A. 2010. *Marketing research: Methodological foundations*. Mason, OH: South-Western Cengage Learning.
- INTERNATIONAL PACKAGING INSTITUTE (IPI). 2010. Revealing packaging processes and values (pp. 43-45). Schaffhausen: IPI.
- INTERNATIONAL POLITICAL SCIENCE ASSOCIATION (IPSA). 2012. World Congress of Political Science, July 8–12, Madrid, Spain.
- INTERWASTE. 2016. [Online]. *Integrated annual report*. Available at <http://www.sharedata.co.za/data/009280/pdfs/INTEWASTE_ar_dec16.pdf>. Accessed: 14/04/2019.
- IOPPOLO, G., CUCURACHI, S., SALOMONE, R., SAIJA, G. & CIRAOLO, L. 2014. Industrial ecology and environmental lean management: Lights and shadows. *Sustainability*, 6(9):6362-6376.
- IQ BUSINESS. 2014. *Packaging sector: A profile of the packaging sub-sector*. [Online]. Available at: <https://www.fpmseta.org.za/downloads/FPM_subsector_packaging_final.pdf>. Accessed: 14/05/2019.
- ISMAEL, A.I., ROSE, R.C., ABDULLAH, H. & ULI, J. 2010. The relationship between organisational competitive advantage and performance moderated by the age and size of firms. *Asian Academy of Management Journal*, 15(2):157-173.
- ITOKIĆ, I., FRUK, G. & JERMIĆ, T. 2011. Biodegradable packaging for storage of fruit and other horticultural products: materials, properties and its effect on fruit quality. *Journal of Central European Agriculture*, 12(1):226-238.

- JACKSON, T. 2005. *Motivating sustainable consumption: A review of evidence on consumer behavior and behavioral change*. London, UK: Policy Studies Institute.
- JI, H., PENG, Y., NICOLE, M., ALLEN, S. & TRAW, M.B. 2014. Identification of a novel HOG1 homologue from an industrial glycerol producer *Candida glycerinogene*. *Journal of Cleaner Production*, 69(6):909-914.
- JOHNSON, G., SCHOLES, K. & WHITTINGTON, R. 2008. *Exploring corporate strategy*. 8th ed. Harlow: FT/Prentice Hall.
- JOHNSON, K.E. 1996. The role of theory in L2 teacher education. *TESOL*, 30(4):765-771.
- KANG, J.H., KWON, O.Y., LEE, K.W., SONG, Y.K. & SHIM, W.J. 2015. Marine neustonic micro plastics around the south eastern coast of Korea. *Journal of Marketing Pollute Bulletin*, 96(1-2):304-312.
- KAO, T.-F. & DU, Y.-Z. 2019. A study on the influence of green advertising design and environmental emotion on advertising effect. *Journal of Cleaner Production*, 242:1-13.
- KAPFERER, J.N. & BASTIEN, V. 2012. *The luxury strategy: Break the rules of marketing to build luxury brands*. London: Kogan Page Publishers.
- KAPFERER, J.N. & MICHAUT, A. 2015. Luxury and sustainability: a common future? The match depends on how consumers define luxury. *Luxury Research Journal*, 1(1):3-17.
- KATERSKY, R.S. & CARTER, C.G. 2007. High growth efficiency occurs over a wide temperature range for juvenile barramundi *Lates calcarifer* fed a balanced diet. *Aquaculture*, 272(1-4):444-450.
- KAUFMANN, H.R., PANNI, M.F. & ORPHANIDOU, Y. 2012. Factors affecting consumers' green purchasing behavioural integrated conceptual framework. *Journal of International Economics*, 15(31):50-69.
- KAISER, K., SCHMID, M & SCHLUMMER, M. 2018. *Recycling of Polymer-Based Multilayer Packaging: A Review*, Recycling.
- KARLSSON, T.M., ARNEBORG, L., BROSTRÖM, G., ALMROTH, B.C., GIPPERTH, L & HASSELLÖV, M. 2018. The unaccountability case of plastic pellet pollution, *Journal of Marine Pollution Bulletin*, 129:52–56.

- KELLENBERG, D.2012. Trading wastes. *Journal of Environmental Economics and Management*, 64(1):68-87.
- KETOKIVI, M. & SCHROEDER, R.G. 2014. Perceptual measures of performance: Fact or fiction? *Journal of Operations Management*, 22(3):247-264.
- KILIAN, A.2016. *Chevron South Africa inks three-year products and services agreement with SNC-Lavalin*. [Online]. Available at: <<http://www.engineeringnews.co.za/printversion/chevron-south-africa-inks-three-yearproducts-and-services-agreement-with-snclavalin-2016-10-20>>. Accessed: 26/05/2019.
- KILLEN, C., JUGDEV, K., DROUIN, N. & PETIT, Y. 2012. Advancing project and portfolio management research: Applying strategic management theories. *International Journal of Project Management*, 30(5):525-538.
- KIM, W.H., MALEK, K. & ROBERTS, K.R. 2019. The effectiveness of green advertising in the convention industry: An application of a dual coding approach and the norm activation model. *Journal of Hospitality and Tourism Management*, 39:185-192.
- KING, A.W. 2007. Disentangling interfirm and intrafirm causal ambiguity: A conceptual model of causal ambiguity and sustainable competitive advantage. *Academy of Management Review*, 32:156-178.
- KLEIN, S., WORCH, E. & KNEPPER, T.P. 2015. Occurrence and spatial distribution of micro plastics in river shore sediments of the rhine-main area in Germany. *Journal of Environmental Science and Technology*, 49(10):6070-6076.
- KLEIS, H. & DALAGER, S. 2007. *100 years of waste incineration in Denmark*. [Online]. Available at: < <https://mea.ramboll.com/-/media/8cba6ee8466246a88e51fe0ba8f9b19f.pdf>>. Accessed: 14/05/2019.
- KOR, Y. & MESKO, A. 2013. Dynamic managerial capabilities: Configuration and orchestration of top executives' capabilities and the firm's dominant logic. *Strategic Management Journal*, 34(2):233-244.
- KOTHARI, C. R., & GARG, G 2014. *Research methodology: Methods and techniques* (3rd ed.). New Delhi: New age international publishers.

- KOTHARI, C.R. 2010. *Research methodology: Methods and technique*. New Delhi: New Age International Publishers.
- KOWARSCH, M. & JABBOUR, J. 2017. Solution-oriented global environmental assessments: Opportunities and challenges. *Greener Management International Journal*, 77:187-192.
- KRAMER, S., PRENETA, N. & KILBRIDE, A. 2013. Thermophilic composting of human wastes in uncertain urban environments: a case study from Haiti. [Online]. Available at <<https://dspace.lboro.ac.uk/dspace-jspui/handle/2134/30917>>. Accessed:12/05/2019.
- KUMAR, R. 2014. *Research methodology. A step by step guide for beginners*. 4th ed. London: Sage Publication.
- LATHMAN, B 2007. *Sampling: What is it? Quantitative Research Methods*, Retrieved 15 October, 2014
- LEE, S. & PAIK, H.S. 2011. Korean household waste management and recycling behavior. *Building and Environment*, 46(5):1159-1166.
- LEGAL INFORMATION INSTITUTE (LII). 2018. *CFR SECTION 260*. [Online]. Available: <https://www.law.cornell.edu/cfr/text/18/part-260>. Accessed: 01/01/2019.
- LEPPELT, T., FOERSTL, K., REUTER, C. & HARTMANN, E. 2013. Sustainability management beyond organizational boundaries—sustainable supplier relationship management in the chemical industry. *Journal of Cleaner Production*, 56:94-102.
- LEVITAS, E. & NDOFOR, H.A. 2013. What to do with the resource-based view: A few suggestions for what ails the RBV that supporters and opponents might accept. *Journal of Management Inquiry*, 15(2):135-144.
- LOVINS, L.H. 2008. The business case for climate protection. *Environmental Management: Reading and Cases*, 5:5-39.
- MADILL, C., WARHURST, S. & MCCABE, P. 2017. The stakeholder model of voice research: Acknowledging barriers to human rights of all stakeholders in a communicative exchange. *International Journal of Speech-Language Pathology*, 20(1):63-66.
- MAHER, J.M., MARKEY, J.C. & EBERT-MAY, D. 2013. The other half of the story: Effect size analysis in quantitative research. *CBE—Life Sciences Education*, 12(3):345-351.

- MAREE, K. 2007. *First steps in research*. Pretoria: Van Schaik Publishers.
- MARINO, G., ROHLING, E.J., RODRÍGUEZ-SANZ, L., GRANT, K.M., HESLOP, D., ROBERTS, A.P., STANFORD, J.D. & YU, J. 2015. Bipolar seesaw control on last interglacial sea level. *An International Journal of business management*, 522(7555):197-201.
- MARITAN, A.C. & PETERAF, M.A. 2011. Building a bridge between resource acquisition and resource accumulation. *Journal of Management*, 37(5):1374-1389.
- MARR, B. & SCHIUMA, G. 2010. Business performance measurement – Past, present and future, Management Decision. *Journal of Supply Chain Management*, 41(8):680-700.
- MARTENS, M. 2010. Voice or loyalty? The evolution of the European Environment Agency (EEA). *Journal of Common Market Studies (JCMS)*, 48(4):881-901.
- MAXWELL, J.A. 2012. *Qualitative research design: An interactive approach*. 3rd ed. California: SAGE Publications.
- MCCUSKER, K. & GUNAYDIN, S. 2015. Research using qualitative, quantitative or mixed methods and choice based on the research. *Perfusion*, 30(7):42-537.
- MCKINNON, A.C. 2015. Environmental sustainability: A new priority for logistics managers. In: MCKINNON, A., CULLINANE, S., BROWNE, M. & WHITEING, A. (eds), *Green logistics: Improving the environmental sustainability of logistics* (pp. 3-30). London: Kogan Page Publishers.
- MCNABB, S.J.N. 2010. *Research methods for political science: Quantitative and qualitative approaches*. 2nd ed. Armonk, New York: M.E. Sharpe.
- MEDIA CLUB SOUTH AFRICA (MCSA). 2011. *South Africa's auto industry to turn green*. The International Marketing Council of South Africa (IMC). [Online]. Available at: <http://www.mediaclubsouthafrica.com/index.php?option=com_content&view=article&id=2557:auto-industry-130911&catid=45:economynews&Itemid=114>. Accessed 02/03/2019.
- MESSICK, S. 1989. Meaning and values in test validation: The science and ethics of assessment. *Educational Researcher*, 18(2):5-11.
- MESSICK, S. 2012. Psychology and methodology of response styles. In: SNOW, R.E. & WILEY, D.E. (eds), *Improving inquiry in social science* (pp. 177-216). UK: Routledge.

- MEYER, A., NIEMANN, W., MACKENZIE, J. & LOMBAARD, J. 2014. Drivers and barriers of reverse logistics practices: A study of large grocery retailers in South Africa. *Journal of Transport and Supply Chain Management*, 11: 1-16.
- MITCHELL, R., AGLE, B. & WOOD, D. 2014. Toward a theory of stakeholder identification and salience: Defining the principle of who and what really counts. *Academy of Management Review*, 22(4):853-886.
- MITRA, S. & DATTA, P.P. 2014. Adoption of green supply chain management practices and their impact on performance: an exploratory study of Indian manufacturing firms. *International Journal of Production Research*, 52(7):2085-2107.
- MOHANTY, R.P. & PRAKASH, A. 2014. Green supply chain management practices in India: An empirical study. *Production Planning & Control*, 25(16):1322-1337.
- MOLINA-BESCH, K. & PÅLSSON, H. 2016. A supply chain perspective on green packaging development-theory versus practice. *Packaging Technology and Science*, 29(1):45-63.
- MOUTON, J. 2001. *How to succeed in your master's and doctoral studies*. Pretoria: Van Schaik Publishers.
- MURTHY, S.N. & BHOJANNA, U. 2010. *Business research methods*. 3rd ed. New York: Sage Publication.
- MUSTAFA, A. 2010. *Research methodology*. New Delhi: AITBS Publishers.
- MUYSINALIYEV, A. & AKTAMOV, S. 2014. Supply chain management concepts: Literature review. *Journal of Business and Management*, 15(6):2319-766.
- NAKANO, M., NGUYEN, P. 2010. *Does board size affect firm performance? Causal evidence using Japanese data*. Working Paper. Japan: Hitotsubashi University.
- NEUTELEERS, S. & ENGELEN, B. 2015. Talking money: How market-based valuation can undermine environmental protection. *Ecological Economics, Elsevier*, 117(C):253-260.
- NGUYEN, L.T., HERMANSEN, J.E. & MOGENSEN, L. 2010. Fossil energy and GHG saving potentials of pig farming in the EU. *Energy Policy*, 38:2561-2571.

- NIKITAEVA, O. 2012. *Gaining a competitive advantage through green packaging: Does green packaging influence consumers' buying behaviour for dry food?* Bachelor of Business Administration Thesis in International Business. Helsinki, Finland: Arcada University of Applied Sciences.
- NIMAWAT, D. & NAMDEV, V. 2012. An overview of green supply chain management in India. *Research Journal of Recent Sciences*, 1(6):77-82.
- NUNNALLY, J.C. & BERNSTEIN, I.H. 1994. *Psychological theory*. New York. McGraw-Hill.
- NYIRENDA, G., NGWAKWE, C.C. & AMBE, C.M. 2014. Environmental management practices for sustainable development: agenda for harmonization. *Environmental Economics Journal*, 5(1):76-85.
- OBURA, C.O. 2015. Influence of vendor managed inventory on organization performance in a manufacturing industry: A case of Unilever Kenya limited. *International Academic Journal of Information Sciences and Project Management*, 1(4):19-29.
- OLIVER, C. 1991. Sustainable competitive advantage: Combining institutional and resourcebased views. *Journal of Learning Organisation*, 18(9):697–713.
- ONTORAEL, R. & SUHADAK, K. & MAWARDI, M. 2017. *Analysis of the influence of external and internal environmental factors on business performance: A study on micro small and medium enterprises (MSMEs) of food and beverage*. [Online]. Available at: <file:///C:/Users/ST.DESKTOPR84A7NU/Downloads/ANALYSIS_OF_THE_INFLUENCE_OF_EXTERNAL_AND_INTERNAL.pdf>. Accessed: 05/07/2019.
- OPPONG, C.A. 2013. Supervisors' remarks in teaching practice: the perspectives of history student teachers. *Journal of Education and Practice*, 4(17):154-161.
- ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). 2013. *The role and measurement of quality in competition analysis*. [Online]. Available at: <http://www.oecd.org/competition/Quality-in-competition-analysis-2013.pdf>>. Accessed: 03/04/2019.
- PACHE, A.C. & SANTOS, F. 2010. When worlds collide: The internal dynamics of organizational responses to conflicting institutional demands. *Academy of Management Review*, 35(3):455-476.

- PACHE, A.C. & SANTOS, F. 2013. Inside the hybrid organization: Selective coupling as a response to competing institutional logics. *Academy of Management Journal*, 56(4):9721001.
- PACKAGING COUNCIL OF SOUTH AFRICA (PACSA). 2015. [Online]. *Design for recycling for paper and packing in South Africa*. [Online]. Available at: <<http://www.packagingsa.co.za/wp-content/uploads/2015/09/Packaging-SA-Recyclabilityby-Design-2015.pdf>>. Accessed: 05/07/2019.
- PAGELL, M. & SHEVCHENKO, A. 2014. Why research in supply chain management should have no future. *Journal of Supply Chain Management*, 50(1):44-55.
- PEATTIE, K. 1995. *Environmental marketing management: Meeting the green challenge*. London, UK: Pitman.
- PENROSE, E.T. 1959. *The theory of the growth of the firm*. New York: John Wiley.
- PIRES, A., MARTINHO, G. & CHANG, J. 2011. Solid waste management in European countries: A review of systems analysis techniques. *Journal of Environmental Management*, 92(4):1033-1050.
- PLANET SA & DANISH TECHNOLOGICAL INSTITUTE. 2010. *SMEs and the environment in the European Union*. [Online]. Available at: <http://ec.europa.eu/enterprise/policies/sme/business-environment/files/main_report_en.pdf>. Accessed: 12/05/2019.
- PLASTIC RECYCLERS EUROPE. 2016. [Online]. *PRE Strategy Paper 2016*. Available at: <https://743c8380-22c6-4457-9895-11872f2a708a.filesusr.com/ugd/dda42a_c0c051cf59594404bf7cad538b1c0027.pdf>. Accessed: 75/7/2019.
- PRIEM, R.L. & BUTLER, J.E. 2014. Is the resource-based “view” a useful perspective for strategic management research? *Academy of Management Review*, 26(1):22-40.
- PUNCH, K.F. 2013. *Introduction to social research: Quantitative and qualitative approaches*. London: Sage.
- PUNČOCHÁŘA, M., RUJB, B. & CHATTERJEEB, P.K. 2012. Development of process for disposal of plastic waste using plasma pyrolysis technology and option for energy recovery. *Procedia Engineering*, 42:420-430.

PUNITHA, S. & MOHD RASDI, R. 2013. Corporate social responsibility: Adoption of green marketing by hotel industry. *Asian Social Science Journal*, 9(17):79-93.

RAHMAN, M.S. 2017. The advantages and disadvantages of using qualitative and quantitative approaches and methods in language "testing and assessment" research: A literature review. *Journal of Education and Learning*, 6(1):102-112.

RAZAVI, M., TALEBI, H.A., ZAREINEJAD, M. & DEHGHAN, M.R. 2015. A GPU-implemented physics-based haptic simulator of tooth drilling. *The International Journal of Medical Robotics and Computer Assisted Surgery*, 11(4):476-485.

REGATTIERI, A., SANTARELLI, G., GAMBERI, M. & MORA, C.A. 2014. A new paradigm for packaging design in web-based commerce – regular paper. *International Journal of Engineering Business Management*, 6(14):1-11.

REGATTIERI, A., SANTARELLI, G., PIANA, F. & GAMBERI, M. 2015. Classification of technical requirements and the means of addressing the problem of waste management in a refugee camp. In: KLUMPP, M., DE LEEUW, S., REGATTIERI, A. & DE SOUZA, R. (eds), *Humanitarian logistics and sustainability* (pp. 169-192). Switzerland: Springer International Publishing.

REPUBLIC OF SOUTH AFRICA (RSA). 1996. *The Constitution*. Pretoria: Government Printer.

RESPONSIBLE PACKAGING MANAGEMENT ASSOCIATION SOUTH AFRICA (RPMASA). 2014. *People – Products – Services Serving Africa*. [Online]. Available at: <<http://www.products-services-serving-africa.com/partners/profile.php?id=1337>>. Accessed: 16/03/2019.

ROKKA, J. & UUSITALO, L. 2008. Preference for green packaging in consumer product choices – do consumers care? *International Journal of Consumer Studies*, 32(5):516-525.

ROOS, C. 2016. *Characterising the waste profile at the North-West University, Potchefstroom Campus: Lessons learned*. Masters Thesis. Vanderbijlpark: North-West University.

ROTHAERMEL, F.T. 2012. *Strategic management: Concepts and cases*. New York: McGraw-Hill/Irwin.

- ROZEBOOM, W.W. 1960. The fallacy of the null-hypothesis significance test. *Psychological Bulletin*, 57(5):416-428.
- SANDS, P., PEEL, J., FABRA, A. & MACKENZIE, R. 2012. *Principles of International Environmental Law*. 3rd ed. New York: Cambridge University Press.
- SANTOS, B. & BRITO, F. 2009. *Green logistics packaging in modern times*. Proceedings of the 10th National Packaging Engineering, Beijing.
- SARKIS, J., ZHU, Q. & LAI K.H. 2011. An organizational theoretic review of green supply chain management literature. *International Journal of Production Economics*, 130:1-15.
- SAUNDERS, M., LEWIS, P. & THORNHILL, A. 2009. *Research Methods for Business Students*. 5th ed. Harlow, England: Pearson Education.
- SCOTT, W.R. 2005. Institutional theory: Contributing to a theoretical research program. *Great minds in management: The process of theory development*, 37(2):460-484.
- SCOTT, W.R. 2008. *Institutions and organizations: Ideas and interests*. New York. Sage Publication.
- SEURING, S. & GOLD, S. 2013. Sustainability management beyond corporate boundaries: from stakeholders to performance. *Journal of Cleaner Production*, 56:1-6.
- SEURING, S. & MÜLLER, M. 2008. From a literature review to a conceptual framework for sustainable supply chain management. *Journal of Cleaner Production*, 16(15):1699-1710.
- SEURING, S. 2001. Green supply chain costing joint cost management in the polyester linings supply chain. *Greener Management International Journal*, 33: 71–80.
- SHI, V.G., KOH, S.C.L., BALDWIN, J. & CUCCHIELLA, F. 2012. Natural resource based green supply chain management. *An International Journal of business management*, 17(1), 54-67.
- SIMIN, M., JANJUŠIĆ, D. & BLAŽEVIĆ, Z. 2013. Eco labelling as a criterion for registration and protection of trademark. *Praktični menadžment, stručni časopis za teoriju i praksu menadžmenta*, 4(2):76-79.
- SINGAPORE INTERNATIONAL ENERGY WEEK (SIEW). 2015. SIEW is the foremost

platform for top policymakers, energy practitioners and commentators to discuss energy issues, strategies and solutions. *Singapore International Energy Week*, Singapore, 26–30 October.

SOLER, C., BERGSTROM, K. & SHANAHAN, H. 2010. Green supply chains and the missing link between environmental information and practice. *Business Strategy and the Environment*, 19:14-25.

SOUTH AFRICAN GOVERNMENT. 2011. *Welcome to the official South African government online site*. [Online]. Available at:<<https://www.gov.za/welcome-official-southafrican-government-online-site>>. Accessed; 17/03/2019.

SOUTH AFRICAN MARITIME SAFETY AUTHORITY (SAMSA). 2016. *Industry profile: Offshore oil and gas*. Cape Town: SAMSA.

SROUFE, L.A. 2007. The place of development in developmental psychopathology. In: MASTEN, A. (ed.), *Multilevel dynamics in developmental psychopathology: Pathways to the future* (pp. 285-299). Mahwah, NJ: Lawrence Erlbaum.

STANKOVIĆ, M. 2012. Eco-labelling: barrier or incentive of international. *Škola biznisa*, 4:34-41.

STANWICK, P.A. & STANWICK, S.D. 2017. The relationship between corporate social performance, and organizational size, financial performance, and environmental performance: An empirical examination. *Journal of Business Management*, 17:195-204.

STARMAN, A.B. 2013. The case study as a type of qualitative research. *Journal of Contemporary Educational Studies*, 1:28-43.

STRAUBE, F., DOCH, S., NAGEL, A., OUYEDER, O. & WUTTKE, S. 2011. Bewertung öko-effizienter Logistikstrukturen in global agierenden Wertschöpfungsketten. *FlexibelSicher-Nachhaltig*, 4(3):201-227.

TATE, W.L., ELLRAM, L.M. & GOLGECI, I. 2013. Diffusion of environmental business practices: a network approach. *Journal of Purchasing & Supply Management*, 19:264-275.

TATE, W.L., ELLRAM, L.M. & KIRCHOFF, J.F. 2010. Corporate social responsibility reports: A thematic analysis related to supply chain management. *Journal of Supply Chain Management*, 46:19-44.

- TEECE, D.J. 2007. Explicating dynamic capabilities: The nature and micro foundations of sustainable enterprise performance. *Strategic Management Journal*, 28(13):1319-1350.
- THAKKAR, J., KANDA, A. & DESHMUKH, S.G. 2011. Mapping of supply chain learning: A framework for SMEs. *Journal of Learning Organisation*, 18:313-332.
- THOMPSON, J. & MARTIN, F. 2010. *Strategic management: Awareness & change*. 6th ed. London: CENGAGE.
- TOLBERT, P.S. & ZUCKER, L.G. 1983. Institutional sources of change in the formal structure of organizations: The diffusion of civil service reform. *American Journal of Sociology*, 4(2):1880-1935.
- TOLBERT, P.S. & ZUCKER, L.G. 1999. The institutionalization of institutional theory. In: CLEGG, S.R. & HARDY, C. (eds), *Studying organization theory & method* (pp. 169-184). London/Thousand Oaks/New Delhi: Sage.
- TOLLER, A.E. & BOCHER, M. 2013. Introduction: What is the role of voluntary approaches in German Environmental Policy – and why? *German Policy Studies*, 9(2):1-20.
- TSENG, M.L. & CHIU, A.S. 2013. Evaluating firm's green supply chain management in linguistic preferences. *Journal of Cleaner Production*, 40:22-31.
- VERGHESE, K., LEWIS, H., LOCKREY, S & WILLIAMS, H. 2015. Packaging's role in minimizing food loss and waste across the supply chain. *Journal of Packaging Technology and Science*, 28(7):603-620.
- VACHON, S. & KLASSEN, R.D. 2008. Environmental management and manufacturing performance: The role of collaboration in the supply chain. *International Journal of Production Economics*, 1(11):299-315.
- VLAEMINCK, P., JIANG, T. & VRANKEN, L. 2014. Food labeling and eco-friendly consumption: Experimental evidence from a Belgian supermarket. *Ecological Economics*, 108:180-190.
- WADE, M. & HULLAND, J. 2004. The resource-based view and information systems research: Review, extension, and suggestions for future research. *Journal of Operations Management*, 28(1):107-142.

- WALKER, H. & JONES, N. 2012. Sustainable supply chain management across the UK private sector. *An International Journal of Supply Chain Management*, 17:15-28.
- WANG, J. 2016. *Advances in logistics, operations, and management science (ALOMS): 127 volumes*. New York: IGI Global.
- WEE, H.M., LEE, M.C., JONAS, C.P. & WANG, C.E. 2011. Optimal replenishment policy for a deteriorating green product: Life cycle costing analysis. *International Journal of Production Economics*, 133(2):603-611.
- WEIß, P. & BENTLAGE, J. 2006. *Environmental management systems and certification*. Sweden: Uppsala Baltic University Press.
- WEIß, P. & BENTLAGE, J. 2016. *Environmental management systems and certification*. PhD thesis. Sweden: Baltic University.
- WERNERFELT, B. 2008. Class pricing: Marketing science. *Management Research Review*, 27(5):755-763.
- WEVER, R. & VOGTLANDER, J. 2017. *Handbook of ethics, values, and technological design*. Dordrecht, Netherlands: Springer.
- WILLIAM, P., HOSKISSON, R., SHORT, J. & YIU, D. 2010. Resource-based theory and corporate diversification: Accomplishments and opportunities. *Journal of Management*, 37(5):1335-1368.
- WILLIAMS, C. 2007. Research methods. *Journal of Business & Economic Research*, 5: 65-72.
- WRAP. 2013. *Business Resource Efficiency Guide: Your Guide to Environmental Management Systems*. Banbury, Oxon: WRAP.
- YALABIK, B. & FAIRCHILD, R.J. 2011. Customer, regulatory, and competitive pressure as drivers of environmental innovation. *International Journal of Production Economics*, 131(2):519-527.
- ZAILANI, S.H.M., ELTAYEB, T.K., HSU, C.C. & TAN, K.C. 2012. The impact of external institutional drivers and internal strategy on environmental performance. *International Journal of Operations & Production Management*, 32(6):721-745.

ZAWISLAK, P.A., CHERUBINI ALVES, A., TELLO-GAMARRA, J., BARBIEUX, D. & REICHERT, F.M. 2012. Innovation capability: from technology development to transaction capability. *Journal of Technology Management & Innovation*, 7(2):14-27.

ZHU, B.L., VAN DIJK, G., FRITZ, C., SMOLDERS, A.J.P., POL, A., JETTEN, M.S.M. & ETTWIG, K.F. 2012. Anaerobic oxidization of methane in a minerotrophic peatland: Enrichment of nitrite-dependent methane-oxidizing bacteria. *Journal of Operations Management*, 78:8657-8665.

ZHU, Q. & SARKIS, J. 2014. Relationships between operational practices and performance among adopters of green supply chain management practices in Chinese manufacturing enterprises. *Journal of Operations Management*, 2(3):265-289.

ZHU, Q., GENG, Y., FUJITA, T. & HASHIMOTO, S. 2010. Green supply chain management in leading manufacturers: Case studies in Japanese large companies. *Management Research Review*, 33(4):380-392.

ZHU, S.J., TANG, S.J., ZHANG, J.H. & YANG, B. 2012. Control the size and surface chemistry of graphene for the rising fluorescent materials. *Chemical Communications*, 48:4527-4539.

APPENDIX 1: Questionnaire



Vaal University of Technology

Questionnaire

Assessing the influence of internal environmental management systems on green packaging management, green information systems and organisational performance.

Thank you for paying attention to this academic questionnaire. The purpose of this study to assess the effectiveness and the impact of internal environmental management, green information systems and packaging on operational organisational performance. I am therefore, requesting for your assistance to complete the questionnaire below. The research is purely for academic purposes and the information will be kept confidential. It will take you approximately 5 minutes to finish the whole questionnaire.

Researcher: D.M. Mahlangu

SECTION A

GENERAL INFORMATION

The section is asking your background information. Please indicate your answer by ticking () on the appropriate box.

A1 Please indicate your type of business

Cooperatives	<input type="checkbox"/>
Sole proprietor	<input type="checkbox"/>
Close corporations	<input type="checkbox"/>
Private companies	<input type="checkbox"/>
Partnerships	<input type="checkbox"/>

A2 Please indicate the nature of your business

Mining/Quarrying	<input type="checkbox"/>
Manufacturing	<input type="checkbox"/>
Retail	<input type="checkbox"/>
Construction	<input type="checkbox"/>

Transport	
Community/personal service	
Tourism	
Finance /insurance	

A3 Please indicate the number of people employed by the

business

21-50	
51-100	
101- 200	
201-500	
501 +	

SECTION B

POLLUTION PREVENTION PLANS

Below of statements of pollution prevention plans you can indicate the extent to which you agree or disagree with the statement by ticking the corresponding number in the 5point scale below.

1	2	3	4	5
strongly disagree	disagree	moderately agree	Agree	strongly agree

Please tick only one number for each statement

B1	Environmental preservation is a highpriority activity in our firm	Strongly disagree	1	2	3	4	5	Strongly agree
B2	In our firm, environmental preservation is largely an issue of maintaining a good public image.	Strongly disagree	1	2	3	4	5	Strongly agree
B3	It is difficult for our firm to be successful and preserve the environment at the same time	Strongly disagree	1	2	3	4	5	Strongly agree

B4	Our firm has a clear policy statement urging environmental awareness in every area	Strongly disagree	1	2	3	4	5	Strongly agree
B5	We evaluate our environmental efforts by their economic benefits to our firm	Strongly disagree	1	2	3	4	5	Strongly agree

SECTION C

Total quality management

Below are statements about total quality management, you are required to indicate the extent to which you agree or disagree with the statement by ticking the appropriate number where:

1=strongly disagree 2= disagree 3= moderately agree 4= agree 5= strongly disagree

1	2	3	4	5
strongly disagree	disagree	moderately agree	Agree	strongly agree

Tick only one number for each statement.

C1	There is acceptance of responsibility for quality by major department heads within the organization	Strongly disagree	1	2	3	4	5	Strongly agree
C2	Degree to which our organization top management (top organization executive and major department heads) is evaluated for quality performance	Strongly disagree	1	2	3	4	5	Strongly agree
C3	Extent to which our organization top management supports long-term quality improvement process.	Strongly disagree	1	2	3	4	5	Strongly agree
C4	There is specificity of quality goals within our organization.	Strongly disagree	1	2	3	4	5	Strongly agree

SECTION D

ENVIRONMENTAL AUDITS

Below are statements about firm competitiveness you may agree or disagree with each statement by ticking the appropriate number provided below where:

1	2	3	4	5
strongly disagree	Disagree	moderately agree	Agree	strongly agree

Please tick only one number for each statement

Indicate if you have engaged in drinking for the reasons below:

D1	Our firms' procedures are compatible with our supply chain partners' business procedures.	Strongly disagree	1	2	3	4	5	Strongly agree
D2	The goals and objectives of our firm are compatible with supply chain partners in business dealings	Strongly disagree	1	2	3	4	5	Strongly agree
D3	Managers from our firm and those of our supply chain partners have compatible approaches in business dealings.	Strongly disagree	1	2	3	4	5	Strongly agree
D4	Our firm's business procedures are compatible with supply chain partners' skills.	Strongly disagree	1	2	3	4	5	Strongly agree
D5	Managers from our firm and those of our supply chain partners have compatible philosophies	Strongly disagree	1	2	3	4	5	Strongly agree

SECTION E

GREEN PACKAGING MANAGEMENT

Below are statements about green packaging management 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

E1	We have increased the usage of environmentally-friendly raw materials and components in our packaging.	Strongly disagree	1	2	3	4	5	Strongly agree
----	--	-------------------	---	---	---	---	---	----------------

E2	We have designed our products and/or services so that their materials can be recycled.	Strongly disagree	1	2	3	4	5	Strongly agree
E3	Being environmentally conscious is an integral part of our corporate culture.	Strongly disagree	1	2	3	4	5	Strongly agree
E4	We plan the deliveries of the company to minimise the environmental impacts.	Strongly disagree	1	2	3	4	5	Strongly agree

SECTION F

GREEN INFORMATION SYSTEM

Below are statements about green information system 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

E1	Information on quality performance is readily available to employees	Strongly disagree	1	2	3	4	5	Strongly agree
E2	Having easy access to information about green spaces in our organisation will encourage us to be more involved in its planning and management	Strongly disagree	1	2	3	4	5	Strongly agree
E3	we use the green information systems in our organisation to improve performance	Strongly disagree	1	2	3	4	5	Strongly agree
E4	In our organisation we would support keeping the existing green information systems as they would increase our property value	Strongly disagree	1	2	3	4	5	Strongly agree

SECTION G

Organisational performance

Below are statements about organisational performance 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

E1	Carbon dioxide emissions considering the volume of production have decreased.	Strongly disagree	1	2	3	4	5	Strongly agree
E2	Waste considering the volume of production has decreased.	Strongly disagree	1	2	3	4	5	Strongly agree
E3	Energy consumption considering the volume of production has decreased.	Strongly disagree	1	2	3	4	5	Strongly agree
E4	Consumption for hazardous materials considering the volume of production has decreased.	Strongly disagree	1	2	3	4	5	Strongly agree
E5	Considering the economic situation, our turnover has increased.							
E6	Considering the economic situation, our market share has increased.							

THE END

Thank You!

APPENDIX 2: Confirmation Letter



Vaal University of Technology

Your world to a better future

To whom it may concern

This letter serves to inform, that a thorough literature search has been performed for:
D.M. Mahlangu, 209072512. on the topic:

Assessing the influence of internal environmental management systems on green packaging management, green information systems and organisational performance.

The search has been carried out on 23 June 2017 by Ms. Rebecca Fani (Employed in the Gold Fields Library)

Per my knowledge, there is currently no indication of this research being carried out before.

Regards

Telephone: 016 950-6627

e-mail: rebeccaf@vut.ac.za

Fax to email: 086 614 1300

APPENDIX 3: CFA, SEM and Reliability Results

CFA results

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	,089	,048	,123	,056
Independence model	,179	,155	,204	,000

Standardized Regression Weights: (Group number 1 - Default model)

	Estimate
PPP5 <--- PPP	.681
PPP4 <--- PPP	.773
PPP3 <--- PPP	.783
PPP2 <--- PPP	.628
PPP1 <--- PPP	.735
TQM4 <--- TQM	.790
TQM3 <--- TQM	.895
TQM2 <--- TQM	.845
TQM1 <--- TQM	.899
EAUD5 <--- EAUD	.754
EAUD4 <--- EAUD	.837
EAUD3 <--- EAUD	.704
EAUD2 <--- EAUD	.636
EAUD1 <--- EAUD	.856
GIS4 <--- GIS	.756
GIS3 <--- GIS	.845
GIS2 <--- GIS	.786
GIS1 <--- GIS	.847
FP5 <--- FP	.785
FP4 <--- FP	.689
FP3 <--- FP	.769
FP2 <--- FP	.674
FP1 <--- FP	.785

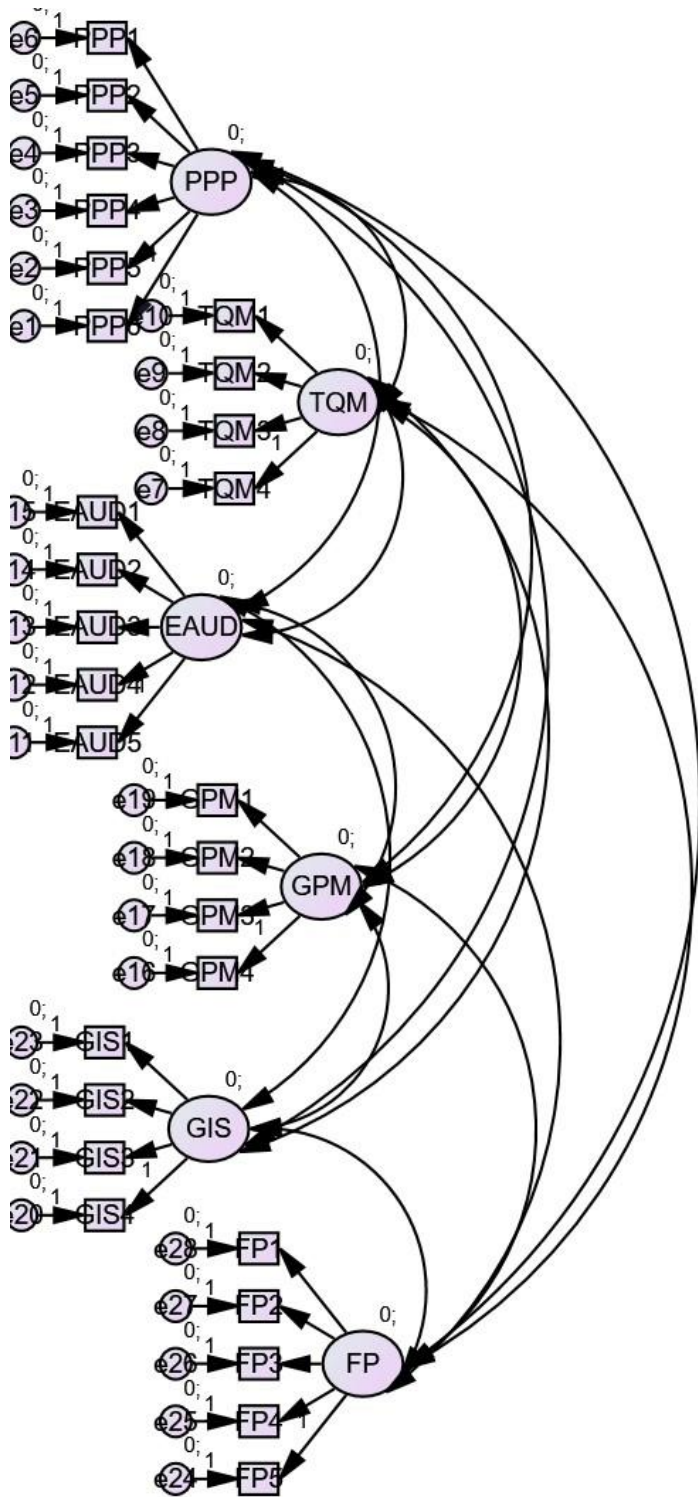
RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	,063	,118	,130	,000
Independence model	,129	,123	,134	,000

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	,970	,987	,875	,949	,975

Saturated model	1,000		1,000		1,000
Independence model	,000	,000	,000	,000	,000



SEM results

Regression Weights: (Group number 1 - Default model)

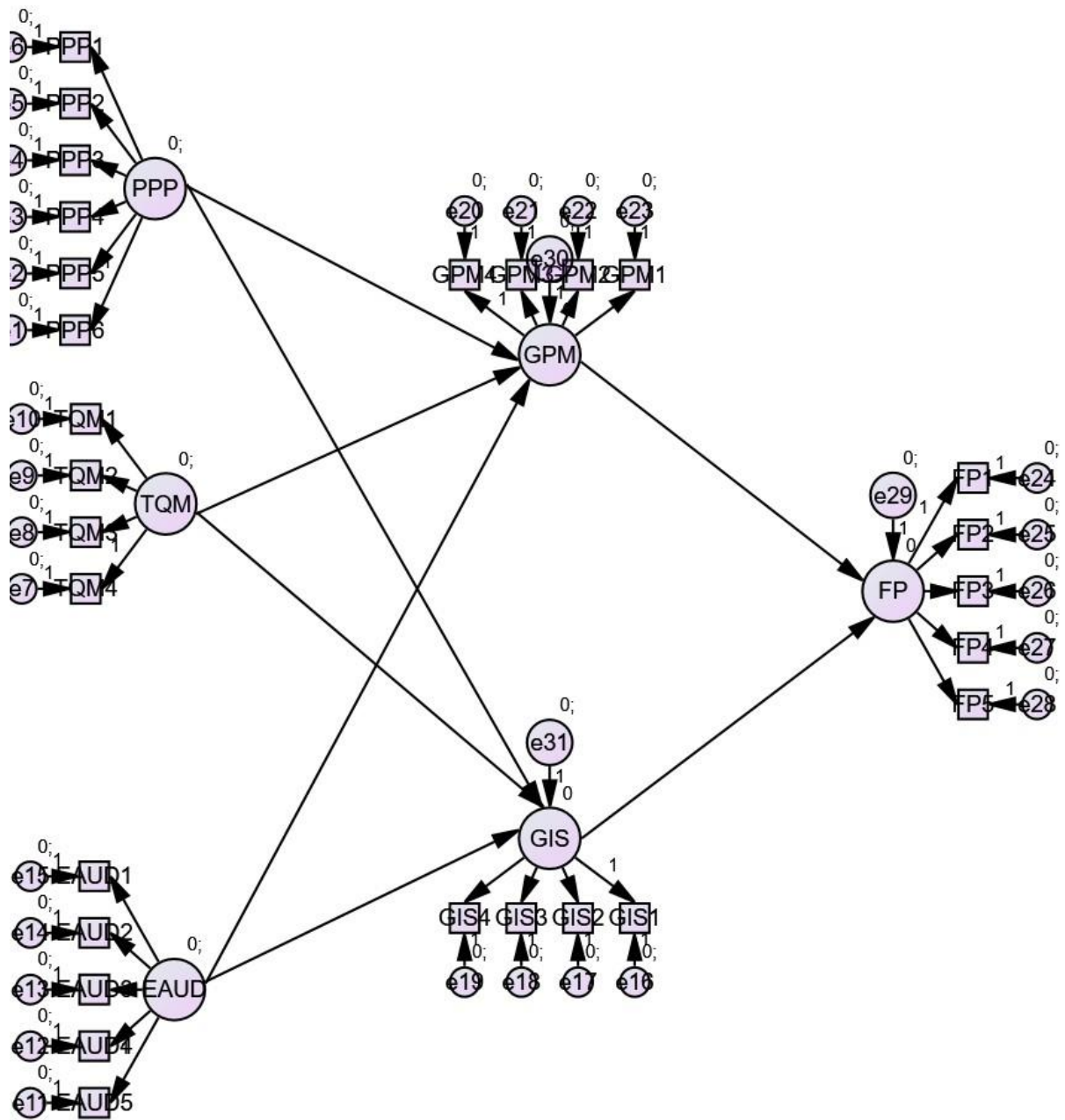
	Estimate	S.E.	C.R.	P	Label
GPM <--- PPP	,860	,010	,565	***	par_23
GPM <--- TQM	,985	,008	,712	,991	par_24
GPM <--- EAUD	,845	,013	,568	***	par_25
GIS <--- PPP	,775	,021	1,348	***	par_26
GIS <--- TQM	,856	,027	,812	***	par_27
GIS <--- EAUD	,895	,009	,867	***	par_28
FP <--- GIS	,897	,562	,915	***	par_29
FP <--- GPM	,773	,295	,865	***	par_30

Baseline Comparisons

Model	NFI	RFI	IFI	TLI	CFI
	Delta1	rho1	Delta2	rho2	
Default model	,944	,985	,973	,962	,972
Saturated model	1,000		1,000		1,000
Independence model	,000	,000	,000	,000	,000

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	,065	,122	,134	,000
Independence model	,129	,123	,134	,000



Reliability analysis

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.880	.138	4

Item Statistics

	Mean	Std. Deviation	N
GPM1	3.95	1.089	230
GPM2	4.20	.971	230
GPM3	4.56	.529	230
GPM4	4.54	.508	230

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
17.25	2.758	1.661	4

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.780	.219	4

Item Statistics

	Mean	Std. Deviation	N
GIS1	4.40	.567	230
GIS2	4.49	.569	230
GIS3	4.62	.550	230
GIS4	4.57	.504	230

Inter-Item Correlation Matrix

	GIS1	GIS2	GIS3	GIS4
GIS1		.068	.126	.086

GIS2	1.000 .068	1.000	-.011	.120
GIS3	.126	-.011	1.000	.003
GIS4	.086	.120	.003	1.000

Inter-Item Covariance Matrix

	GIS1	GIS2	GIS3	GIS4
GIS1	.322	.022	.039	.025
GIS2	.022	.324	-.003	.035
GIS3	.039	-.003	.303	.001
GIS4	.025	.035	.001	.254

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.860	.118	5

Item Statistics

	Mean	Std. Deviation	N
FP1	4.49	.524	230
FP2	4.54	.508	230
FP3	4.53	.500	230
FP4	4.54	.516	230
FP5	4.42	.577	230

Inter-Item Correlation Matrix

	FP1	FP2	FP3	FP4	FP5
FP1	1.000	.001	.116	-.014	-.009
FP2	.001	1.000	.027	.095	.106
FP3	.116	.027	1.000	-.114	.050
FP4	-.014	.095	-.114	1.000	.050
FP5	-.009	.106	.002	.050	1.000

Inter-Item Covariance Matrix

	FP1	FP2	FP3	FP4	FP5
FP1	.275	.000	.030	-.004	-.003
FP2	.000	.258	.007	.025	.031

FP3	.030	.007	.250	-.029	.001
FP4	-.004	.025	-.029	.266	.015
FP5	-.003	.031	.001	.015	.333