A BEST PRACTICE FRAMEWORK IN REVERSE LOGISTICS

by

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STATEMENT OF ORIGINALITY

Student number:3335-158-9

I declare that **"*A BEST PRACTICE FRAMEWORK IN REVERSE LOGISTICS*"** is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

_____ _____

Amanda Badenhorst **Date**

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ABSTRACT

Reverse logistics is an important process that is often misunderstood. Reverse logistics can cause considerable cost, but provide numerous opportunities. Many organisations do not understand the correct processes and procedures to follow and how to manage reverse logistics efficiently. The focus of this study was on best practices in reverse logistics. A best practice framework was developed to help organisations overcome problems and manage their reverse logistics more efficiently. This study adopted a mixed method research approach with both qualitative and quantitative elements. A comprehensive literature study was conducted to develop a conceptual best practice framework in reverse logistics and a survey was conducted to seek inputs from industry in South Africa to refine the framework into a workable instrument in practice. The study concluded that the best practices identified in literature have proven to be important in practice, and applying such practices will enable organisations to manage their reverse logistics more efficiently.

Key terms: reverse logistics, reverse logistics management, reverse logistics best practices, reverse logistics processes, reverse logistics activities, reverse logistics systems, product returns, reverse supply chain, third party reverse logistics

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LIST OF COMMONLY USED ACRONYMS

3PL	Third party logistics provider
3PRL	Third party reverse logistics provider
CILTSA	Chartered Institute of Logistics and Transport South Africa
CRM	Customer relationship management
CSCM	Closed-loop supply chain management
CSCMP	Council of Supply Chain Management
ERP	Enterprise resource planning
GSCM	Green supply chain management
IT	Information technology
KMS	Knowledge management system
RLA	Reverse Logistics Association
RLEC	Reverse Logistics Executive Council
RLMS	Reverse logistics management software
RLS	Reverse logistics management system
RMA	Return merchandise authorisation
RSCM	Reverse supply chain management
SCM	Supply chain management
TMS	Transportation management system
WMS	Warehouse management system

CHAPTER 1
INTRODUCTION TO THE STUDY

1.1 INTRODUCTION

"Awareness of the art and science of logistics continues to increase" (Rogers & Tibben-Lembke, 1998:4). This study was conducted in the logistics discipline in South Africa. It focuses specifically on the topic of reverse logistics. It was undertaken in an effort to develop a best practices framework in reverse logistics to help organisations overcome the challenges they face with regard to reverse logistics, and help them to successfully implement and manage reverse logistics processes.

The chapter begins by providing a background to the study, which is followed by a discussion of the concept of reverse logistics, followed by the demarcation of the scope of the study. The problem statement, research objectives and the research methodology of the study are then explained. The chapter concludes with an outline of the study.

1.2 BACKGROUND

Traditionally, reverse logistics, which is essentially the opposite of logistics (Council of Supply Chain Management Professionals, 2010:114), has not enjoyed an attractive reputation because of the misconception that it is merely a cost drain that does not add any value to the supply chain (Mukhopadhyay & Setaputra, 2006:716). However, during the last decade, reverse logistics has gained more attention because of competition and marketing motives, direct economic motives and environmental concerns as well as strategic and managerial implications (Dowlatshahi, 2005:3456; Ravi & Shankar, 2005:1012). With legislative measures also tightening up, organisations do not have any choice but to engage in reverse logistics practices (Ravi & Shankar, 2005:1012). In addition, with the growing concern for the environment and the need to use materials effectively and efficiently, reverse logistics is gaining recognition worldwide in business as well as research (Wang, Zhou & Ren, 2010:336).

In modern supply chains, reverse logistics is a key competence and its importance is widely recognised. Well-known professional organisations such as the Reverse Logistics Executive Council (RLEC) and the European Commission have shown long-term interest in the

development of reverse logistics, as well as the sponsoring of international scientific reverse logistics projects (De Brito, 2003:18).

In starting to search for a topic, it was discovered that there is a great need to engage in research on reverse logistics. It seems that organisations do not give enough attention to this part of the supply chain. Up to now, academic research in the field of reverse logistics has been neglected. In addition, it seems that businesses and supply chains in South Africa do not realise the importance of reverse logistics. In the 2011 Supply Chain Foresight annual research report in South Africa, only 3% of the respondents in major supply chains indicated that reverse logistics is an important objective that they would pursue in the following year (Supply Chain Foresight, 2011:9).

Questions could be asked why such a low percentage of organisations in South Africa consider reverse logistics to be important. It could be argued that the reasons for this phenomenon are exactly the same as those found in international literature sources. Rogers and Tibben-Lembke (2001) conducted extensive research in the USA on reverse logistics. In their research they asked several organisations about what kinds of issues caused problems for them in completing their reverse logistics mission. Their findings are listed in table 1.1 below.

Table 1.1: Barriers in reverse logistics

	Barrier	**Percentage of respondents**
1	Importance of reverse logistics relative to other issues	39.2%
2	Company policies	35.0%
3	Lack of systems	34.3%
4	Competitive issues	33.7%
5	Management inattention	26.8%
6	Financial resources	19.0%
7	Personnel resources	19.0%
8	Legal issues	14.1%

Source: Rogers & Tibben-Lembke (2001:143)

From table 1.1 it appears that the most significant barrier in reverse logistics is its importance relative to other issues. Other reasons for its lack of credibility might be poor processes, no senior executive overseers, lack of systems and information visibility, inability to quantify costs of returns, “loose” company return policies, poor internal cross-functional communication and insufficient resource allocation to reverse logistics (Rukavina in Walsh, 2007:42).

Despite all the barriers, it has been found that reverse logistics should be important and organisations can enjoy many benefits if they do engage in reverse logistics practices in an efficient and effective manner. Some organisations are beginning to realise that reverse logistics is important, that it can be extremely cost-effective and deliver great added value to the customer's overall experience of the organisation or brand if handled and managed correctly (Weers, 2008:36). Reverse logistics can be a major source of untapped profitability (Sumner, 2008:1) and a well-managed reverse logistics programme can distinguish an organisation from its competitors and increase customer loyalty (Dampier, 2006:22). Hence sound practices in product returns and reverse logistics can be a "win-win" situation benefiting both customers and the firm (Stock in Stock & Mulki, 2009:33).

However, even if organisations realise the importance of reverse logistics, they may still struggle with implementing and managing the entire process efficiently. According to Cope (2007:18), the challenges that organisations face are highly dependent on the type of maturity level of reverse logistics. The author distinguishes between five stages or levels of maturity in reverse logistics. In stage 1, the *innocence* stage, organisations do not understand reverse logistics and are not involved in any reverse logistics activities and processes. In stage 2, the *understanding* stage, organisations become aware of reverse logistics but lack the ability to execute and efficiently manage their reverse logistics processes and activities. In stage 3, the *competence* stage, organisations are well-equipped to manage their reverse logistics processes and activities efficiently and effectively. In stage 4, the *development* stage, organisations start to broaden the scope of their reverse logistics capabilities and move toward becoming experts in the field of reverse logistics. In the final stage, the *excellence* stage, organisations are world-class leaders and experts in reverse logistics. Figure 1.1 depicts the challenges in the five stages of maturity in reverse logistics.

STAGE 1	STAGE 2	STAGE 3	STAGE 4	STAGE 5
Innocence	**Understanding**	**Competence**	**Development**	**Excellence**
No reverse logistics No understanding of the benefits and needs	Non-existent, or poorly developed reverse logistics but growing understanding of the need from an environmental, control and warranty reclaim perspective	Solid reverse logistics capabilities for traditional repairable and good controls on 3rd party service returns	Increasing scope of reverse logistics to include a much broader range of parts. Growing focus on warranty recovery, meeting environmental legislature	World class optimised reverse logistics. Minimise warranty cost through pushing back warranty cost to suppliers, fully environ-mentally compliant, excellent warranty claim controls.

Figure 1.1: Maturity levels in reverse logistics
Source: Adapted from Cope (2007:18)

The important question here is, how can an organisation move towards becoming a world-class leader in reverse logistics? Doughton (2008:20-21) suggests that organisations should start by implementing reverse logistics best practices. This study will address these issues by taking organisations through the maturity stages of reverse logistics from the *innocence stage* to the *understanding stage*, and providing a solid overview of the concept of reverse logistics. The study can also assist organisations become *competent*, by providing them with solutions to the problems they experience in reverse logistics, and from there taking them into the *development and excellence stages* by outlining best practices in reverse logistics. It is necessary for organisations to realise that reverse logistics is a growing aspect of nearly every supply chain. Those that are embracing this fact and are building reverse flows into their systems will be the market winners (Stent, 2006:1).

1.3 CONCEPT OF REVERSE LOGISTICS

Despite the findings of the 2011 Supply Chain Foresight on the situation in South Africa, the concept "reverse logistics" has, in recent years, gained significant attention from within the realms of academia, and from operations managers and company executives (Zheng, Zheng & Liu, 2005:851). Reverse logistics is by nature a highly complex process and a specialised area of any supply chain. No matter what the product is, how it is sold or who the customers are, every organisation needs to focus on recovering the maximum value from returns (Min, Kim & Ha, 2006:94).

Reverse logistics involves the movement of goods in the opposite direction of the supply chain, that is, from the customer back to the supplier (Subramaniam, Bhadury & Peng, 2004:169). In order to understand the concept of reverse logistics it is necessary to comprehend logistics management in general.

The CSCMP (2010:114) defines logistics management as follows:

> that part of the supply chain process that plans, implements, and controls the efficient, effective flow and storage of goods, services, and related information from the point-of-origin to the point-of-consumption in order to meet customers' requirements. Logistics management activities typically include inbound and outbound transportation management, fleet management, warehousing, materials handling, order fulfillment, logistics network design, inventory management, supply/demand planning and management of third party logistics service providers. To varying degrees, the logistics function also includes sourcing and procurement, production planning and scheduling, packaging and assembly and customer service. It is involved in all levels of planning and execution – strategic, operational, and tactical. Logistics management is an integrating function which coordinates and optimises all logistics activities, as well as integrates logistics activities of other functions, including marketing, sales, manufacturing, finances, and information technology.

According to CSCMP (2010:161), reverse logistics is "a specialised segment of logistics focusing on the movement and management of products and resources after the sale and after delivery to the customer." It also "includes product returns for repair and/or credit". Reverse logistics is a process that enables organisations to become more environmentally capable through recycling, reusing and reducing the amount of materials used.

Rogers and Tibben-Lembke (1998:268) define reverse logistics as "the process of planning, implementing, and controlling the efficient, cost effective flow of raw materials, in-process inventory, finished goods and related information from the point of consumption to the point of origin for the purpose of recapturing value or proper disposal". Reverse logistics thus consists of a series of processes (Hudson 2004:1) and activities, which an organisation uses to collect used, unwanted, damaged or outdated products, as well as packaging and shipping materials from the end-user or reseller (Rogers & Tibben-Lembke, 1998:4). Reverse logistics activities

also cut across several functional areas such as marketing, operations, logistics, distribution and transportation. Other areas such as finance and accounting, customer service, quality and reliability, purchasing and design/engineering could become heavily involved in the reverse logistics process (Dowlatshahi, 2005:3456-3457).

From the above definitions, it can be concluded that an independent reverse logistics process starts with the end user or the purchaser's decision that the product has reached the end of its life and that materials need to be disposed of (Blumberg, 2005:15). A basic reverse logistics process consists of *collection, inspection, sorting* and *disassembly* as well as *disposal*. Before disposal is considered, the organisation can decide on any element of reverse logistics. For instance, if the organisation decides that the product can be *reused, repaired* or *refurbished* it can go directly back to the distribution process. If *remanufacturing* is decided upon, the product will move back to the manufacturer or production process. However, if recycling is chosen, products will move back through to the original supply chain. Figure 1.2 provides a graphical representation of the definition and concept of reverse logistics.

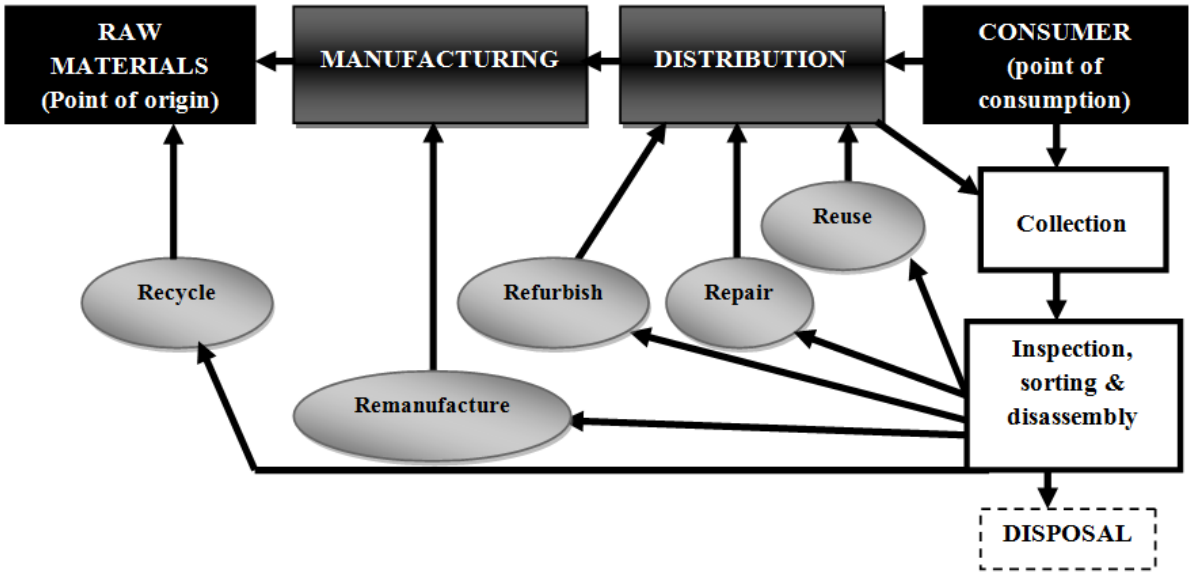

Figure1.2: The reverse logistics process

Source: Adapted from PricewaterhouseCoopers (2008:16)

Figure 1.2 indicates that materials flow backwards to the source of the original supply chain. However, it should be noted that reverse logistics does not necessarily start with the end user but can also happen during the distribution process or through production waste by-products or

commercial returns. The reverse logistics process, activities and options will be discussed in greater detail in chapter 2.

From the above definitions found in the literature the following definition will be used as a basis for the purposes of this study:

> Reverse logistics is the process of planning, implementing and controlling the efficient, cost-effective reverse flow of raw materials, in-process inventory, finished goods and related information, from the point of consumption (internally in operations and externally by customers) to the point of origin for the purpose of recapturing value, proper disposal and in the process delivering a customer service.

It is clear that reverse logistics consists of numerous activities and elements and can be viewed in a holistic or narrow sense. In order for organisations to manage the entire process efficiently and effectively, they need to understand all aspects of reverse logistics.

In summary, product returns will continue to be a part of business operations. In some fashion, all members of the supply chain are involved in the process. With increasing competition and higher customer demands, it is essential for all facets of the supply chain to operate at peak efficiency and effectiveness. As a part of the process, product returns are no exception (Stock & Mulki, 2009:54).

1.4 DEMARCATION OF THE STUDY

This study will focus on reverse logistics and not on forward supply chain practices or processes. The reason for this is that best practices, problems and solutions in reverse logistics may not apply to forward logistics practices. In the previous section it became evident that reverse logistics is the opposite of logistics. In the same way, the forward supply chain is essentially the opposite of the reverse supply chain. According to Halldorsson (2008:26), reverse logistics starts where the traditional principles of supply chain management come to an end, and that is when a product reaches the end of its life or use and is redundant to its users.

Forward logistics has different characteristics from those of reverse logistics in terms of complexity, costs (Efendigil, Önüt & Kongar, 2008:270), physical distribution and cash flow (Roy, 2003:1). Forward flows are a controlled procedure where goods are characterised by

order, prepacked truckloads, pallets, and their shipment in order to receive them on schedule. Returns, however, are characterised by the uncertainty of types and quantities, and a wide variety of conditions (Wyld, 2007:28; Zheng et al., 2005:851). Table 1.2 indicates the comparison between forward and reverse logistics.

Table 1.2: Differences between forward and reverse logistics

	Forward logistics	**Reverse logistics**
Quality	Product quality uniform	Product quality not uniform
Quantity	Large quantities of standardised items	Small quantities
Product value	High	Moderate to low
Product life cycle	Manageable	Less manageable
Product flow	One way (push)	Two way (push and pull)
Pricing	Pricing of product uniform	Pricing of product not uniform
Order cycle time	Short order cycle time	Medium to long order cycle time
Routing	Routing of product unambiguous	Routing of product ambiguous
Information tracking	Automated information systems used	Combination of automated and manual systems
Inventory Management	Inventory management consistent	Inventory management inconsistent
Inventory control	Focused	Not focused
Disposition	Disposition options clear	Disposition options not clear
Costs	More understandable, and transparent	Less understandable, and more hidden
Type of customers	Type of customer easy to identify and market to	Type of customer difficult to identify and market to
Priority	High priority	Low priority
Visibility	Visibility of process more transparent	Visibility of process less transparent
Financial management	Financial management issues clear	Financial management issues not as clear
Negotiations	Negotiation between parties more straightforward	Negotiation less straight forward
Channel	Less complex (single or multi-echelon)	More complex and diverse (multi-echelon)

Source: Min and Ko (2008:177)

In table 1.2 it is evident that the characteristics of forward logistics and reverse logistics differ significantly. It is also clear that reverse logistics is much more complicated than forward logistics, and best practices will therefore also be different.

Reverse logistics spans various businesses and industries and each member in the supply chain, including the manufacturer, wholesaler, third party logistics (3PL) provider and retailer, has different goals and processes relating to reverse logistics. However, despite the fact that each company has different needs and requirements for handling returns, there is a lot of commonality to processing returns, especially within an industry segment. Standards or guidelines for some of these processes are beneficial to any industry (Tibben-Lembke & Rupnow, 2008:33).

This study will not focus on any specific industry, business sector or organisation in the reverse supply chain. Hence the best practices in reverse logistics in this study will be generally applicable to any industry, business sector or reverse supply chain member.

1.5 PROBLEM STATEMENT

There are pressures on organisations to act responsibly in terms of the protection of the environment and create value for all stakeholders (Nylund, 2012:9). This includes responsibility towards the internal and external customers of the organisation. If organisations do not have policies and systems in place regarding the return, repair and reuse of goods and the removal of scrap (reverse logistics elements) they will harm their image, frustrate internal customers and lose external customers (Jayaraman & Luo, 2007:56).

Reverse logistics can cause considerable cost but also provides numerous opportunities and can therefore be regarded as a key element and part of the supply chain, even though it is often hidden (Horowitz, 2010:1). There are major barriers and obstacles, which make it difficult to manage reverse logistics efficiently and proactively (Ravi & Shankar, 2005:1012; Zheng, et al., 2005:852). Therefore many organisations ignore reverse logistics functions and regard them as a nuisance (Greve, 2010:1; Daugherty, Richey, Genchev & Chen, 2005:78).

From the literature it is clear that the problem is that organisations do not know where to start, what processes and procedures to follow and how to manage the process efficiently and effectively. This study will endeavour to make a contribution to the problems and challenges that organisations face with regard to reverse logistics, by identifying solutions and providing best practices that will enable organisations to successfully implement and manage their reverse logistics processes.

The problem statement in this study is therefore as follows:

What are the best practices in reverse logistics that could be included in a framework to assist organisations to overcome problems and challenges in reverse logistics as well as improve and effectively manage their reverse logistics processes?

1.6 RESEARCH OBJECTIVES

The primary objective of this study is to *determine best practices in reverse logistics and to compile a framework that can assist organisations to manage their reverse logistics more efficiently.*

The secondary objectives in this study are as follows:

(1) to investigate the concept of reverse logistics
(2) to determine the importance of reverse logistics
(3) to explore the drivers and benefits of reverse logistics
(4) to explore all the dimensions and elements of reverse logistics
(5) to identify the problems and challenges in reverse logistics
(6) to find solutions to the problems and challenges in reverse logistics
(7) to compile a conceptual best practice framework based on the literature study
(8) to seek inputs from industry in order to refine the best practice framework into a workable instrument in practice

1.7 RESEARCH METHODOLOGY

To address the objective of this research a qualitative dominant embedded mixed method research approach was followed. According to Johnson, Onwuegbuzie and Turner (2007:123) mixed method research is "the type of research in which a researcher or team of researches combines elements of qualitative and quantitative research approaches (e.g. use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration". Creswell (2009:208) explains that embedding in a mixed method research approach is where the researcher might have a primary aim to collect one form of data and have the other form of data provide supportive information.

The nature of this study was therefore both descriptive and exploratory and contains quantitative and qualitative factors. There were two reasons for this approach: (1) Crucial elements of this study were based on existing research and secondary data on the topic of reverse logistics in order to develop a best practice framework; and (2) primary sources were needed to refine the framework into a more workable instrument. The research in this study consisted of two phases, which are illustrated in figure 1.3.

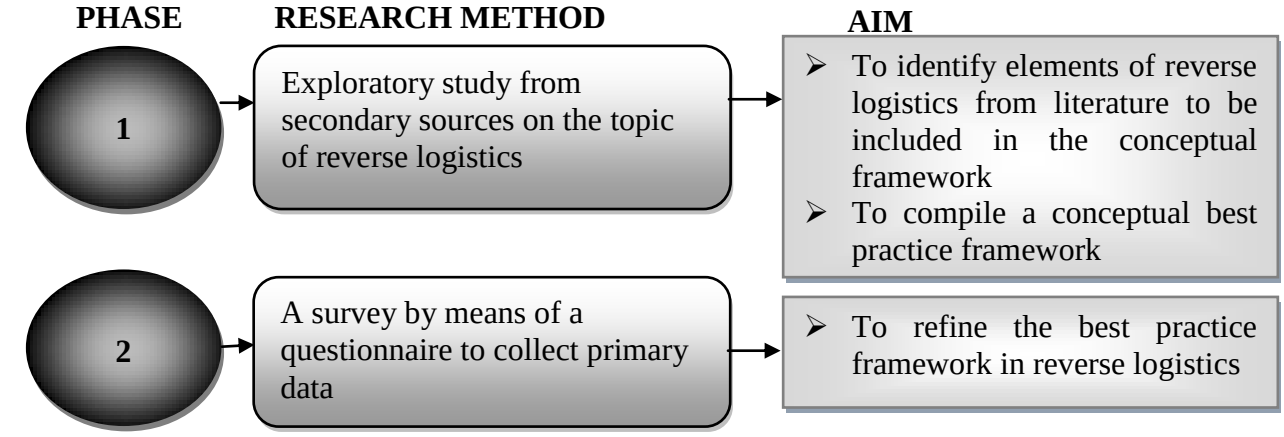

Figure 1.3: Broad phases of research conducted in this study

1.7.1 Phase 1: literature study

The secondary objectives of this study required a comprehensive study of literature on the topic of reverse logistics. The topic of reverse logistics was discussed in two sections. In the first section, the concept of reverse logistics was explored and discussed. In the second section, all the problems and challenges and solutions in reverse logistics were identified and discussed. From the literature study a conceptual best practice framework in reverse logistics was compiled to assist organisations to improve the management of reverse logistics processes, as well as overcome problems in reverse logistics.

Numerous sources were used to conduct the literature study. Most of the sources were found by using the internet through internet search engines and electronic global databases. The majority of the sources are international because of the lack of South African sources. It is also important to point out that not all the sources that were consulted were based on scholarly work in the field of reverse logistics. Numerous company and association web pages were consulted to gain a more practical overview in the field of reverse logistics and to identify some of the best practices in reverse logistics. A major source of expert knowledge and opinions in the field of

reverse logistics was found in an on-line magazine produced by the Reverse Logistics Association (RLA) which consists of a board of advisors comprising industry experts.

All the different sources consulted in this study were used to

- determine the current state of research in reverse logistics
- gain an in-depth understanding of the field of reverse logistics
- identify the problems and challenges in reverse logistics
- find solutions to these problems and challenges
- identify best practices in reverse logistics
- ultimately compile a conceptual best practice framework in reverse logistics

1.7.2 Phase 2: Empirical study

In this phase, a survey was conducted. The research instrument was a questionnaire (see appendix A), which was compiled from the conceptual best practice framework that was developed from the literature in chapters 2 to 4. During the period of October/November 2012, the questionnaire was administered by email to South African organisations that specialise in reverse logistics.

This study used nonprobability sampling, more specifically purposive or judgemental sampling techniques. Purposive samples are generated when the selection of units is made by the researcher using his or her own judgement about cases that are important to the research or can be used for the research (Kent, 2007:230). Judgemental sampling is used when members are chosen on the basis of the researcher's judgement on what constitutes a representative sample of the population of interest (Tustin, Ligthelm, Martins & Van Wyk, 2005:346).

A search was done in October 2012 using Google, to identify organisations that specialise in reverse logistics services in South Africa. Nineteen companies were identified. These companies' information and contact details were obtained from their webpages. To increase the sample size the Chartered Institute of Logistics and Transport South Africa (CITLSA) was contacted to distribute the questionnaire to its members. Two additional members indicated that they are involved in reverse logistics and agreed to participate. The sample thus included 21 organisations (see appendix B).

Initial contact was made via email, explaining the purpose of the study and requesting assistance in completing the questionnaire. Thirteen organisations responded and ten completed the questionnaire. These aspects are further discussed in chapter 5, section 5.7.2.3.

1.8 OUTLINE OF THE STUDY

This study consists of seven chapters and the outline is depicted in figure 1.4.

Chapter 1 introduces the study and provided background on the concept of reverse logistics. The problem statement and research objectives were explained and a brief overview of the research methodology provided. The chapter ends with the current section, which serves as an outline of the study.

Chapter 2 is a comprehensive literature chapter on the concept of reverse logistics. The chapter starts with an introduction and rest of the chapter consists of various sections including the following:

- The definitions of reverse logistics and its related concepts
- Drivers of reverse logistics
- Benefits of reverse logistics
- Product returns
- Reverse logistics parties, processes and activities.

The chapter ends with a conclusion.

Chapter 3 is also based on findings from the literature, where the problems and solutions of reverse logistics are discussed. The chapter starts with a brief introduction, followed by the following sections:

- Reverse logistics problems
- Solutions to reverse logistics problems
- Reverse logistics problems and solution framework

The chapter ends with a summary.

Chapter 4 includes the conceptual frameworks for best practices in reverse logistics. This chapter starts with a brief introduction, followed by several frameworks and best practice tables developed from the literature. The chapter concludes with a summary of the chapter.

Chapter 5 deals with the research methodology of the study. The research approach is discussed and the theoretical background on the research design and methods explained, including information on how these methods were used to achieve the objectives of the study. The research methodology of both phases in the study is explained. Validity and reliability, limitations and ethical considerations are also highlighted. The chapter ends with a summary.

Chapter 6 provides the results and findings of the empirical study as well as the refined best practice framework. It contains a descriptive analysis, an inferential analysis, a gap and opportunity analysis and a summary.

Chapter 7 concludes the study with a summary of the literature and empirical findings. In this chapter conclusions are drawn from the research results, and recommendations are made for further research.

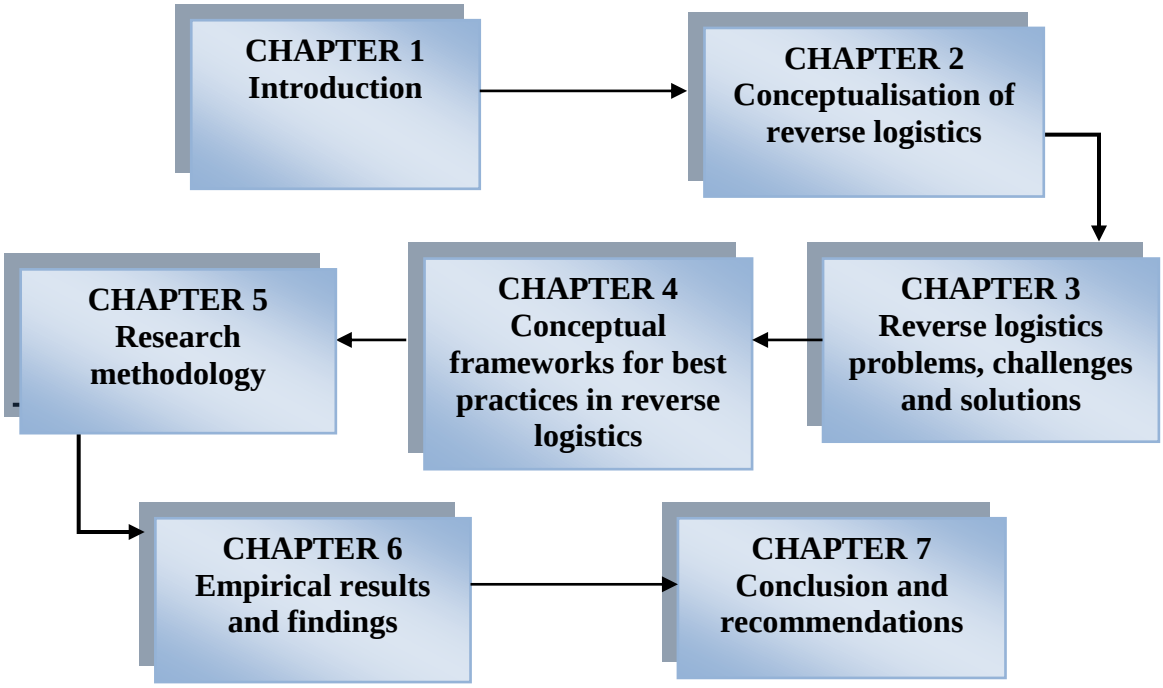

Figure 1.4: Outline of study

CHAPTER 2
CONCEPTUALISATION OF REVERSE LOGISTICS

2.1 INTRODUCTION

Chapter 1 provided an introduction to the study and briefly discussed the background, the concept of reverse logistics, the scope, problem statement, objectives and research method of the study. This chapter deals with the concept of reverse logistics in more detail.

Reverse logistics, which is sometimes referred to as "logistics backward" because its flow of goods is the exact opposite to the flow of the conventional supply chain (BearingPoint, 2008:27; Steven, 2004:163), has become an important issue. Once labelled as "the forgotten child of the supply chain" (Gupta & Tiwari, 2009:3), reverse logistics has not enjoyed an attractive reputation because of the misconception that it is only a cost drain and adds no value to the supply chain (Mukhopadhyay & Setaputra, 2006:716). However, reverse logistics can be classified as an asset rather a liability. If the products are returned it does not necessarily mean that they do not have any value (De Brito, 2003:17). Traditionally, organisations have focused on improving the forward logistics activities, and for many years, most of the organisations have not treated the reverse logistics process with the same care and diligence afforded traditional areas of logistics. They generally hold that the flow of goods typically ends with the consumer in a supply chain (Sople, 2007:184; Jian & Xu, 2006:1089; Kim, 2001:1).

This situation, however, is changing because many organisations now consider the cost and impact of reverse logistics when designing products, rather than forward considerations such as manufacturing costs, marketability and sales margins (Doherty, 2009:1; Jian & Xu, 2006:1089; Monaham, Van den Bossche & Harthan, 2004:22). Organisations always look for ways to improve, and this has made areas forgotten in the past a key source of efficiency (Zuluaga, 2005:16). The reason for the increasing focus on reverse logistics in the last decade is because of competition and marketing motives, direct economic motives and concerns with the environment as well as strategic and managerial implications (Dowlatshahi, 2010:4200; Dowlatshahi, 2005:3456; Ravi & Shankar, 2005:1012). Organisations are giving more and more attention to reverse logistics because of environmental issues and the impact of these issues on public opinion (BearingPoint, 2008:28; Jian & Xu, 2006:1089; Zuluaga, 2005:11). With legislative measures tightening up, organisations do not have any choice but to engage in

reverse logistics practices (Ravi & Shankar, 2005:1012; Sarkis, Helms & Hervani, 2010:337). Consequently, the high rate of goods being returned, increasing environmental regulations and standards and growing consumer awareness have all contributed to organisations rethinking the significance of reverse logistics (Lu, Zhang, Ruan & Wu, 2007:324; Partida, 2011:62).

Reverse logistics is an issue that organisations need to master and it is thus necessary to develop a reverse logistics system that rivals traditional outbound channels in terms of efficiency, cost effectiveness and competitiveness (Smith 2005:180). Managing the reverse supply chain is an entirely different process where credit returns, warranty replacements, exchanges, repairs and end of leases occur (Kim, 2001:1).

Reverse logistics has become a new frontier of management including activities such as reverse distribution, recycling, reuse and the reduction of the amounts of materials in the forward system (Carter & Ellram, 1998:85) just, to name but a few. Activities in reverse logistics can cover retailers, manufacturers and service entities and can also cut across organisational functions such as marketing, operations, logistics, distribution and transportation, finance and accounting, customer service, quality, purchasing, and design and engineering (Dowlatshahi, 2011:1; Dowlatshahi, 2005:3456).

This chapter will include definitions of reverse logistics, and the concepts closely related to reverse logistics will be identified and discussed. The importance of reverse logistics will be emphasised by identifying and discussing the drivers in reverse logistics and the benefits of reverse logistics. This chapter will also look at product returns by exploring the type of returns that exist as well as identifying the reasons for product returns. The parties involved in reverse logistics will then be identified and the reverse logistics processes, activities and options discussed. The chapter will conclude with a brief summary of the elements discussed in this chapter. Figure 2.1 provides an overview of the chapter.

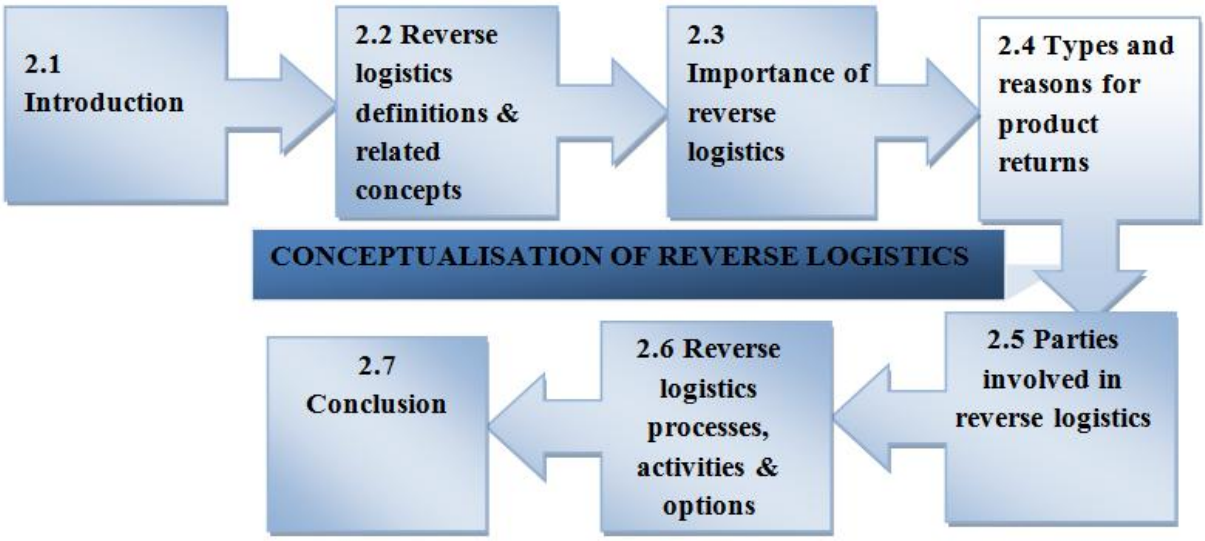

Figure 2.1: Outline of chapter 2

2.2 REVERSE LOGISTICS DEFINITIONS AND RELATED CONCEPTS

There are many different definitions of the concept, because reverse logistics, despite an apparent lack of interest in and awareness of it, is one of the fastest developing fields in business logistics, which results in constant changes in scope and significance (Vogt, Pienaar & De Wit, 2002:234). Despite this, there are also other terms closely related to reverse logistics which often cause confusion. In this section, the different definitions of reverse logistics will be highlighted, followed by a description of the concepts closely related to the phenomenon.

2.2.1 Definitions of reverse logistics

Reverse logistics is essentially the opposite of logistics. The Council of Supply Chain Management Professionals (CSCMP, 2010:144) defines logistics as the "process of planning, implementing, and controlling procedures for the efficient and effective transportation and storage of goods including service, and related information from the point of origin to the point of consumption for the purpose of conforming to customer requirements". Reverse logistics, however, can be defined as a "specialised segment of logistics focusing on the movement and management of products and resources after the sale and after delivery to the customer". It also "includes product returns for repair and/or credit". Furthermore, reverse logistics is a process that enables organisations to become more environmentally capable through recycling, reusing and reducing the amount of materials used (CSCMP, 2010:151).

A number of definitions of reverse logistics can be found in literature. Table 2.1 highlights some of the definitions of by various authors or scholars.

Table 2.1: Definitions of reverse logistics

Author or scholar and year	Definition of reverse logistics
Patrida (2011:62)	Reverse logistics focuses on the movement and management of products returned by the customer for repair or credit. This involves authorising the return, performing salvage activities and managing and processing warranty claims
Dowlatshahi (2011:1)	Reverse logistics is the process in which products (e.g. end of life products) are returned from consumers or customer service centres for the purpose of gaining their value or planning for their proper disposal
Zhang (2010:4169)	Reverse logistics is the physical movement of goods formed by repairing and returning substandard goods as well as turnover containers returned to supply side from demand side. This involves the item entities' reverse flow process such as reclaiming pallets and containers used to transport, receiving the customer returns, collecting containers, raw materials, scrap and spare parts processing defects in the product sales
BearingPoint (2008:27)	Reverse logistics denotes a set of planning, execution and flow control measures for raw materials and finished products in order to recover and recycle those products or materials. It involves a whole range of activities, including collection, sorting, processing and reconditioning
Lu et al. (2007:324)	Reverse logistics is the process of planning, implementing and controlling flows of raw materials, in process inventory, and finished goods, from a manufacturing, distribution or use point to a point of recovery or point of proper disposal
Sople (2007:184)	Reverse logistics is the process of moving goods from their place of use, back to their place of manufacture for reprocessing, refilling, repairs or waste disposal. It is a planned process of goods movement in reverse, done in an effective and cost-efficient

	manner, through an organised network
Hugo, Badenhorst-Weiss and Van Biljon (2004:225)	Reverse logistics is a concept aimed at waste and cost reduction in the distribution channel by creating procedures to reverse the distribution process
Steven (2004:163)	Reverse logistics comprises all activities involved in managing, processing, reducing and disposing of hazardous or nonhazardous waste from the production, packaging and use of products, including the process of redistribution
Banks (2002:1)	Reverse logistics involves the timely and accurate movement of service-related and nonservice-related materials from a user back through the supply chain to the appropriate activity
Vogt et al. (2002:234)	Reverse logistics is the management of all activities involved in goods, demand information and money flowing in the opposite direction of the primary logistics flow. It involves reducing the generation of waste, as well as managing the collection, transport, disposal and recycling of both hazardous and nonhazardous waste in a way that maximises the long-term profitability of the business
Guide Jr., Jayaraman, Srivastava and Benton (2000:136)	Reverse logistics is the task of recovering discarded products; it may include packaging and shipping materials and backhauling them to a central collection point for either recycling or remanufacturing
Fleischmann, Bloemhof-Ruwaard, Dekker, Van der Laan, Van Nunem and Van Wassenhove (1997:2)	Reverse logistics is the process that encompasses the logistics activities all the way from used products no longer required by the user to products that can be used again in a market. It involves the physical transportation of used products from the end user to a producer

Source: Compiled by researcher

Consequently, reverse logistics can be viewed in a narrow or a broad sense. In a narrow sense, it is the recovery process for right products, parts or material as a result of environmental problems or obsolete products. In a broad sense, it also includes the contents of waste logistics.

The ultimate goal is reducing resource use in such a way that waste is reduced too, and positive and recycling logistics is more efficient at the same time (Zhang, 2010:4169-4170).

The following can be inferred from the definitions of reverse logistics in table 2.1: *Firstly*, some authors define it as a set of logistics management tasks or activities, whereas most of them define it as a process. *Secondly*, included in the definitions are the inputs in reverse logistics where most authors are in agreement that it includes discarded products, used products, products or parts previously shipped and hazardous and nonhazardous waste. Other authors or scholars see reverse logistics as a wider concept that includes the entire reverse flow of information, raw materials, inventories and goods through the supply chain. *Thirdly*, included in the definitions are the tasks and activities which are all similar to the activities performed in forward logistics, with a few additional tasks. Reverse logistics activities include planning, implementing and controlling an efficient and cost-effective flow of products, as well as the collection, transportation, recovery, storage, processing, acceptance, reduction, management, disposal and shipment of products.

Table 2.1 indicates that most authors suggest that the entire process of reverse logistics starts at the point of consumption. However, this could be misleading because reverse logistics could also start at retailers and distributors (who are not consumers of the products) (Zuluaga, 2005:19). In the same way "point-of-origin" is also misleading, and is not necessarily the correct way to describe reverse logistics. It should rather be the "point-of recovery" because flows may go back to other points (De Brito 2003:20).

To sum up, reverse logistics can be defined as the process of planning, implementing and controlling the efficient, cost-effective flow of raw materials, in-process inventory, finished goods and related information from the point of consumption to the point of origin for the purpose of recapturing value or proper disposal. The next section focuses on the concepts that are closely related to reverse logistics.

2.2.2 Related concepts of reverse logistics

It is clear from above that there are many ways to define reverse logistics, and given its novelty as a research area, the definition of reverse logistics may cause certain confusion among those interested in the area, with the result that it can also be confused with other closely related concepts or terms (Rubio, Chamorro & Miranda 2008:1100). These terms include closed-loop

supply chain and closed-loop supply chain management (CSCM), reverse supply chain management (RSCM), green logistics and green supply chain management (GSCM) and returns management.

Before explaining what these related concepts entail, it is necessary to define supply chain management. The CSCMP (2010:180) defines supply chain management as follows:

> …"the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies. Supply chain management is an integrating function with primary responsibility for linking major business functions and business processes within and across companies into a cohesive and high-performing business model. It includes all of the logistics management activities with and across marketing, sales, product design, finance and information technology".

The concepts closely related to reverse logistics will now be elaborated on in the sections to follow.

2.2.2.1 Closed-loop supply chain

Closed-loop supply chains are formed when forward and reverse supply chain activities are combined into a single system in order to integrate returned products back into the distribution network (Kussing & Pienaar, 2009:433). Closed-loop supply chain management (CSCM) can be defined as "supply chains that are designed to consider the acquisition and return of products, reuse activities, and the distribution of the recovered products" (Rogers, Lambert, Croxton & García-Dastugue, 2002:4). According to Guide and Van Wassenhove (2006:349), CSCM can be defined as the "design, control and operation of a system to maximise value creation over the entire life-cycle of a product with dynamic recovery of value from different types and volumes of returns over time". Closed-loops involve forward as well as backward logistics.

2.2.2.2 Reverse supply chain

A reverse supply chain is a series of activities involved in retrieving a used or unused product from a customer and either disposes, reuses or resells it (Guide & Wassenhove, 2006:25). Reverse logistics is a part of reverse supply chain management (RSCM) and includes the intake, shipping and other logistics of product returns (Kim, 2001:1). The reverse supply chain is no longer only a disposal channel. Instead, it recaptures resources locked up in the product, package or part returned (Krikke, 2009a:13). RSCM is the automation of business processes to manage the reverse path of a product from the customer to its final disposition and includes the following:

- managing product returns, real-time inventory and workflow
- tracking warranties
- ordering and exchanging parts
- collaborating with suppliers
- analysing data
- performing repairs
- demanufacturing
- redisposition and customer notification

2.2.2.3 Green logistics

There is growing interest, awareness and maturity around the business necessity for green logistics where many modern organisations pride themselves on their environmentally friendly policies and practices (O'Donnell, 2009:1). Reverse logistics is closely related to green logistics in terms of overlapping goals with regard to issues of reuse, recycling and waste disposal (Kussing & Pienaar 2009:423). According to Rogers and Tibben-Lembke (1998:258), green logistics "attempts to measure and minimize the ecological impact of logistics activities". Reverse logistics is also a vital part of green supply chain management (GSCM). Srivastava (2007:54-55) defines GSCM as "integrating environmental thinking into supply-chain management, including product design, material sourcing and selection, manufacturing processes, delivery of the final product to the consumers as well as end-of-life management of the product after its useful life". GSCM is also known as environmentally conscious supply chain management. It takes into account the environmental issues in all aspects of the supply chain which means that the economy and environment are developed coordinately. In the management process, it puts up eco-design for the whole supply chain, from raw material

purchase, production, consumption to waste recycling and reuse (Zhang, 2010:4170).

2.2.2.4 Returns management

Reverse logistics is also part of returns management. Reverse logistics, CSCM and returns describe activities in returns management. However, it does not adequately describe the returns management process. Reverse logistics encompasses only the backward movement of materials in the supply chain, whereas returns management is much broader in scope. According to Rogers, Lambert, Croxton and Garcia-Dastugue (2008:163), returns management "is part of supply chain management that includes, reverse logistics, gate keeping, and avoidance". Norek (2002:36) maintains that returns management "includes the informational support of the entire returns process, including arrangements for transportation and physical handling". Returns management embraces returns at the end of a product's life, commercial returns (leasing, mail order, B2C), contractual returns (newspapers, publishers), returns under warranty (faulty goods), production waste and scraps, and "functional" returns, such as packaging to be reused for the same purpose (containers, packaging) (BearingPoint, 2008:27). Returns management requires collaboration and interaction between the members of the supply chain and is thus a boundary-spanning activity. In other words, it is a critical element and requires planning and effective implementation across supply chain firms (Rogers et al., 2008:160).

It is clear from the above that the concepts that are related to reverse logistics differ slightly with in scope and emphasis. What is also clear is that reverse logistics and its related concepts recognise the forward and backward flow of materials and information and endeavour to minimise waste and the environmental impact to the advantage of society and the organisation or supply chain. Figure 2.2 illustrates reverse logistics and its related concepts.

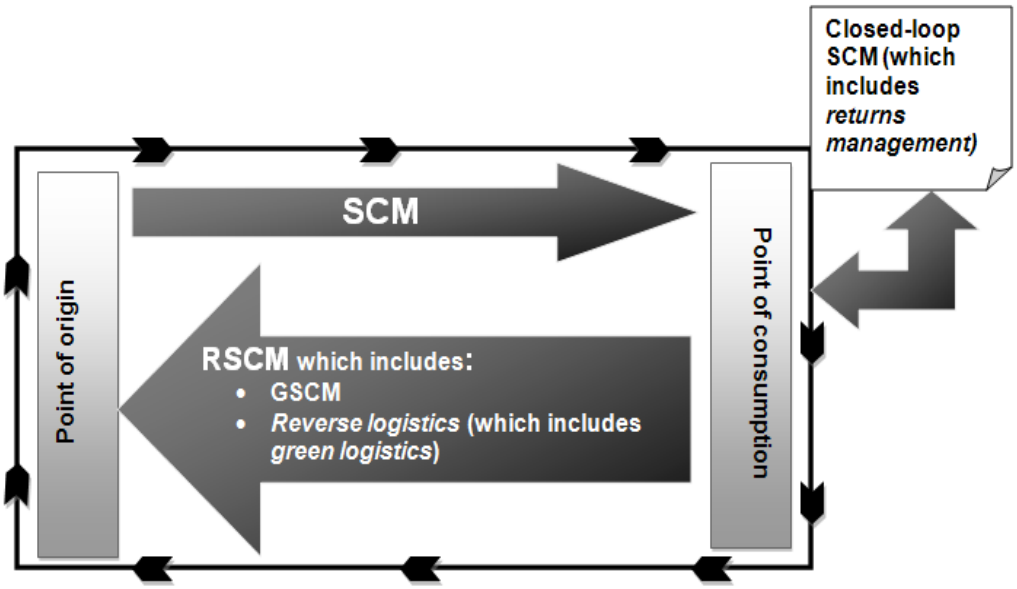

Figure 2.2: Reverse logistics and its related concepts

Source: Compiled by researcher

In the next section, the importance of reverse logistics will be discussed in terms of the drivers in and benefits of reverse logistics.

2.3 IMPORTANCE OF REVERSE LOGISTICS

Reverse logistics has become significant because organisations are under increasing pressure from many stakeholder groups, including shareholders, customers, employees, suppliers, reverse supply chain partners, government agencies, nonprofit organisations and the (public) environment (PWC, 2008:19; Vachon & Klassen 2006:796) owing to environmental issues, legislation and consumer expectations. This section focuses on the importance of reverse logistics by discussing the different drivers of reverse logistics, followed by the benefits that reverse logistics has to offer organisations and their stakeholders.

2.3.1 Drivers of reverse logistics

Organisations generally become involved in reverse logistics because they can profit from it or they do not have a choice because of environmental legislation and laws, or they feel socially impelled (De Brito, 2004:14). Evolving financial, competitive and customer pressures as well as increasingly complex environmental regulations compel organisations to engage in reverse logistics processes (Partida, 2011:62).

The drivers of reverse logistics can be divided into three different categories, including (1) economic drivers, (2) corporate citizenship and consumer expectations and (3) environmental issues and legislations.

2.3.1.1 Economic drivers

Economic drivers concern profits and relate to all recovery actions where the company has direct or indirect economic gains (Wang et al., 2010:338). A reverse logistics programme can generate direct gains for organisations by reducing the use of raw materials, by adding value with recovery and by reducing disposal costs. Even with no clear or immediate expected profit, an organisation can be more involved in reverse logistics because of competition and/or strategy drivers, marketing or customer-related drivers, from which indirect gains are expected (De Brito, 2003:49-50; De Brito & Dekker, 2003:7; Wang et al., 2010:338). Hence economic drivers can also be inside the organisation and will become evident in the benefits of reverse logistics, which will be discussed later in this chapter.

In today's globalised and fast-paced economy, competition is driving companies to address the importance and impact of reverse logistics processes on an organisation's performance (Huscroft, 2010:7). In terms of strategic drivers, organisations may become involved in reverse logistics in order to prepare for or even avoid future legislation (De Brito, 2004:50). Regarding marketing-related drivers, an organisation may engage in reverse logistics in order to prevent other organisations from entering the market (Dijhuizen in De Brito, 2004:50). In terms of customer-related drivers, an organisation may gain indirectly by establishing a positive environmental image with the customer (Wang et al., 2010:33).

The direct gains may thus include the input materials, cost reduction and value-added recovery. However, indirect gains may include impending legislation, market protection, green image and improved customer-supplier relations (De Brito & Dekker, 2003:7).

2.3.1.2 Corporate citizenship and consumer expectations

Another significant driver of reverse logistics is extended responsibility or corporate citizenship which compels organisations to become active in accepting returns. In other words, extended responsibility/corporate citizenship is a set of values or principles that drives an organisation to become responsibly engaged in reverse logistics (Bernon, Cullen & Rowat, 2004:12). The

increasing significance of corporate social responsibility (Carter, 2004:4) indicates that organisations have to offer more liberal return policies which will further increase the importance of returns disposition (French & Discenza, 2006:769).

Customer support is the main driver for organisations to become involved in reverse logistic. In a study by BearingPoint (2008:29), 91% of the organisations, which included 600 respondents (supply chain, operations and purchasing directors in large organisations and small and medium-sized enterprises in a variety of vertical sectors including, transport, energy, high-tech distribution, automotive, textiles, electronics/ IT and consumer goods), indicated that they engage in reverse logistics as a means to acquire the badge of a "corporate citizen" and reinforce their customer loyalty and satisfaction policies. Consequently, organisations deciding to establish a reverse logistics structure are motivated first and foremost by the desire to respond to consumer expectations (BearingPoint, 2008:29). This outcome is not surprising. Customers are the driving force behind any organisation. Without the customer, the organisation has no purpose or need to exist. The customer is the driver of the demand on the organisation, which means that the organisation must be able to adapt to the needs of the customer, especially if the organisation wants to remain competitive (Huscroft, 2010:36).

2.3.1.3 Environmental issues and legislation

Accelerating environmental concern, which has already resulted in legislation, and financial interest in reverse logistics, have both contributed to the popularity of reverse logistics in some countries (Jian & Xu, 2006:1089). Organisations face increasing pressure to take responsibility for their environmental performance (Kussing & Pienaar, 2009:431) because society's stance towards environmental issues has been changing, and factors such as legislative initiatives, increasing awareness from customers, and organisations' perception on new business opportunities, are the reasons why organisations pay more attention to reverse logistics (Salema, Póvoa & Novais, 2006:615).

The environmental implications of reclamation, reuse and recycling to save landfill space, energy, and costs are vital for organisations (Sarkis et al., 2010:337). The practices relating to *environmental issues* and performance may include activities such as preventing pollution, recycling, extracting resources and proper disposal (Vachon & Klassen, 2006:797). The green

image has stimulated a number of organisations to explore options for take-back and recovery of their products (Thierry in Ravi, Shankar & Tiwari, 2005:332).

In addition, reverse logistics is growing in importance because governmental regulations and legislation are compelling organisations to take back their products (Sarkis et al., 2010:337). According to De Brito (2004:50), *legislation* refers to "any jurisdiction indicating that a company should recover its products or take it back". Environmental legislation typically involves the product life-cycle phase in which consumers discard products (Le Blanc, 2006:8). This legislation, which has an impact on reverse logistics, especially in Europe, can include recycling quotas, packaging regulations and manufacturing take-back responsibility (De Brito & Dekker, 2003:8). In this instance, organisations do not have any choice but to comply. This strong involuntary push towards environmental awareness has caused more organisations to focus on their reverse process and seek out avenues to attain value from the products they must take back. (Huscroft, 2010: 48).

In a nutshell, the reasons for organisations becoming involved in reverse logistics activities include economic, corporate citizenship, consumer expectations, legal (end-of-life or packaging laws) and environmental (reduced waste to landfill and industrial ecology) issues (Simpson, 2010:16). Generally speaking, reverse logistics is often driven by legislation constraint and environmental responsibility. Nevertheless, the enterprise with profit as its aim pays more attention to the direct or indirect economic benefits (Ji, 2008:59). However, it is clear that the main motives for organisations involving themselves in reverse logistics include customer expectations (BearingPoint, 2008:29). Reverse logistics is no longer simply a subprocess, but actually a major driver of securing a competitive advantage in the age of demanding customers (Min et al., 2006:94).

2.3.2 Benefits of effective reverse logistics

Effective reverse logistics operations benefit both the organisation and its customers (Amini, Retzlaff-Roberts & Bienstock, 2005:368). The benefits of reverse logistics, which are closely related to the drivers of reverse logistics, can also emphasise the significance of reverse logistics. If managed in the right way there are multiple benefits, beyond meeting legislation, to be realised by tackling reverse logistics (Butler, 2004:1). This section deals with the benefits of reverse logistics, in terms of cost reductions resulting from effective reverse logistics

management, waste and environmental cost reductions and customer satisfaction and competitive advantages.

2.3.2.1 Cost reductions due to effective reverse logistics management

If the reverse logistics process is managed correctly, it can minimise logistics costs and improve revenue (Bernon, Rossi & Cullen, 2011:22). Hence effective reverse logistics management can add significantly to an organisation's profitability (Mollenkopf & Weathersby, 2003:24). If adequate resources (tangible/intangible or property-based/ knowledge-based) are targeted to reverse logistics programmes, this can have tremendous positive financial impact (Genchev, Landry, Daugherty & Roath, 2010:14). In the USA, a study of more than 160 manufacturers and service providers conducted in 2010 by Aberdeen Group, revealed that 87% of organisations indicated that the effective management of the reverse supply chain was either "extremely" or "very important" to their operational and financial performance (Pollock, 2010:8). Organisations have discovered that the effective management of reverse logistics can result in reductions of inventory carrying costs, transportation costs and waste disposal costs (Lu et al., 2007:324; Gupta & Tiwari, 2009:9). Effective reverse logistics practices will also significantly reduce costs relating to a product before the product is purchased, at the time of the purchase and after the purchase (Tibben-Lembke, 1998:51). From a logistics perspective, returned products that are handled efficiently can be reinserted into the forward supply chain, which can generate additional revenue, reduce operating cost and minimise the opportunity costs of writing off defective or obsolete products (Mollenkopf & Closs, 2005:35).

2.3.2.2 Waste and environmental cost reductions

Reverse logistics by definition includes processes such as remanufacturing, refurbishment, recycling, reuse and asset recovery. Engaging in reverse logistics activities organisations can therefore reach a certain level of green (see section 2.2.2.3) – in other words, organisations can be more environmentally responsible (Patridge, 2011:18). Reverse logistics is inherently green (Vick in Patridge, 2010:4) and all elements of reverse logistics have green implications and bring huge benefits to the environment (Robe in Patridge, 2011:18).

Reverse logistics is primarily used as a tool for management in an appropriate manner to reduce all kinds of waste (Starostka-Patyk & Grabara, 2010:698). Countless environment-related benefits can result from an effective reverse logistics programme. For instance, through the use

of pollution prevention, a company can coordinate and market an effort that incorporates product refurbishment, process modification, equipment redesign and reuse of waste materials to minimise the introduction of nonusable waste into the environment. Organisations can reduce the generation of waste with the prioritisation of waste prevention, reuse and recycling (UPS Consulting, 2004:6). With reverse logistics, organisations can also recycle products or packaging to improve their environmentally friendly practices (Hudson, 2004:2). Through effective reverse logistics operations, companies can also cut out inefficient returns processes that result in unnecessary transportation moves, helping to reduce carbon emissions and improve air quality (Patridge, 2011:18).

The benefit of green reverse logistics is tangible, and many organisations are becoming aware that being green means being more profitable too (Robe in Patridge, 2011:18). With the increase in costs emanating from practices that seek to minimise the impacts on natural resources, reverse logistics can become a production procedure that will minimise environmental impacts at lower costs (Flávia, Bernardi, Da Rocha & Camargo, 2010:37). Reverse logistics can help the organisation to be more cost effective and ecologically friendly by extending a product's normal life cycle beyond traditional usage (Melbin in Dowlatshahi, 2000:144). In addition, reverse logistics can reduce costs by reusing products, components and materials instead of simply disposing of them in landfills which has a negative impact on the environment (Yimsiri, 2009:1).

Ultimately, whether it is the actual products being returned or the process whereby an organisation returns them, reverse logistics can and should be both green and cost-effective (Patridge, 2011:18). Therefore effective returns management and reverse logistics can reduce an organisation's waste-disposal costs and increase its environmental compliance (Kussing & Pienaar, 2009:424). The positive results of reverse logistics in waste management in business practice bring hope to the task of popularising this concept, which, in a measurable way, can contribute to the practical implementation of the philosophy of sustainable development, both at the level of individual enterprises and global supply chains (Starostka-Patryk & Grabara, 2010:698).

2.3.2.3 Customer satisfaction and competitive advantages

Reverse logistics can be leveraged as a tool for customer satisfaction (Sople, 2007:184) and can afford an organisation an opportunity to capture valuable data to help future manufacturing, packaging and marketing decisions where the organisation can proactively take steps to increase customer satisfaction by analysing the reasons why customers return products (Kim, 2001:2). It allows organisations to differentiate themselves in the eyes of the customers. High-quality reverse logistics can promote long-term relationships where customers are more likely to repurchase if the organisation does a good job handling returns (Daugherty, Myers & Richey, 2002:86; Genchev et al., 2010:14).

Many organisations use their reverse logistics capabilities as market differentiators (Pollock, 2007:13–14). Reverse logistics is a vital tool for supporting marketing and brand initiatives in an age where good corporate citizenship has become more important to consumers (Butler, 2004:1). With reverse logistics processes, organisations can enhance customers' perceptions of product quality, help minimise the purchase risk and boost goodwill (Mollenkopf & Closs, 2005:34). Ultimately, an effective reverse logistics process can give an organisation the necessary competitive advantage to move above peers and competitors, and possibly capture larger market share in the industry (Huscroft, 2010:2).

It is clear that there are numerous benefits that may stem from effective and efficient reverse logistics processes and practices. Table 2.2 provides a summary of all the benefits of reverse logistics, as discussed in this section.

Table 2.2: Benefits of effective reverse logistics

Cost reductions due to effective reverse logistics management	• Minimise logistics costs in an organisation • Improve or generate additional revenue • Add to profitability of organisations • Positive financial impact
Waste and environmental cost reductions	• Reverse logistics equals green which equals profitability • Elements of reverse logistics have green implications • Reverse logistics brings environmental-related benefits by means of ecologically friendly practices, pollution prevention, reduction of waste generations and reduction of carbon emissions and improvement of air quality

	• Reverse logistics helps with environmental cost efficiency – reduce costs by reusing products, components and materials and reduce waste-disposal costs • Reverse logistics increases environmental compliance
Customer satisfaction and competitive advantages	• Reverse logistics is a tool for customer satisfaction • Reverse logistics can help organisations capture valuable data and proactively take steps to increase customer satisfaction • High-quality reverse logistics can promote long-term relationships • Reverse logistics is an important tool for marketing and brand initiatives – corporate citizenship • A reverse logistics process can enhance customers' perceptions of product quality, help minimise the purchase risk and boost goodwill • An effective reverse logistics programme can give organisations a competitive advantage and help capture larger market share

In conclusion, the effective management of reverse logistics will undoubtedly improve customer service levels, support organisations' environmental strategies, meet developing legislative requirements and impact positively on profitability and competitive positioning (Butler, 2004:1). The next section focuses on the types and reasons for product returns.

2.4 TYPES AND REASONS FOR PRODUCT RETURNS

There are different types of products returns which can affect every member of the supply chain, from consumers to manufacturers. There are also many different reasons for returns, depending on who initiates them as well as the nature of the materials involved (Schatteman, 2003:267).

Wang et al (2010:337) specify the different kinds of reverse flows according to their return reasons and categorise them under the three main supply chain stages in which they occur. Similarly, De Brito and Dekker (2003:9) have categorised product returns according to the types of and reasons for returns under the following three headings: manufacturing, distribution and customer/user returns.

2.4.1 Manufacturer returns

Manufacturing returns include all those cases where components or products have to be recovered in the production phase. This occurs for a variety of reasons. Raw materials may be left over, intermediate or final products may fail quality checks and have to be reworked and products may be left over during production (De Brito & Dekker, 2003:9; Wang et al., 2010:337). Hence the reasons for manufacturing returns can include raw material surplus, quality control returns, and production leftovers or by-products and scraps (De Brito, 2004:15). These include materials or products resulting from the production process or ones that do not fulfill the quality requirements. Some products can be reworked to meet the quality requirements, while the excess products need to be disposed of or recycled to reduce costs and the environmental impact (Le Blanc, 2006:10).

2.4.2 Distribution returns

Distribution returns refer to all those returns that are initiated by a supply chain actor during distribution, after the product has been made. There are various types of distribution returns such as product recalls, commercial returns, stock adjustments and functional returns which can be described as follows (De Brito, 2003:53; De Brito, 2004:15; De Brito & Dekker, 2003:9; Wang et al., 2010:337):

- *Product recalls* include complicated products that are recollected because of safety or health issues where the manufacturer or a supplier is the initiator and not the customer (De Brito & Dekker, 2003:9; Le Blanc, 2006:10). Product recalls fall under "distribution returns" since they are usually initiated in this phase and are specially demanding with respect to distribution (De Brito, 2003:53). Well-known examples of product recalls are in the automotive industry (Le Blanc, 2006:10).

- *Commercial returns* take place when a buyer has a contractual option to return products to the seller (De Brito, 2003:53; De Brito & Dekker, 2003:9; Wang et al., 2010:337). These are product returns that occur during or shortly after the sales process (Le Blanc, 2006:10). These may be the result of wrong/damaged deliveries to products with a too short remaining shelf life or unsold products that retailers or distributors return (De Brito, 2003:53; De Brito & Dekker, 2003:9), and overstocking at retailers and promotional actions (Le Blanc, 2006:10).

- *Stock adjustments* occur when a channel member redistributes stocks, for instance between warehouses or shops in the case of seasonal products (De Brito, 2003:53; De Brito & Dekker, 2003:9; Wang et al., 2010:337).

- *Reusable items or functional returns* are related to consumption, use or distribution of the main product (Le Blanc, 2006:10) where products go backwards and forwards in the supply chain owing to their inherent function (De Brito, 2003:53; De Brito & Dekker, 2003:9; Wang et al., 2010:337). An example would be reusable containers and pallets which can be used in the distribution process because their function is to carry other products and they can serve this purpose several times (De Brito, 2003:53; De Brito & Dekker, 2003:9; Wang et al., 2010:337). The common characteristic is that they are not part of the product itself, but contain and/or carry the actual product (Le Blanc, 2006:11).

2.4.3 Customer or user returns

Customer or user returns are those that are initiated by the customer or user of the product as a result of consumption (De Brito, 2004:15; Wang et al., 2010:338) and can include reimbursement guarantees, warranty and service returns, end-of-use returns and end-of-life returns which can be described as follows (De Brito, 2003:54; De Brito & Dekker, 2003:10; Le Blanc, 2006:11; Wang et al., 2010:338):

- *Reimbursement guarantees* involve customers being given opportunities to change their mind about the purchase.
- *Warranty and service returns* involve the incorrect functioning of products during use, or a service relating to the product.
- *End-of-use returns* include situations where the user has the chance to return the product at a certain stage of its life. In other words, these products are returned after some period of use owing to end of lease, trade-in or replacement
- *End-of-life returns* include returns that are at the end of their physical life and are either returned to the OEM because of legal product take-back requirements or for value-added recovery. In other words, when products have reached the end of their physical or economical life, end-of-life returns occur.

It is necessary to distinguish between the different types of reverse flow as each stream is involved with different actors and reprocessing options (Wang et al., 2010:338). The first two types can be classified as internal returns of the supply chain, and in contrast, customer-related returns and demand are initiated by external customers (Wikner & Tang, 2008:353). Figure 3.3 illustrates the types of product returns in the reverse supply chain

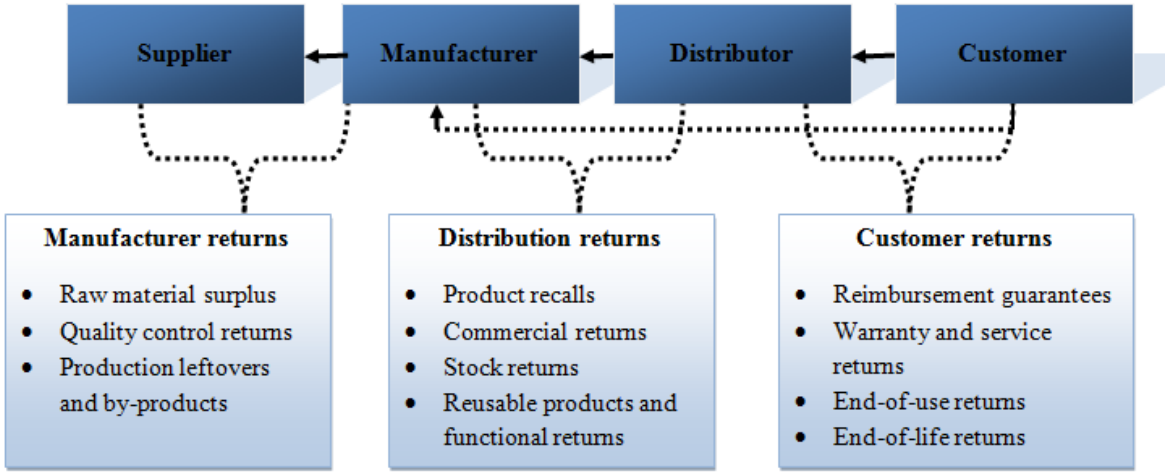

Figure 2.3: Types of product returns in the reverse supply chain
Source: Adapted from Ji (2008:54)

The following three product returns are evident in figure 2.3: *Firstly*, manufacturer returns in the reverse supply chain take place between the manufacturer and its supplier. *Secondly*, distribution returns in the reverse supply chain take place between the distributor and the manufacturer. *Thirdly*, customer returns in the reverse supply chain take place between the customer and distributor or customer and manufacturer.

It is clear that there are a many different reasons for product returns, which increase the need for effective reverse logistics. The reason for returns not only stems from damaged products or quality issues but also from issues within the organisation and supply chain. The next section discusses the different parties involved in reverse logistics.

2.5 PARTIES INVOLVED IN REVERSE LOGISTICS

A number of parties are involved in reverse logistics. Some of the parties in reverse logistics are responsible for the reverse logistics chain, while others only complete certain tasks in the chain (De Brito & Dekker, 2003:18-19; Efendigil et al., 2008:271; Starostka-Patyk & Grabara, 2010:702). Many variations are found in practice. In general, one can distinguish between

internal and external actors. Internal actors are the actual members of the supply chain, who perform one or more of the reverse logistics processes and activities. External actors do not participate in the supply chain, but try to influence it, for example, the government and branch organisations (Krikke, 1998:3).

The following role players and actors in particular are the most significant in reverse logistics: forward supply chain actors; specialised reverse chain players; governmental institutions; and opportunistic players. Their roles will involve managing/organising, executing or accommodating the activities of the reverse logistics chain (De Brito, 2004:15; Efendigil et al., 2008:271; Fleischmann, 2001:4). Each of these parties or players will now be discussed in more detail.

2.5.1 Forward supply chain actors

Forward supply chain actors include the supplier, original equipment manufacturer (OEM), distributor or wholesaler, and retailer (De Brito, 2004:15; Efendigil et al., 2008:271). These actors are part of the internal actors since they are the actual members of the supply chain. These actors will now be described in more detail.

- *Suppliers* are organisations that supply other organisations with goods or services (CSCMP, 2010:178). In reverse logistics, some recyclable materials or component parts may be returned to the original supplier.

- *OEMs* refer to the organisations that manufacture the products (the "original" manufacturer). However, with the growth of outsourcing, the term "OEMs" can also refer to organisations that buy, assemble and resell the products (CSCMP, 2010:134). Normally, products or materials that require remanufacturing will be sent to the OEM. From there the products will move back through the supply chain to the distributors or wholesalers.

- *Distributors* or *wholesalers* are organisations that typically receive the goods in quantity from the manufacturer and ship them to the customers in smaller quantities (CSCMP, 2010:62). In the reverse logistics process, distributors or wholesalers may receive goods for refurbishment or repair which can then be resold to the retailer or customer.

- *Retailers* are organisations that purchase products from a manufacturer or distributor and resell them to the ultimate consumer (CSCM, 2010:160). In reverse logistics, retailers may play a two-way role. Retailers are usually the initial link in the reverse flows of products (Jack, Powers & Skinner, 2009:242). They accept product returns from the end customers and distribute them back into the reverse supply chain, to the distributors or OEMs for remanufacture, refurbishment or repair. The retailers also participate in reselling the repaired, refurbished or remanufactured products to the ultimate customers.

2.5.2 Specialised reverse supply chain players

These players can also be classified as internal actors because they are directly involved in reverse logistics processes and activities. Specialised reverse chain players may include *third party reverse logistics (3PRL) providers* (De Brito & Dekker, 2003:19–18; Efendigil et al., 2008:271), *brokers*, *jobbers* (Efendigil et al., 2008:271) and *intermediate processors* (Krikke, 1998:3). Each of these players will now be described in more detail.

- *3PRL providers* offer reverse logistics as a value-added service to organisations wishing to outsource their reverse logistics processes and activities. Basic activities that 3PRL providers offer are collecting returned products and inspecting and categorising them according to the different reverse logistics disposition option (Kannan, 2009:399). Their services may also include recycling, used-asset disposition, customer returns, returnable container management and repair/refurbish (Armstrong & Associates Inc in Chorpa & Meindl, 2007:426) and any other disposition option.

- *Brokers* in reverse logistics are organisations that specialise in products that are at the end of their sales life. They are often willing to purchase any product in any condition, given a low enough price (Rogers & Tibben-Lembke, 1998:255). Brokers will then resell these products back to the market for a profit.

- *Jobbers* are similar to wholesalers that purchase return products from retailers in small job lots. The jobber will carry out the repair processes in order to maximise value. They will then either sell the products directly to customers or to other intermediaries (Bernon et al., 2011:492).

- *Intermediate processors* are organisations that purchase source separated recyclable materials, process them and resell them for remanufacturing (Krikke, 1998:3).

2.5.3 Governmental institutions and opportunistic players

- *Governmental institutions* (EU, national governments and municipalities) may be internal or external actors in the reverse logistics process. The internal actors may be governmental municipalities that usually perform the waste collection function (Efendigil et al., 2008:271; Krikke, 1998:3; Starostka-Patyk & Grabara, 2010:702). External actors may include national governments or bodies such as the European Union (EU) which promote the collection, reuse and recycling of components in order protect the environment.

- *Opportunistic players* are external actors in reverse logistics such as charity organisations that accept returned products as donations from various players in the reverse logistics process.

It is clear that various parties are involved in reverse logistics. Each actor has different objectives and may compete with other actors (Efendigil et al., 2008:271; Starostka-Patyk & Grabara, 2010:702). For instance, a manufacturer may perform recycling in order to prevent jobbers from reselling its products at a lower price (Efendigil et al., 2008:271).

2.6 REVERSE LOGISTICS PROCESSES, ACTIVITIES AND OPTIONS

As mentioned earlier, reverse logistics consists of a series of processes (Hudson, 2004:1) and activities that an organisation will use to collect used, unwanted, damaged or outdated products, as well as packaging and shipping materials from the end-user or reseller (Rogers & Tibben-Lembke, 1998:4). This section looks at reverse logistics processes, activities and options, in which each reverse logistics actor may be involved.

2.6.1 Reverse logistics processes

An independent reverse logistics process starts with the end user or the purchaser's decision that the product has reached the end of its life and needs to dispose of the materials (Blumberg, 2005:15). These processes may include asset recovery and recycling management, field and

technical support, parts planning, returns and repair management and service parts logistics (Biederman, 2006:1).

In general, return process activities can be grouped into three stages, namely (1) product collection, (2) inspection, separation and sorting, and (3) recovery and disposition. Each of these stages will now be described in greater detail.

- *Product collection*

  Collection involves collecting used products, making them available and moving them physically to some point where further treatment is carried out (De Brito, 2003:11; Hugo et al., 2004:228; PWC, 2008:16; Yimsiri, 2009:6). In other words, collection involves taking back products from returners to reprocessing points (Wang et al., 2010:340). *Collection* includes processes such as purchasing, transportation, consolidation, transhipment and storage (Ji, 2008:59; Le Blanc, 2006:11; PWC, 2008:16; Yimsiri, 2009:6). Product collection can also be linked to product acquisition and receiving. *Product acquisition* refers to retrieving the product back from the market (Le Blanc, 2006:11; PWC, 2008:16). The *receiving* process includes unloading and distributing product returns to processing (Stock & Mulki, 2009:38).

  This stage thus involves all the logistic activities in the reverse chain to obtain the products from the market and transport them to the facilities for the next stages (Le Blanc, 2006:11; PWC, 2008:16) of inspection, separation, sorting, reprocessing, recovery and disposition.

- *Inspection, separation and sorting*

  Returned products need to be classified according to quality and composition in order to determine the route in the reverse chain (Le Blanc, 2006:11; PWC, 2008:16). The *inspection, separation and sorting* stage occurs at the collection point where the products are *inspected* and *sorted* on the basis of their quality (Ji, 2008:55; Wang et al., 2010:340) and then *separated*, which entails splitting the flow of used products according to their disposal options (Yimsiri, 2009:6). This stage thus denotes all operations determining whether a given product is reusable and in what way (Yimsiri, 2009:6).

Inspection, separation and sorting may encompass testing, disassembly, shredding and storage (Wang et al., 2010:340; Yimsiri, 2009:6). After this stage, the organisation must determine the reuse manner of the product and classify it (Ji, 2008:55) in order to move to the next stages of reprocessing, recovery and disposition.

- *Recovery and disposition*

  Recovery is the process of recovering value from the returned product, components and materials (Le Blanc, 2006:12). Product *disposition* refers to the different ways organisations attempt to recover the costs of products that are being returned (Stock & Mulki, 2009:38). *Disposition* involves putting the product back into inventory or temporary storage, repackaging, repair, refurbishing or remanufacturing (Stock & Mulki, 2009:38). *Disposition* thus refers to the determination of ultimate outcome for the product (Genchev et al., 2010:11). Ultimately, "*final disposition*" refers to the exit route returned products finally take (Bernon et al., 2011:492).

At the end of these processes, numerous disposition options are available to organisations. These reverse logistics disposition options form part of the activities and processes in reverse logistics.

2.6.2 Reverse logistics activities and options

The activities and options in reverse logistics are closely intertwined and in some instances viewed as identical. These activities and options include the following: return to the seller, reuse, resell, redistribution, salvage, repair, recondition, refurbish, remanufacturing, recycling and disposal which may involve either incineration or landfill. Each of these options will now be described in further detail.

- *Return to the seller*

  In this option, the organisation can return the product to the supplier for a full refund (Hugo et al., 2004:223; Rogers & Tibben-Lembke, 1998:9). Returns to the seller can also be done when there was an incentive to order larger quantities than normal and if these excess

products cannot be sold, the buyer must be allowed to return these additional units (Rogers & Tibben-Lembke, 1998:79).

- *Reuse*

Reuse simply means that the product can be used again for a purpose similar to the one for which it was designed (Rogers & Tibben-Lembke, 1998: 262). Reuse also involves repairing, refurbishing, washing or recovering used products. Packaging can also be reused which can prolong the item's useful life and delay final disposal or recycling (Massachusetts EPP, [s.a.]:3).

Reuse requires separation of the components (say cameras from film) or removing fibres (say, paper) and employs technologies ranging from simple sorting to complex chemical separation. Reprocessed material is then used to produce new products or to make products of lesser value (Sarkis et al., 2010:337). There are several options in the reuse activity in reverse logistics, which include resell, redistribution, salvage, repair and recondition and refurbishment.

  - *Resell*

    In this option the product is sold again. The organisation has many options in terms of reselling. Organisations can either sell the products as a whole or in a demolished form (Hugo et al., 2004:223). For instance, they can sell the product to scrap dealers, where the prices obtained may depend on the condition of materials or the organisation can sell products that are of insufficient quality to a salvage company that will normally export these products to foreign markets (Hugo et al., 2004:223; Rogers & Tibben-Lembke, 1998:9). The organisation can also opt to sell products or materials to dealers, brokers and recycling plants. If the product has not been used, the organisation can resell the product either to a different customer or an outlet store (Rogers & Tibben-Lembke, 1998:9). Another option that the organisation can make use of is to sell surplus materials to employees (Hugo et al., 2004:223).

- *Redistribution*

Redistribution involves reusable products being distributed to potential markets or future users (Fleishmann, Krikke, Dekker & Flapper, 2000:658). In other words, redistribution means directing reusable items to a market or to new markets, and physically moving them to potential new users (Krikke, 2009b:20; Yimsiri, 2009:6). In addition, redistribution can also take place where the organisation plans to sell the recycled product, but it is essential for the organisation to determine whether or not there is a market for the recycled products (Roy, 2003:1).

- *Salvage*

Salvage is closely related to redistribution where a product is sold to a broker or some low-revenue customer (Rogers & Tibben-Lembke, 1998:263). However, salvage items have been used or damaged, and can no longer be sold as new. In salvage, items lose value relative to the amount of use or damage and the most difficult part of managing salvage is determining its value (Rogers & Tibben-Lembke, 1998:78). Any valuable materials that can be reclaimed will be salvaged before the remainder sent to landfill (Rogers & Tibben-Lembke, 1998:11-12).

- *Repair and recondition*

Repair is the process in which products are fixed and returned to working order (Fernández & Kekäle, 2005:196). According to Bhamra and Hon (2004:56), repair is simply the "correction of specified faults in a product". Repair/repackage relates to a moderate magnitude of repairs and/or repackaging which allows the product to be reused (Ji, 2008:53). In terms of *recondition*, a product is cleaned and repaired in such way that it is returned to a new state (Rogers & Tibben-Lembke, 1998:261). Reconditioning components for reuse will allow organisations to capture value from the returned products (Roy, 2003:1). Bhamra and Hon (2004:56) describe reconditioning as the "process of returning a used product to a satisfactory working conditioning that may be inferior to the original specification".

- *Refurbish*

Refurbishing is similar to reconditioning but involves more work in repairing the product (Rogers & Tibben-Lembke, 1998:261). It involves bringing products to a specified quality through upgrading (Fernández & Kekäle, 2005:196). It can also be described as the "process of restoring a product by cleaning, repairing, recovering, and reusing the item for its original intended use" (Massachusetts EPP, [s.a.]:3).

- *Remanufacturing*

This option is similar to reconditioning and refurbishing but requires even more extensive work and repairs and often requires complete disassembling (Rogers & Tibben-Lembke, 1998:261). The process of remanufacturing consists of "collecting a used product or component from the field, assessing its condition, and replacing worn, broken, or obsolete parts with new or refurbished parts" (Beamon, 1999:337). Bhamra and Hon (2004:56) describe remanufacturing as a "process of returning used products to at least OEM original performance specifications from customers' perspective and giving the resultant product a warranty that is at least equal to that of a newly manufactured equivalent".

- *Recycling*

Recycling involves the reduction of products to their basic elements which are then reused (Rogers & Tibben-Lembke, 1998:261). Recycling is the "process of collecting used products, components, and/or materials from the field, disassemble them, separating them into categories of like materials, and processing into recycled products, components, and/or materials" (Beamon, 1999:332). Another description of recycling is "the process by which materials that would otherwise become waste are collected, separated or processed are returned to the economic mainstream to be reused in the form of raw materials or finished goods" (Global Recycling Network, [s.a.]). Organisations can recycle when the product is broken down and "mined" for components that can be reused or resold (Ji, 2008:53).

- *Donation*

  Sometimes organisations decide to give the returned products to charity organisations without receiving any compensation for these products. As a rule, organisations make use of this option because they pride themselves on being good corporate citizens and feel that it is important to support charities (Rogers & Tibben-Lembke, 2001: 140).

- *Disposal*

  Disposal is required for products that cannot be reused for technical or cost reasons. This would apply, say, to products rejected at the separation level owing to excessive repair requirements but also to products without satisfactory market potential, say, owing to obsolescence. Disposal may include incineration and landfilling steps (Yimsiri, 2009:6). These two options are briefly described below:

  - Firstly, *incineration* is the "destruction of solid, liquid, or gaseous wastes by controlled burning at high temperature. Hazardous organic compounds are converted to ash, carbon dioxide, and water. Burning destroys organics, reduces the volume of wastes, and vaporises water and other liquids the wastes may contain. The residue ash produce may contain some hazardous material" (Enviro-Glossary, [s.a.]).

  - Secondly, *landfill* is the final disposal of solid waste on land (Enviro-Glossary, [s.a.]) and involves controlled environments for the burying of waste (Rogers & Tibben-Lembke, 1998:259).

Figure 2.4 illustrates the reverse logistics process and activities based on the above discussions.

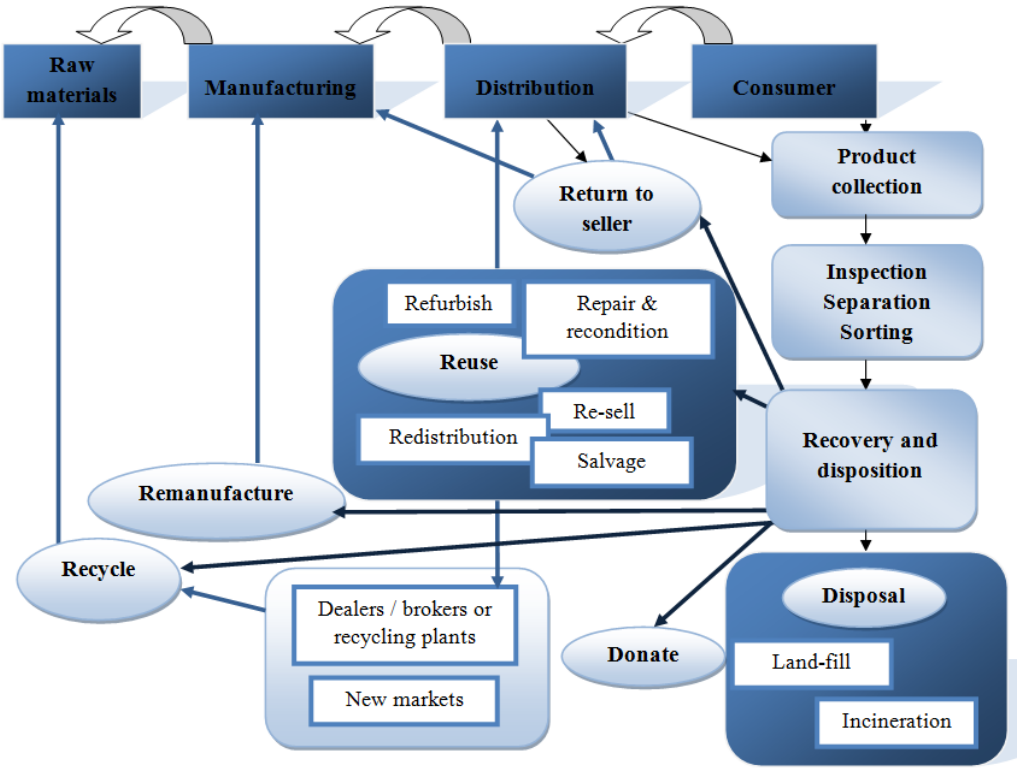

Figure 2.4: Reverse logistics processes and activities

Source: Compiled by researcher from Gupta and Tiwari (2009: 6); PWC (2008:16); Singh, Singh and Walia (2011:902).

2.7 CONCLUSION

This chapter provided an extensive overview of the concept of reverse logistics. Numerous elements were discussed, all based on information gathered in literature.

The chapter started with a definition of reverse logistics. It is clear from the literature, that there are various definitions of reverse logistics. The most comprehensive definition states that it is the process of planning, implementing and controlling the efficient and cost-effective flow of raw materials, in-process inventory, finished goods and related information, from the point of consumption to the point of origin or point of recovery, for the purpose of capturing value or proper disposal.

It was also found that there are certain concepts closely related to reverse logistics. These concepts are often confused with reverse logistics and include the following: closed-loop supply chain; closed-loop supply chain management (CSCM); reverse supply chain management (RSCM); green logistics and green supply chain management (GSCM); and returns

management. A figure was compiled to place reverse logistics and these related concepts in context (see figure 2.2).

The next section of the chapter focused on the importance of reverse logistics, where the drivers as well as the benefits of reverse logistics were discussed in terms of the literature findings. The main drivers of reverse logistics include economic drivers, corporate citizenship and consumer expectations as well as environmental and legislative issues. The benefits, however, included cost reductions owing to effective reverse logistics management, waste and environmental cost reductions as well as customer satisfaction and competitive advantages. Table 2.1 provided a summary of all the benefits discussed in this chapter.

Next the types and reasons for product returns were discussed, and three main types were identified, namely manufacturer returns, distribution returns and consumer returns. Figure 2.3 illustrated the types and reasons of returns in reverse logistics.

Then the parties involved in the reverse logistics were discussed. Several parties were identified in literature. These parties included *forward supply chain actors*, namely suppliers, OEMs, distributors or wholesalers and retailers, *specialised reverse chain players*, namely 3PRL providers, brokers, jobbers and intermediate processors, and *governmental institutions* and *opportunistic players.*

Finally, the reverse logistics process, activities and options were discussed. The reverse logistics process involved *product collection, inspection, separation and sorting* and *recovery and disposition.* Numerous options also form part of the reverse logistics activities, and each of these was briefly described. The section ended with an illustration of the reverse logistics process and activities or options for product returns.

This chapter was based on literature findings, which will be used as a foundation for the framework that will be developed for the purpose of this study. With this in mind, the next chapter deals with the problems and challenges in reverse logistics as well as the solutions to overcome these problems.

CHAPTER 3

REVERSE LOGISTICS PROBLEMS, CHALLENGES AND SOLUTIONS

3.1 INTRODUCTION

The previous chapter focused on the conceptualisation of reverse logistics, whereas this chapter examines the problems and challenges of reverse logistics and solutions to overcome these problems. Reverse logistics is by its very nature a highly complex process and a specialised area of any supply chain. It does not matter what the product is, how it is sold or who the customers are, every organisation needs to focus on recovering the maximum value from returns (Min et al., 2006:94). Reverse logistics is generally more complex than forward logistics owing to multiple reverse distribution channels, individual product returns in small quantities, extended order cycles associated with product exchanges and a variety of product disposition options (Min & Ko, 2008:2).

In the preceding chapter it became apparent that reverse logistics can bring significant benefits for the organisations. However, if organisations do not manage their reverse logistics efficiently and effectively, they may find themselves struggling to match competitive market conditions, and thus unable to resolve customer demand or risking compliance with increasing environmental regulations (Mehrmann, 2007:29).

This chapter starts with an introduction, followed by a discussion of all the problems and challenges of reverse logistics, based on the literature findings. The problems are discussed according to the various main categories. Then the possible solutions, also based on the literature findings, to these problems and challenges are highlighted. These solutions are also discussed in main categories. Thereafter a framework will be provided to synthesise the problems, challenges and solutions. The purpose of this framework is to indicate what solutions can be used to overcome the specific problems or challenges organisations may experience in this regard, all based on the findings of this chapter. The chapter ends with a conclusion. Figure 3.1 indicates the outline of this chapter.

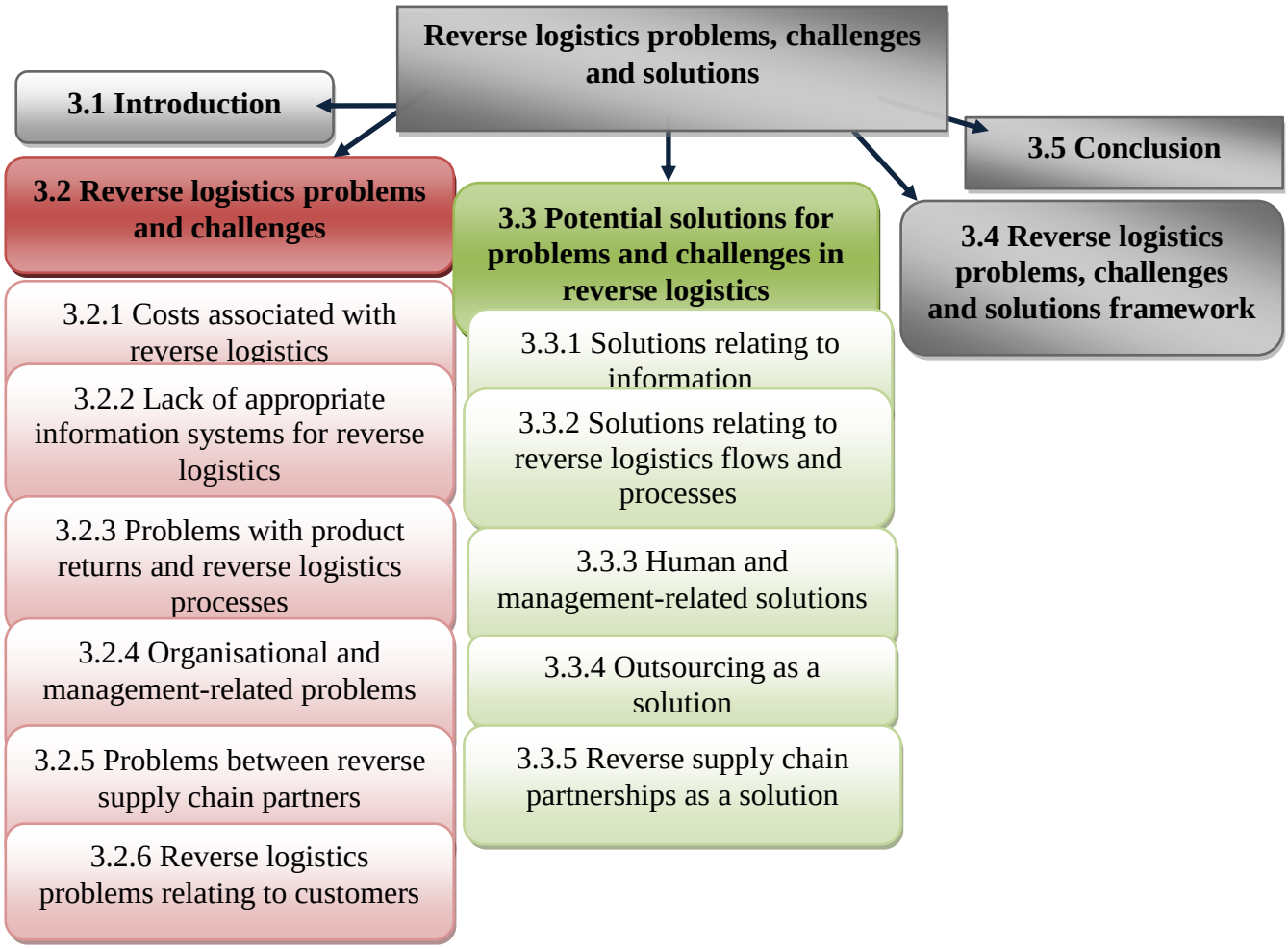

Figure 3.1: Outline of chapter 3

3.2 REVERSE LOGISTICS PROBLEMS AND CHALLENGES

Many factors influence the implementation of effective reverse logistics and these pose challenges for many organisations and supply chains. There are numerous barriers that make it difficult to have efficient and effective reverse logistics processes in place (Ravi & Shankar, 2005:1026). In this section, the problems and challenges that organisations may encounter in reverse logistics are discussed in terms of the costs associated with reverse logistics, lack of appropriate information systems for reverse logistics, problems with product returns, human and management-related problems, problems between reverse supply chain partners and reverse logistics problems relating to customers.

3.2.1 Costs associated with reverse logistics

Reverse logistics cost is significant and on the rise. It is a challenge for an organisation not only to manage forward logistics in order to minimise waste and maximise customer satisfaction, but

also to pay considerable attention to reverse logistics (Carter & Ellram, 1998:85). The costs associated with reverse logistics can be quite complicated owing to all the details involved (Lee, McShane & Kozlowski, 2002:151).

One of the main pressures that organisations have to face in reverse logistics is to reduce costs (Pollock, 2010:8). Reverse logistics is a nonrevenue-generating process which results in only a few resources allocated to this part of the supply chain (Pogorelec, 2000:68; Rogers & Tibben-Lemke, 2001:141). Organisations scarcely view returns as part of their centralised cost structure (Biederman 2006:2) and run the risk of escalating costs by not addressing this component of the supply chain (Pogorelec, 2000:68).

According to the Reverse Logistics Executive Council (RLEC), the increase in costs for processing returns is an astounding 200 to 300%, in comparison with a forward sale. It can therefore be said that it may cost three times more to process the reverse logistics of an item than it does to process the forward logistics to sell it (Norman & Sumner, 2007:2).

Most organisations are not aware of the current costs associated with reverse logistics because processes may be poorly defined and the systems may lack the necessary support (Moore, 2006:10; UPS Consulting, 2004:3). The hidden costs of reverse logistics can be severely underestimated (UPS Consulting, 2004:3). The challenge for organisations is to determine how much the existing processes are costing them, especially when they have not disbursed the resources in order to determine what the true costs are (Schwartz, 2000:100). These hidden costs may include the following (Walden, 2005:1):

- merchandise credit to the customer where the defect is not covered by the supplier under its warranty
- the cost of processing the return back to the distribution centre
- the transportation cost of moving the items back to the central returns centre
- the cost of testing and repackaging materials
- the storage cost in the warehouse
- the disposal cost if the item is damaged beyond repair

3.2.2 Lack of appropriate information systems for reverse logistics

The application of information technology is the principal link in the reverse logistics system (Zheng et al., 2005:853). The complexity of a reverse logistics programme means that information support is absolutely critical. However, Richey, Chen, Genchev and Daugherty (2005b:830) have found that traditional information systems are designed for forward logistics only and not reverse logistics.

One of the most serious problems that organisations have to face in executing reverse logistics is having an effective information system in place (Zheng et al., 2005:852). A lack of information and technological systems can be an extremely serious problem in terms of reverse logistics implementation (Ravi & Shankar, 2005:1013). Developing technology tools that work in reverse logistics is especially complicated because of a lack of standardisation in the reverse logistics processes (Richardson, 2006:2). Many logistics systems are not well prepared to deal with reverse logistics and if organisations do not have volume, the entire process can be woefully inefficient (Rogers & Tibben-Lembke, 1998:43). The main areas of concern in information include insufficient information technology (IT) investment, the low reliability of IT solutions, lack of information visibility and misinformation. Each of these problem areas will now be explained in greater detail.

3.2.2.1 Insufficient IT investment

Insufficient IT investment is a major problem and one of the most serious problems that organisations face in the execution of a reverse logistics operation (Jayaraman, Ross & Agarwal, 2008:414). Most organisations use labour-intensive, manual, inefficient and often undisciplined reverse logistics processes (Thrikutam & Kumar, 2004:1). Few organisations have successfully automated information systems in the return process and the resources allocated to these systems are also stretched to their limit and are not always available for reverse logistics applications (Jayaraman et al., 2008:414; Rogers & Tibben-Lembke, 1998:43).

3.2.2.2 Low reliability of IT solutions

Low reliability among standard IT solutions is another area of concern in reverse logistics. Despite a number of effective reverse logistics software and IT solutions available, the majority

of organisations lack reliable reverse logistics management software systems (Rupnow, 2011:35).

Many enterprise resource planning (ERP) and customer relationship management (CRM) and warehouse management system (WMS) are not sufficiently reliable and effective to take products back (Norman & Sumner, 2007:1). ERP systems are the backbone of most organisations' logistics information systems. These systems facilitate integrated operations and reporting and initiate, monitor and track critical activities such as order fulfilment and replenishment (Bowersox, Closs & Cooper, 2010:98). CRM is designed to extend the functionality of ERP sales and delivery applications. CRM provides sales representatives and customers with current information on sales history, shipment history, order status, promotional summaries and shipment information (Bowersox et al., 2010:105). A WMS incorporates processes to guide physical activities, including product receipts, material movement and storage and order selection (Bowersox et al., 2010:108). Most supply chain management (SCM) systems provide limited reverse logistics capabilities. These systems also lack end-to-end capabilities in areas such as returns forecasting and customer return collaboration and also fail to provide robust decision support for returns authorisation and disposition (Thrikutam & Kumar, 2004:3).

3.2.2.3 Lack of information visibility and capability

Many organisations lack visibility in their information systems (Rukavina in Walsh, 2007:42). With little data visibility, a broad range of deficiencies may exist, such as unreliable and inaccurate data capture and inadequate monitoring of customer satisfaction levels (Thrikutam & Kumar, 2004:3). Lack of return information visibility also makes the planning and productivity of reverse logistics extremely difficult (Stock in Kuzeljevich, 2004:36).

Closely related to visibility issues in reverse logistics is misinformation. Forecasting is a difficult task in reverse logistics where misinformation can pose difficulties. Misinformation means that the future return flow does not match the actual return flow. It is therefore caused by data being insufficient, abundant, ambiguous or conflicting (De Brito, 2003:206).

To conclude, organisations are still struggling through reverse logistics processing without adequate software system to collect data, supply visibility or provide the decision capabilities necessary for the special requirements of processing product returns (Rupnow, 2011:35).

3.2.3 Problems with product returns and reverse logistics processes

Product returns are the most common aspect of reverse logistics (Banker, 2001:1). Returns come from different places, in different conditions, with different disposal options (Rogers in Richardson, 2006:2). Product returns are often uncertain in terms of timing, disposition, condition and the quality and quantity of returns (Jayaraman & Luo, 2007:60; Mason, 2002:43). These uncertainties in product returns are described in further detail below.

3.2.3.1 Uncertainty of product returns

Return processing is highly dynamic, inconsistent and complex because it involves irregular material flows (Hart, 2008:12). Product returns can therefore have infrequent and erratic timing patterns (Daugherty et al., 2005:80). Organisations usually do not know what and how many products will be returned on a given day. The majority of product returns are unplanned and therefore unpredictable (Kussing & Pienaar, 2009:429). As mentioned in section 3.2.2, many organisations lack adequate information visibility. Similarly, a lack of visibility of incoming returned products makes planning for reverse logistics difficult in terms of the staff and resources needed (Barry, 2003:1; Jensen in Zieger, 2003:3).

As a rule, the products that are returned are in various conditions (Hart, 2008:12). This can pose problems because the quality of products that are returned is not as uniform as in forward logistics (Ravi & Shankar, 2005:1014). Products that are returned also diminish in value extremely quickly, especially technological products which could lose their value in a few short months (Tompkins, 2010:3).

Product returns are also not straightforward owing to the fact that reverse logistics involves the handling of products in small volumes (Daugherty et al., 2005:80). Not having enough volumes can cause the entire return process to become ineffective (Stock in Zieger, 2003:2).

3.2.3.2 Time and money spent on determining the most suitable disposition option

Another problem that organisations experience is what to do with product returns. As mentioned in chapter 2, disposition involves inspecting the returned product in order to determine whether it can be resold, repaired or discarded (Norek, 2002:38). All types of organisations generally have to deal with retrieving products and decide on the proper disposition option that will allow them to reclaim value that would have otherwise been lost (Richey et al., 2005b:832). The disposition of product returns is a key area of concern because it is also time-consuming and costly (Norek, 2002:38). These disposition options were discussed in more detail in chapter 2, section 2.6.

To conclude, in the product return process there is a lot of room for error, especially given the various stages a returned product must go through (Stock in Kuzeljevich, 2004:36). In many organisations, return processes are poorly defined and not adequately structured, which results in the inability to stay in touch with the identity, location, status and condition of returned goods going backwards through the supply chain (Thrikutam & Kumar, 2004:3).

3.2.4 Organisational and management-related problems

By now it should be clear that the reverse logistics process is unpredictable, which makes it difficult for organisations to plan and control it (Zeng et al., 2005:852). There are many human and management-related problems in the effective management of reverse logistics. These include the following: a lack of strategic planning to include reverse logistics; a shortage of executive managers for reverse logistics, a lack of top management awareness of and commitment to reverse logistics; a lack of departmental collaboration and communication and resistance to change; and the need for new approaches. These problems will now be discussed in more detail.

3.2.4.1 Lack of strategic planning to include reverse logistics

According to Stock (Harps 2003:2), only a small percentage of organisations link reverse logistics to their competitive strategy. Strategic planning is necessary in all areas of the business, including reverse logistics (Ravi & Shankar, 2005:1017). The problems and difficulties associated with the planning, control and implementation of reverse logistics strategies and programmes can result in a many mistakes and misperceptions on the part of the organisation

(Stock, 2001:1). An executive management structure that does not include reverse logistics when considering product development or marketing strategies can expose the organisation to serious pitfalls (Walker, 2010:39).

3.2.4.2 Shortage of executive managers for reverse logistics

Often even the best-performing organisations may have limited or even no executive focus on their reverse logistics (Tompkins, 2010:1). A major problem in the successful management of reverse logistics is the absence of an executive overseer to take responsibility for reverse logistics (Rukavina in Walsh, 2007:42; Starkowsky in Andel, 2004:43). Stock and Mulki (2009:50) found that even if organisations do have an executive overseer who is responsible for reverse logistics, it is not this overseer's main function and he/she has other responsibilities besides reverse logistics.

3.2.4.3 Lack of top management awareness of and commitment to reverse logistics

Top management can be a chief barrier to the successful management of reverse logistics, and if there is no commitment, this can hinder the entire process even more (Ravi & Shankar, 2005:1016; Rogers & Tibben-Lemke, 1998:35). Lack of awareness in terms of the importance of reverse logistics can be one of the main barriers to the successful management of the process (Ravi & Shankar, 2005:1017; Rogers & Tibben-Lemke, 1998:33). A major misconception is that returns represent failure, which results in management not wanting to devote their attention to reverse logistics (Rogers & Tibben-Lemke, 2001:141). Restrictive company policies because of management inattention can also make reverse logistics difficult to implement (Ravi & Shankar, 2005:1015). In organisations where managers do not recognise the importance of an effective reverse logistics programme, there is a risk of harming the organisation's reputation and alienating customers (Daugherty, Richey, Hudgens & Autry, 2003:49).

3.2.4.4 Lack of departmental collaboration and communication

Reverse logistics processes often suffer from a lack of interdepartmental communication and cooperation (Lang in Hoffman, 2006:1; Rukavina in Walsh, 2007:42). Reverse logistics is a boundary-spanning process between business units in the same organisation, and developing a system that has to work across these boundaries can also exacerbate the problems (Rogers & Tibben-Lembke, 1998:43).

Unless all the departments understand the role of the reverse logistics process and its end goals, conflicting goals and priorities will be set across departments (Mollenkopf & Closs, 2005:42; Tompkins, 2010:2).

3.2.4.5 Resistance to change and the need for new approaches

The reverse flows may also involve an entirely different channel which requires new approaches (Norek, 2002:42; Richey, Genchev & Daugherty, 2005a:235). Resistance to change in the organisation can therefore be a problem because reverse logistics requires drastic changes in mindset and practice (Ravi & Shankar, 2005:1015). Having a successful reverse logistics process in place requires a shift in the organisation. However, many organisations' policies and structures get in the way of the change necessary for the successful implementation of reverse logistics (Ravi & Shankar, 2005:1015).

In conclusion, the perspective of reverse logistics being unimportant is likely to impact negatively on an organisation's performance (Autry, Daugherty & Richey, 2001:2) and a lack of accountability for reverse logistics is a major reason why reverse logistics tends to be undermanaged (Monaham et al., 2004:21). In many organisations, reverse logistics is still a "part-time" activity (Stock & Mulki, 2009:50).

3.2.5 Problems between upstream reverse supply chain partners

There are various problems in the reverse supply chain. For reverse logistics to be successful, collaboration between supply chain partners is crucial (Zeng et al., 2005:853). A lack of communication between partners can be a source of risk (Breen, 2006:546). Hence a key barrier to successful reverse logistics is the lack of support of channel members such as dealers, distributors and retailers (Ravi & Shankar, 2005:1017). Major problems with reverse supply chain partners can therefore stem from a *lack of collaboration, a lack of communication* and *a lack of support.* The parties involved in reverse logistics were discussed in chapter 2, section 2.5.

3.2.6 Reverse logistics problems relating to customers

There are various kinds of problems in reverse logistics that are related to customers or end-users, which originate from the following:

3.2.6.1 Lack of communication and rules enforcement

Suppliers do not always work effectively with their customers by communicating their expectations and arrangements for reverse logistics (Breen, 2006:546). Poorly defined return policies between the organisation and the customer can create extremely lenient or complex returns that can lengthen the processing time and consume valuable resources (Tompkins, 2010:2; Monaham et al., 2004:21). In many instances, organisations do not enforce their reverse logistics rules and allow customers to return products that should not be accepted (Breen, 2006:546; Norek, 2002:38). This can lead to abuse from the customers in the sense that they may take advantage through the level and type of returns (Daugherty et al., 2003:49). There are also instances where a customer, who did not receive a return merchandise authorisation (RMA) because of an unacceptable return reason, returns the product and still receives credit (Norek, 2002:38). RMA is essentially the authorisation given to a customer to return a product to a supplier (Rogers & Tibben-Lembke, 1998:262). RMA can also involve a reference number produced to recognise and give authority for a faulty product to be returned to a distribution centre or manufacturer (CSCMP, 2010:160).

3.2.6.2 Customer expectations and dissatisfaction

Returning products to an organisation can automatically carry with it a negative connotation in the customer's mind (Dampier, 2006:22). Perceived expectations of customers are a vital aspect of any organisation, especially when a customer receives a product that does not meet a specific expectation (Riedel, 2004:1). This can jeopardise the organisation's relationship with its customers (Dampier, 2006:22; Riedel, 2004:1). Organisations that do not consider their ultimate customers' wants and needs as the driving force behind reverse logistics can cause major failures in the entire reverse logistics system (Dowlatshahi, 2005:3474).

To conclude this section, it is clear that there are many problems and challenges in reverse logistics relating to costs, information systems, product returns, human and managerial matters as well reverse supply chain partners and customers. In the next section, the solutions to these problems and challenges in reverse logistics will be discussed in detail.

3.3 POTENTIAL SOLUTIONS TO PROBLEMS AND CHALLENGES IN REVERSE LOGISTICS

There are various solutions that can help organisations overcome the problems and challenges they experience in reverse logistics. In this section, some of these solutions will be discussed relating to the following: information; reverse logistics flows and processes; human and management-related matters; outsourcing; and reverse supply chain partnerships.

3.3.1 Solutions relating to information

Information is an integral part of any business operating efficiently and effectively. With the appropriate information technology, information management and data collection and systems in place, organisations can overcome a variety of problems in reverse logistics. This section explains each of these solutions in more detail.

3.3.1.1 Invest in capable information technology

Information technology application is the principal link in a reverse logistics system (Zheng et al., 2005:853). Organisations are finding it increasingly necessary to develop capabilities relating to the use of information technology (Daugherty et al., 2005:83). By investing in wireless technology such as radio frequency identification technology (RFID), an organisation can be more cost efficient. Wireless technologies reduce manpower and human error which in turn will cut costs and improve the bottom line (Caston, 2008:34). In essence, by investing and applying the right state-of-the art technology, organisations can reduce operating cost (Pollock, 2008:25); increase customer satisfaction; and improve business performance, communication between supply chain partners and return processes (Schatteman, 2003:276). State-of-the-art technology will also enable organisations to overcome problems relating to the low reliability of IT solutions.

3.3.1.2 Information management and data collection

Another key information-related solution to overcome reverse logistics problems and challenges is information management. Organisations must work with other members in the supply chain to overcome information-related problems. One way to do this is to adopt an integrated information management approach. The integrated information management approach can be used to predict and reduce uncertainty, exert a buffer action of information in reverse goods and

funds flow and exchange the validity of information of physical resources (Jayaraman et al., 2008:416).

Reducing or even preventing returns is one of the best solutions to overcome product return problems. Return prevention involves the collection of information that will enable the organisation to eliminate or minimise future returns (Harps, 2002:3). Organisations should start by determining and addressing the root cause of returns (Monaham et al., 2004:22). Organisations can reduce a large portion of returns by using returns data to uncover and remove the causes of product defects, investigating loading and packaging practices that lead to damage and improving shipping accuracy (Harps, 2002:3). Hence through effective data collection, organisations can reduce return incidences which will improve customer service and reduce costs (O'Neill & Chu 2001:8; Rupnow, 2010:50; Rupnow, 2006:30).

Organisations can also make use of data management to track the flow of information among the products between customers and distinguish the proportion rate of returned goods at the same time. The information will be utilised to improve the reliability of the products and pinpoint special problems in reverse logistics systems (Zheng et al., 2005:853).

3.3.1.3 Appropriate information systems for reverse logistics

Numerous systems are available that can overcome the problems organisations may encounter in reverse logistics. Each of these systems will now be discussed in greater detail.

- *Standard information systems*

  In an earlier section it became clear that information systems are the crucial threads that bind together and link every aspect of the reverse logistic process. Without information systems, errors will be made and efficiency hampered (Lee et al., 2002:155). Accurate, flexible and automated information systems can overcome numerous problems and challenges in reverse logistics. By implementing a sound and flexible reverse logistics information system, organisations can improve the efficiency and effectiveness of reverse logistics processes and operations, integrate current and future partners and increase customer satisfaction (Harps, 2003:7; Harrington, 2006:15; Monaham et al., 2004:27; Rogers & Tibben-Lembke, 1998:191; Zheng et al., 2005:852). More importantly, management rely on such systems to make the right strategic decisions in both forward and reverse supply chain planning (Lee et

al., 2002:155). By automating the information system, organisations can improve information visibility and reduce costs (Hammrich, 2007:28).

Another significant consideration when implementing an information system is to ensure that it is compatible with other members in the supply chain. This will help to overcome the problems with communication in the reverse supply chain and ensure effective information sharing between partners (Daugherty et al., 2002:89).

- *Internet and web-based systems*

Organisations can also overcome information visibility problems by using the *internet* or adopting a *web-based approach* (Hammrich, 2007:28; Patrican & Kirk, 2009:14; Rukavina in Walsh, 2007:43). In a web-based management approach, organisations can capture the reasons for product returns, determine the quality of a new product and evaluate their customers' return habits (Hammrich, 2007:28). A web-based system will provide the organisation with real-time information, provide data integrity and make electronic data transfers possible (Rukavina in Walsh, 2007:43).

- *Specific reverse logistics systems*

There are numerous systems and software available that are specific to reverse logistics and return processes. These systems can include reverse logistics management systems (RLS), special returns software and return systems, and return merchandise authorisation (RMA) systems, which will be discussed in greater detail below.

  - *Reverse logistics management systems*

A number of organisations are beginning to consider implementing reverse logistics systems (RLS) to fill the gaps not addressed in corporate ERP systems. Although most transactional ERP, financial or manual systems can satisfy some of the basic data collection requirements of returns transaction processing, specialised reverse logistics management software (RLMS) systems, which address specific needs required for the successful management of reverse logistics, will enable an organisation to gather all the necessary data

and then go far beyond data collection by providing the ability to create information knowledge and wisdom from the transactional data (Rupnow, 2011:35).

RLS will cover the gaps, provide tools for visibility, automate processes and make decisions through all the unique steps, processes and activities necessary in the complex life of a returned item (Rupnow, 2011:35). RLS is designed to work in an organisation and with partners by enabling them to centralise all data, decision rules and tools (Rupnow, 2011:36). Thus by making use of RLS, organisations can address numerous problems and challenges pertaining to information visibility, high costs and customer dissatisfaction in reverse logistics (Blumberg, 2006:57).

- *Special returns software and return systems*

Special returns software can assist with the inspection of returns and facilitate the disposition process. It will also enable organisations to gather valuable information on the reasons for product returns and reduce the future instances of returns (Rukavina in Walsh, 2007:43). Hence customised software will facilitate monitoring and evaluating product return flows (Stock in Kuzeljevich, 2004:38).

However, it is also essential for the organisation to have a fast return system. The function of the return system is an integral part of an organisation's customer service and having an effective return system can improve sales and help the organisation gain market share (Riedel in Biederman, 2004:1; Enarsson, 2006:186). It is therefore imperative for organisations to build a return system that will satisfy their customers (Enarsson, 2006:212).

- *Return merchandise authorisation (RMA) systems*

Organisations can also make use of an RMA system, which is used to make the RMA process more efficient and effective. The RMA system can be used to overcome the uncertainty in the timing of product returns as well as high costs. The system will also help to create visibility by providing advance notification of product returns (Mollenkopf & Closs, 2005:42; Patrican & Kirk, 2009:14; Stock in Kuzeljevich, 2004:38). Such a system allows organisations to gain valuable information on each item being returned since it allows customers to choose which items are being returned and the reason for the return before the return shipments actually occur. An RMA system will therefore also improve

customer service (Dampier, 2006:22; Mollenkopf & Closs, 2005:42). It was stated earlier that organisations can overcome visibility problems by means of a web-based approach. However, using a web-based RMA system linked to an ERP system, which customers are required to use, can cut costs by up to 80%. Organisations that implement these systems often achieve return on investment in a remarkably short time (Reece & Norman, 2006:1). Organisations can also overcome their forecasting problems in terms of product returns by utilising an RMA system (Mollenkopf & Closs, 2005:42; Stock in Kuzeljevich, 2004:38).

- *Other systems*

  Other systems that can also help organisations to overcome problems in reverse logistics include a knowledge management system (KMS), a warehouse management system (WMS) and a transportation management system (TMS). A KMS is generally an IT-based system for managing knowledge in organisations to support the creation, capture, storage and dissemination of information (CSCMP, 2010:108). A KMS can help to improve customer service, reduce costs and improve information flow (Cope, 2008:23). To promote the more efficient handling of product returns, organisations can also make use of a WMS which will enable the organisation to have better control of how goods are returned, reduce freight cost and improve inventory record accuracy, data entry and data integrity (Rukavina in Walsh, 2007:43). A TMS plans, executes and manages transport and movement (Bowersox et al., 2010:108), and can also help with visibility problems and reduce transportation and handling costs (Rukavina in Walsh, 2006:43).

In conclusion, leading-edge organisations are putting their reverse logistics management systems in place as a part of their entire management strategy (Beltran, 2002:2). Regardless of the approach that an organisation adopts in addressing its reverse logistics challenges, the key goal is to improve the visibility of goods in the reverse supply chain. This is where data come in, and this is why information technology plays such a critical role in the growth of reverse logistics (Reese, 2011:2).

3.3.2 Solutions relating to reverse logistics flows and processes

There are various solutions to overcoming reverse logistics problems and challenges in the system's flows and processes. This section deals with some of these solutions.

3.3.2.1 Solutions in the reverse logistics process

Not all product return situations are the same and the reverse logistics process needs to be unique for each return in terms of the product, the demand for it or its condition (Wodarski in Reese, 2011:3). To ensure efficiency in the returns process, organisations need to know how many returns they have in their system, where each is at any given time and all the information on the product return (Norek, 2002:37).

In order to overcome high costs, problems with product returns and customer-related problems, organisations should streamline, structure, automate, standardise and formalise their reverse logistics processes.

- *Streamlining and structuring the reverse logistics process*

  Streamlining reverse logistics processes is vital to increasing the bottom-line profitability and reducing costs (Patrican & Kirk, 2009:15; Riedel, 2004:1). By actively managing the reverse flow of products and setting structured processes, organisations can realise cost savings (Verstrepen & Neyens, 2007:38).

- *Automating the reverse logistics process*

  In the previous section it was mentioned that information systems should be automated. Likewise, organisations should automate their entire reverse logistics process (Kim, 2001:2; Norman & Sumner, 2007:2; Patrican & Kirk, 2009:14; Pollock, 2010:9). Automation can cut costs significantly (Gartner in Rowlands, 2002:2). Automation will also help organisations to gain insight into the supply chain which will lead to cuts in shipping and labour costs (Hammrich, 2007:28). Hence by automating the reverse logistics process, organisations can realise huge cost savings (Norman & Sumner, 2007:2; Patrican & Kirk, 2009:14; Pollock, 2010:9).

  Organisations must also have automated processes in place to assess the returned products, determine their condition and route them to their appropriate destination, which will reduce the amount of staff required to process the returns and lower production and inventory levels (Kim, 2001:2).

- *Standardising and formalising reverse logistics processes*

  Standardisation and formalisation of the reverse logistics process can help organisations manage the reverse logistics process more efficiently and effectively and reduce costs and create visibility in overall returns (Genchev, Richey & Gabler, 2011:257; Patrican & Kirk, 2009:14; Pollock & Dutta, 2009:27; Pollock, 2010:9).

In essence, the reverse logistics process should be uncomplicated, convenient and quick, and if organisations are able to process returns faster they can realise great cost savings (Greer, 2004:1; Murphy, 2007:4; O'Neill & Chu, 2001:8; Rogers, 2010:38; Rupnow, 2010:50; Smith, 2005:170). This will improve customer satisfaction and experience, which will ultimately enhance revenue streams that will go directly to the bottom line (Greer, 2004:1; Murphy, 2007:4; O'Neill & Chu, 2001:8; Rogers, 2010:38).

3.3.2.2 Gatekeeping as a solution to overcoming problems in reverse logistics

Organisations should consider establishing a gatekeeper, which is usually the customer service department, at the start of the reverse logistics process (Hoffman, 2006:1). The gatekeeper identifies returns, verifies receipts, inspects the return and makes informed decisions about accepting the return or directing it from there (Hoffman, 2006:1), which can reduce system costs (Rogers & Tibben-Lembke, 1998:88). A robust gatekeeping function will make the entire reverse flow more manageable and profitable (Murphy, 2007:4; Patrican & Kirk, 2009:14; Ravi & Shankar, 2005:1015; Rogers & Tibben-Lembke, 1998:38). Gatekeeping is thus a vital aspect of handling and managing returns effectively since it involves the screening of defective and unwarranted returned products at the entry point into the reverse logistics process (Ravi & Shankar, 2005:1014-1015). In gatekeeping, the quality of a product can be determined to enable the organisation to make the best choice, such as what disposal option to use (Ravi & Shankar, 2005:1015). In essence, having a gatekeeper at the start of the reverse logistics process and with a robust gatekeeping function, the entire reverse logistics process will become more efficient and effective (Harrington, 2006:15).

3.3.2.3 Centralisation as a solution to overcoming problems in reverse logistics

In order to have more streamlined processes in place and give reverse logistics a greater degree of focus, organisations should separate reverse logistics facilities from forward logistics

facilities (Gooley, 2002:42; Patrican & Kirk, 2009:15). Central return centres improve the efficiency of reverse logistics processes and facilitate the effective handling of returns (Dutton, 2010:1; Harrington, 2006:15; Hoffman, 2006:1).

Although merchandise is shipped in both forward and reverse logistics, the conditions are vastly different. Forward centres are designed to ship goods out and handle goods that have already been organised in pallets and boxes in uniform sizes. Return centres, however, receive a wide range of products that are returned in any type of box or package (Dutton, 2010:1).

Organisations should also centralise return processes in order to prevent reverse bottlenecks because returns are integrated back into the distribution system (Lang in Hoffman, 2006:1). By centralising the return processes, organisations can realise cost savings, improve the quality of returns processing, overcome visibility and quality problems and improve information management (Rogers & Tibben-Lembke, 1998:50).

3.3.3 Human and management-related solutions

In this section human and management-related solutions to overcome problems and challenges in reverse logistics will be discussed, with specific reference to strategies and planning for reverse logistics, policies, guidelines and programmes for reverse logistics, management and staff as well as functional departments in the organisation.

3.3.3.1 Strategies and planning for reverse logistics

Reverse logistics should be in line with the organisation's corporate culture and strategic orientation and also support the organisation's competitive strategies (Jayaraman & Luo, 2007:68). For reverse logistics to be successful, organisations need to look at it as part of the whole service or operations picture and not as an isolated activity that is treated as an afterthought (Quinn, 2005:66).

Senior executives need to learn about their current reverse logistics performance and benchmark it and make it part of the strategic planning growth process (Tompkins, 2010:2). Hence to overcome the major organisational problems relating to reverse logistics, a comprehensive strategic plan for reverse logistics should be created to ensure success. Strategic planning involves an attempt on the part of the manager on the course of action that has to be adopted for

the realisation of reverse logistics. An organisation should thus create a comprehensive strategic plan for reverse logistics which will also help to create awareness of the importance of reverse logistics (Ravi & Shankar, 2005:1027).

Organisations can adopt numerous strategies to overcome problems other than human and management-related problems in reverse logistics. For instance, in order to overcome problems relating to customer expectations and dissatisfaction, the organisation can implement a customer-focused strategy (Harps, 2002:4). In choosing the right disposition strategy or implementing multiple disposition strategies, organisations can also overcome problems relating to the disposition process and realise higher recovery rates and keep the value of returned products (Rogers, 2010:39; Stock in Kuzeljevich, 2004:39).

In essence, the role of strategic planning in reverse logistics is necessary to achieve the goals to ensure the survival of the organisation in the marketplace (Ravi & Shankar, 2005:1017). By implementing a successful reverse logistics strategy, organisations can increase their profits by enhancing operational efficiency and boosting customer loyalty (Riedel, 2004:1).

3.3.3.2 Establishing policies, guidelines and programmes for reverse logistics

Organisations need to adopt a formal approach to reverse logistics which will enable them to reduce the cost of doing business (Harkins in Murray, 2007:16). By establishing policies, guidelines and programmes for reverse logistics, organisations can overcome numerous problems and challenges in reverse logistics. It is therefore necessary for organisations to establish clear, uniform and formalised policies and decision rules for reverse logistics (Mollenkopf & Closs, 2005:43; Monaham et al., 2004:21; Murphy, 2007:6; Patrican & Kirk, 2009:14).

In order to govern the disposition of returns it is necessary to establish understandable and enforceable return policies (Monaham et al., 2004:21; Murphy, 2007:6; Patrican & Kirk, 2009:14). By creating formal return policies organisations can improve control over returns and minimise abuse from customers in terms of product returns (Autry, 2005:750; Genchev et al., 2011:251; Richey et al., 2005b:831). An effective reverse logistics policy can promote supply chain collaboration by encouraging parties to work together, which can reduce the number of returns and drive costs out of the process (Bierderman, 2004:1).

Organisations should also systematically develop decision rules that consider the cost of return transportation, reprocessing or remanufacturing and the resale value. These guidelines will enable organisations to focus their return and processing efforts on products, achieve return on investment and simultaneously minimise the costs of those products that will not generate any return (Mollenkopf & Closs, 2005:43).

In a previous section it was mentioned that the best solution to overcoming problems in reverse logistics is return prevention or reduction. However, besides effective data collection, organisations should also review their current return policies and customer service practices and evaluate and simplify their return policies to reduce returns (Patrican & Kirk, 2009:14; Tompkins, 2010:1). Organisations can also make use of return avoidance policies or zero-return policies to reduce returns and costs (Patrican & Kirk, 2009:17; Rogers & Tibben-Lembke, 1998:61). Alternatively, customer-focused policies will improve customer service, which will also result in cost savings (Harps, 2002:4; O'Neill & Chu, 2001:6).

Apart from policies and guidelines, organisations also need to develop an innovative, sophisticated and formalised reverse logistics programme (Autry, 2005:755; Dutton, 2010:2, Greer, 2004:1; Richey et al., 2005a:237). A sophisticated, innovative and formalised reverse logistics programme will improve the end customer's experience, realise cost savings, improve the management of inventory and return flow and qualify as a competitive advantage in the marketplace (Autry, 2005:755; Dutton, 2010:2, Greer, 2004:1; Richey et al., 2005a:237). An efficient and well-managed reverse logistics programme can generate significant cost savings in inventory-carrying, transportation and waste-disposal costs and improve an organisation's competitive position (Dampier, 2006:22; Gooley, 1998:1).

3.3.3.3 Top management support and staff for reverse logistics

Top management support is essential for the successful management of reverse logistics (Dowlatshahi, 2005:3474). There should be a dedicated manager who focuses only on returns (Stock in Harps, 2003:7). If organisations want their reverse logistics system to be successful, their top management should guide and support the implementation of a successful reverse logistics programme. Organisations must thus realise that a reverse logistics system will not work properly without the full support of its executive team (Mollenkopf & Closs, 2005:42).

The top management of the organisation should also demonstrate commitment to reverse logistics and align it to the organisation's goals and integrate it with the rest of the supply chain (Ravi & Shankar, 2005:1016).

3.3.3.4 Staff training for reverse logistics

Another vital consideration is the staff who are involved in the reverse logistics process. According to Melzer (Blanchard, 2005:8), organisations need to train their staff extensively on how to consult customers on the products before they buy them. This does not only improve customer satisfaction, but also reduces product returns. Organisations can also conduct formal training of employees involved in the reverse logistics process, which can help to make the entire return process more efficient (Stock in Kuzeljevich, 2004:38).

3.3.3.5 Coordination of functional departments

It is essential to integrate all the functional areas that affect or are affected by returns, because reverse logistics spans several functional areas and therefore cannot be managed in isolation (Mollenkopf & Closs, 2005:43). All the functional departments should understand the return process and its ultimate goals (Jayaraman & Luo, 2007:57). Communication is critical in managing reverse logistics effectively (Breen, 2006:546). To overcome any communication problems that may arise, organisations should build cross-functional teams (Lang in Hoffman, 2006:1). Hence for the effective design and implementation of reverse logistics, a cross-functional team with representation of stakeholders is essential (APQC, 2011:1; Dowlatshahi, 2005:3474).

In conclusion, for successful reverse logistics management, the organisational characteristics should include centralised oversight of reverse logistics activities through strict reporting requirements and possibly a separate function with senior leadership that can maximise corporate visibility and communication with other departments (Monaham et al., 2004:27).

3.3.4 Outsourcing as a solution

In chapter 2, the 3PRL providers' role in the reverse supply chain was briefly explained. Outsourcing of reverse logistics functions and activities can overcome numerous problems and challenges. Many organisations view the entire concept of reverse logistics as unmanageable,

and choose to outsource their reverse logistics activities instead of attempting to manage the process themselves (Integrated Warehousing Solutions, 2005:1). One of the primary reasons for outsourcing returns to 3PL providers is their expertise, knowledge and experience in reverse logistics (TMSi, [s.a.]:3; Witt, 2007:29).

If organisations find the costs of reverse logistics too much of a challenge, they can make use of third party logistics (3PL) providers. These providers have the ability to cut costs at every point of the reverse logistics process (Cain, 2008:15) and can help save the organisation money and time (Smith, 2005:179). If organisations lack the time or resources to invest in proper information systems, they can also make use of 3PL providers. These providers generally have to deal with powerful forward logistics management systems which make it easier for them to also implement successful and strong reverse logistics information systems. The combination of forward logistics and reverse logistics information systems will be more conducive to an overall effective information system (Meng, Zhang & Song, 2009:632).

Some organisations may find that they do not have enough volumes to justify the development of reverse logistics programmes. The best solution for these organisations would be to outsource their reverse logistics processes to 3PL providers (Bernon et al., 2004:18). Organisations should also consider making use of 3PL providers since they are specialists who can execute numerous product disposition tasks efficiently and effectively (Rukavina in Walsh, 2007:42). 3PL providers can also increase the efficiency of operations (Haibo, 2008:372).

Organisations can also make use of third party reverse logistics (3PRL) providers to handle some of their reverse logistics activities and functions. There is no doubt that 3PRL providers can benefit the reverse supply chain as a whole. Such providers bring capabilities gained from managing different types of supply chains to the undertaking of reverse logistics activities. A successful reverse supply chain can be created through collaboration with an organisation where the 3PRL provider can analyse the organisation's reverse logistics operations (TMSi, [s.a.]:2). Making use of 3PRL providers in a closed-loop supply chain also allows for sustainability because reverse logistics services afford organisations the opportunity to increase their profit margins, differentiate their services from those of their competitors, attract new clients, experience the advantages of well-managed reverse logistics practices and improve their status in the global supply chain network (Efendigil et al., 2008:270; TMSi, [s.a.]:3). 3PRL providers specialise in reverse logistics activities and it is therefore clear that they can take advantage of

economies of scale by converting reverse logistics functions in a profit-generating activity into the closed loop supply chain (Kannan, Murugesan, Senthil & Noorul Haq, 2009:164).

3.3.5 Reverse supply chain partnerships as a solution

As previously mentioned, for any partnership to be successful, collaboration, communication and trust and commitment are necessary. Supply chain collaboration is any kind of joint, coordinated effort between two or more entities in a supply chain to achieve a common goal (Jayaraman et al., 2008:416). By leveraging a partnership network and creating alliances, organisations can overcome problems pertaining to the lack of support from channel members. This will lead to optimum results in the reverse logistics process and improve returns to the bottom line (Pollock, 2010:8; Stock, 1998:115).

Organisations can also improve their communication with partners through contractual processes (Breen, 2006:546). By building and developing a long-term partnership based on mutual trust and commitment, organisations can reap massive rewards. Mutual trust and commitment between supply chain partners will enhance the performance and management of the reverse logistics programme and create an overall positive environment (Daugherty et al., 2003:49). This trust and commitment with partners will also enable organisations to improve their customer service and create customer satisfaction (Daugherty et al., 2003:57). By sharing and integrating information with supply chain partners, organisations can also minimise costs and realise faster turnaround times and speed in the returns process and improve customer service (Olorunniwo & Li, 2010:460; Rupnow, 2007:1).

It is therefore imperative for organisations to promote a common culture based on aligned visions measured by shared metrics and milestones necessary to achieve best-in-class performance (Mehrmann, 2007:25). In the next section, a framework for the problems and challenges in reverse logistics and the solutions in overcoming these problems and challenges will be presented.

3.4 A FRAMEWORK FOR REVERSE LOGISTICS PROBLEMS, CHALLENGES AND SOLUTIONS

In the previous sections, the problems, challenges and solutions in terms of reverse logistics were discussed in separate sections under separate dimensions. In this section, in table 3.1, the

problems and corresponding solutions in reverse logistics are matched to provide a more holistic overview of the findings in this chapter.

Table 3.1: Reverse logistics problem and solution framework

PROBLEMS AND CHALLENGES	SOLUTIONS
Costs associated with reverse logistics	**Information-related solutions** • Invest in information technology • Make use of data collection • Make use of appropriate information system for reverse logistics **Solutions relating to reverse logistics flows and processes** • Make use of solution applicable to the reverse logistics process • Make use of gatekeeping • Make use of centralisation **Human and management-related solutions** • Establish policies, guidelines and programmes for reverse logistics **Outsourcing as a solution** • Outsource reverse logistics **Reverse supply chain partnerships as a solution** • Make use of reverse supply chain partnerships
Lack of appropriate information system for reverse logistics • Insufficient IT investment • Low reliability of IT solutions • Lack of information visibility and capability	**Information-related solutions** • Invest in information technology • Make use of information management and data collection • Use appropriate information systems for reverse logistics

	Solutions relating to reverse logistics flows and processes • Make use of centralisation **Outsourcing as a solution** • Outsource reverse logistics
Problems with product returns and reverse logistics processes • Uncertainty of product returns • Time and money spent on determining the most suitable disposition option	**Information-related solutions** • Make use of information management and data collection • Make use of appropriate information system for reverse logistics **Solutions relating to reverse logistics flows and processes** • Make use of solutions applicable to the reverse logistics process • Make use of gatekeeping • Make use of centralisation **Human and management-related solutions** • Make use of appropriate strategies • Establish policies, guidelines and programmes for reverse logistics • Train staff **Outsourcing as a solution** • Outsource reverse logistics
Organisational and management-related problems • Lack of strategic planning to include reverse logistics • Lack of executive managers for reverse logistics • Lack of top management awareness and commitment to reverse logistics	**Information-related solutions** • Make use of appropriate systems **Human and management-related solutions** • Make use of strategic planning • Enlist the support of top management • Coordinate the functional departments **Outsourcing as a solution** • Outsource reverse logistics

• Lack of departmental collaboration and communication • Resistance to change and the need for new approaches	
Problems between reverse logistics partners • Lack of collaboration • Lack of communication • Lack of support from channel members	**Information-related solutions** • Invest in information technology • Make use of information management • Make use of appropriate systems for reverse logistics **Human and management-related solutions** • Establish policies for reverse logistics **Outsourcing as a solution** • Outsource reverse logistics **Reverse supply chain partnerships as a solution** Make use of reverse supply chain partnerships
Customer-related problems • Lack of communication and rule enforcement • Customer experience and customer dissatisfaction	**Information-related solutions** • Invest in information technology • Make use of information management and data collection • Make use of appropriate systems for reverse logistics **Solutions relating to reverse logistics flows and processes** • Make use of solutions applicable to the reverse logistics process • Make use of gatekeeping **Human and management-related solutions** • Make use of appropriate strategies • Establish policies, guidelines and programmes for reverse logistics • Train staff

	Reverse supply chain partnerships as a solution • Make use of reverse supply chain partnerships

In the next chapter, a more comprehensive framework will be provided in terms of each of the specific problems and challenges that organisations experience in reverse logistics. The particular problems and challenges with the specific solutions to overcome each of the problems and challenges will be illustrated in the framework, together with the proposed best practices in reverse logistics.

3.5 CONCLUSION

Many factors influence the implementation of effective reverse logistics, which pose challenges to many organisations and supply chains. Numerous barriers can make it difficult to put efficient and effective reverse logistics processes in place (Ravi & Shankar, 2005:1026). Many logisticians set up great forward movement but are deficient in reverse logistics, and it could be argued that the more sophisticated the forward logistics is, the clumsier the reverse logistics processes tend to be (Stent, 2006:1).

In this chapter, the problems, challenges and solutions relating to reverse logistics were identified and discussed in separate categories. A framework (see table 3.2) was also drawn up to link the problems, challenges and solutions in reverse logistics.

Many problems and challenges in reverse logistics were identified. *Cost associated with reverse logistics* was one of the first problems discussed, and it became clear that the high and hidden costs in reverse logistics are major areas of concern. Regarding *information,* the problems that were identified included insufficient investment in IT, low reliability of IT solutions, lack of information visibility and misinformation. Problems relating to *product returns* were pinpointed as uncertainty in timing, disposition, condition and quality and quantity. The *human and management-related problems* that were highlighted included the lack of strategic planning to include reverse logistics, the shortage of executive managers for reverse logistics, the lack of top management awareness and commitment towards reverse logistics, the lack of departmental collaboration and resistance to change and the need for new approaches. *Problems between reverse supply chain partners* were identified as a lack of collaboration, communication and support from channel members. Lastly, *reverse logistics problems relating to customers* were

identified as a lack of communication and rules enforcement as well as customer expectations and dissatisfaction.

Numerous solutions were also identified. S*olutions relating to information* were identified and discussed in terms of information technology, information management and data collection as well as appropriate systems for reverse logistics. *Solutions relating to reverse logistics flows and processes* included solutions in the reverse logistics process, gatekeeping, and centralisation. In terms of *human and management-related* solutions, strategies and planning for reverse logistics, establishment of policies, guidelines and programmes for reverse logistics, management and staff for reverse logistics and the coordination of functional departments were pinpointed. *Outsourcing* is another solution that was highlighted, which included outsourcing to 3PL providers. Lastly, *reverse supply chain partnerships* as solutions to overcome problems and challenges in reverse logistics were identified and discussed.

From the information in this chapter, it is clear that organisations need to look at their competitors, consider outsourcing if they lack the resources, understand how reverse logistics impacts on the supply chain and create a communication strategy whereby all affected departments understand their roles and responsibilities in reverse logistics and the return process (Rukavina in Walsh, 2007:42).

The solutions that were identified in this chapter are critical to overcoming problems that exist in the reverse logistic function, and will also form the foundation of the best practice framework in reverse logistics, which will be presented in the form of tables and figures in the next chapter.

CHAPTER 4

CONCEPTUAL FRAMEWORKS FOR BEST PRACTICES IN REVERSE LOGISTICS

4.1 INTRODUCTION

The previous chapters in this study were all based on the literature and included the following:

- chapter 1 which introduced this study
- chapter 2 which explored and explained the concept of reverse logistics
- chapter 3 which identified and discussed the problems, challenges and solutions in reverse logistics

One of the objectives of this study was develop to a best practice framework for reverse logistics, which will enable organisations to overcome the problems and challenges they may experience with reverse logistics. Included in this chapter is a series of frameworks and tables that was developed for the purpose of this study. All these frameworks and tables were based on the literature as discussed in previous chapters (chapters 1-3).

In this chapter, ten frameworks are discussed in sections. Besides the frameworks, a series of best practice tables, with short explanations of each, are also provided. Each table will be briefly explained. These tables, however, will mostly serve as a reference to the frameworks depicted in this chapter. The outline of this chapter is illustrated in figure 4.1.

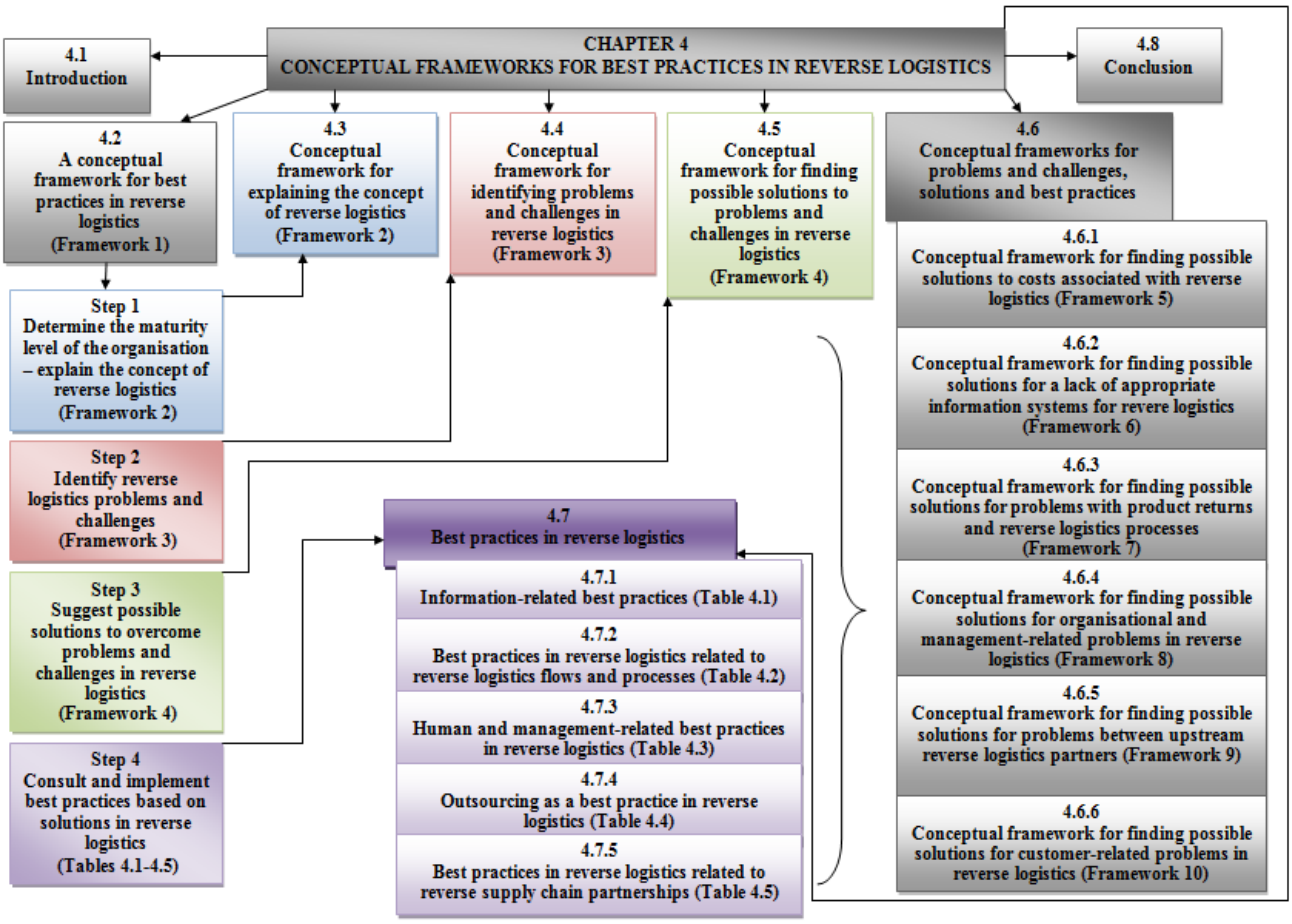

Figure 4.1: Outline of chapter 4

In the next section, the conceptual framework for best practices in reverse logistics will be presented and discussed, followed by an explanation of the development of each framework[1].

4.2 FRAMEWORK 1: CONCEPTUAL FRAMEWORK FOR BEST PRACTICES IN REVERSE LOGISTICS

In the previous section it was mentioned that the conceptual framework for best practices in reverse logistics was based on the literature. Framework 1 was therefore developed on the basis of various literature sources dealing with the topic of reverse logistics, as discussed in previous chapters (see chapters 1–3). Framework 1 is presented in figure 4.2 on page 76.

[1] Frameworks in this chapter can either be used as a consultancy instrument, or organisations can use them without any assistance from consultants.

Framework 1 represents the broad conceptual framework of this study. As indicated in figure 4.2, the framework comprises four steps which will be explained below.

- *Step 1: Determine the maturity level of the organisation*

In chapter 1, the maturity levels of organisations in reverse logistics were explained (see figure 1.1). It is clear from figure 4.2 that some organisations have no understanding of the concept of reverse logistics, while others range from understanding the concept, to being competent in reverse logistics or being in the developmental stage of reverse logistics processes to being world-class organisations in reverse logistics.

These maturity levels formed the basis of the conceptual framework. In the first step it is therefore necessary to determine the level of maturity of the organisation in order to determine which path to follow in the framework. If it is determined that the organisation has a low level of maturity, it is necessary to first explain the concept of reverse logistics, as discussed in chapter 2. For this part of the framework, an additional framework was developed explaining the concept of reverse logistics (see framework 2, section 4.3), specifically for those organisations with a lower level of maturity in reverse logistics.

- *Step 2: Identify reverse logistics problems and challenges*

The next step can only commence once the organisation has an improved level of understanding of reverse logistics or a satisfactory level of maturity in reverse logistics. This step involves identifying the problems and challenges that organisations may experience in reverse logistics. These problems and challenges were identified in chapter 3 on the basis of various literature sources. In this step, organisations should identify the problems and challenges in reverse logistics that apply to their organisation, which will enable them to find possible solutions to these problems. Step 2 represents framework 3, which is presented and discussed in section 4.4.

- *Step 3: Suggest possible solutions to overcome the problems and challenges in reverse logistics*

Step 3 involves finding possible solutions to overcome the problems and challenges in reverse logistics. These solutions were also based on literature sources which were discussed in chapter 3. In this step, the organisation needs to find the solutions on the basis of its particular problems

and challenges in reverse logistics, as identified in step 2 of the framework. Step 3 represents framework 4, which is presented and discussed in section 4.5.

- *Step 4: Consult and implement best practices based on solutions in reverse logistics*

Step 4 of the framework includes the implementation of the best practices in reverse logistics. The solutions identified in chapter 3 formed a foundation for the best practices in reverse logistics. Hence the best practices identified in this study were also based on various literature sources. As previously mentioned, this chapter includes a series of comprehensive tables containing all the best practices in reverse logistics. Organisations can make use of these tables to identify the necessary best practices which can be implemented in order to improve and effectively manage their reverse logistics processes.

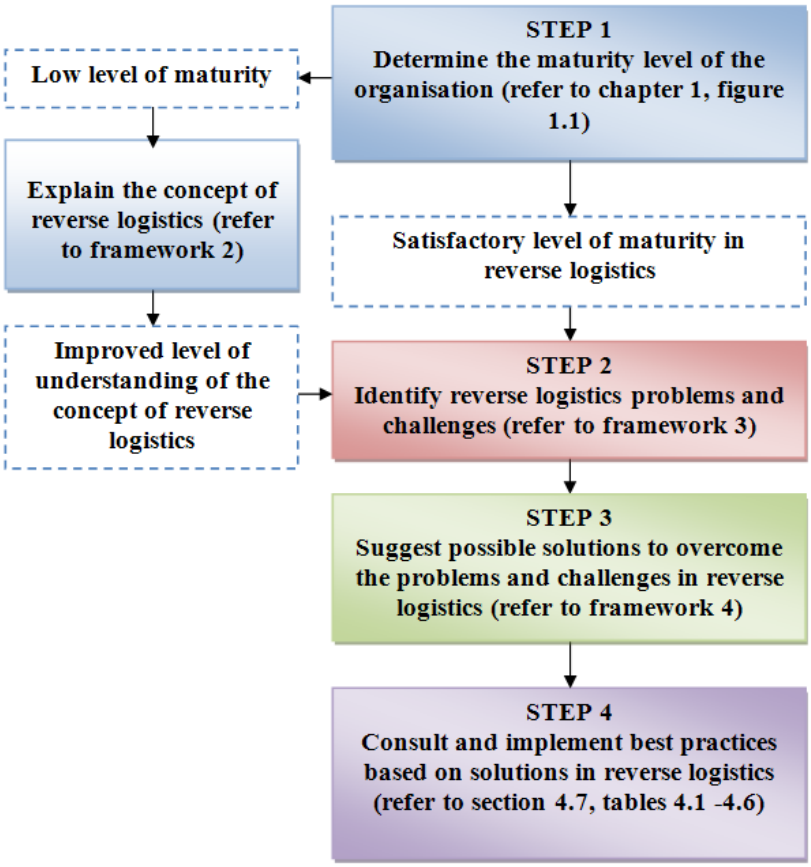

Figure 4.2: Framework 1: conceptual best practice framework in reverse logistics

Because framework 1 is broad, a series of more detailed conceptual frameworks was developed, based on each of the stages in the framework. Each of these frameworks will be illustrated and discussed in the sections to follow.

4.3 FRAMEWORK 2: CONCEPTUAL FRAMEWORK EXPLAINING THE CONCEPT OF REVERSE LOGISTICS

This section presents framework 2. As mentioned in the previous section, framework 2 represents step 1, which is to determine the maturity level of the organisation. Figure 4.3 illustrates framework 2 on page 79, which is followed by an explanation of the elements in the framework.

Framework 2 was specifically developed for those organisations with a lower level of maturity in reverse logistics. Framework 2 is as an extension of framework 1. The elements of this framework are based on chapter 2, which provided a comprehensive discussion of the concept of reverse logistics. Hence if an organisation does require a greater understanding of the concept of reverse logistics, chapter 2 should be used as a reference.

The elements in framework 2 (figure 4.3) include the following:

- *Define reverse logistics and explain the related concepts*

In chapter 2, section 2.2, the definition of reverse logistics and its related concepts were discussed. Numerous definitions of reverse logistics, from various authors/scholars, were provided in table 2.1 (section 2.2.1). The concepts closely related to reverse logistics were discussed in section 2.2.2. It was found that these concepts are often confused with reverse logistics. These concepts included the closed-loop supply chain and closed-loop supply chain management (CSCM), reverse supply chain management (RSCM), green logistics and green supply chain management (GSCM) and returns management. Section 2.2.2 also explained and illustrated reverse logistics and its related concepts (figure 2.2). The purpose of this illustration was to provide the context of reverse logistics and its related concepts, in order to make it more understandable.

- *Emphasise the importance of reverse logistics by explaining the drivers of reverse logistics and highlight the benefits of reverse logistics*

In chapter 2, section 2.3, the importance of reverse logistics was emphasised by discussing the drivers and benefits of reverse logistics. Numerous drivers were identified in section 2.3.1. These drivers were placed in categories which included economic drivers, corporate citizenship

and consumer expectations and environmental issues and legislations. Each of these categories was discussed in detail.

Section 2.3.2 highlighted the benefits of reverse logistics. Table 2.2 was compiled in order to summarise the benefits identified in the various literature sources. These benefits included cost reductions owing to effective reverse logistics management, waste and environmental cost reductions and customer satisfaction and competitive advantages.

- *Explain the types and reason for product returns*

In section 2.4, chapter 2, the different types and reasons for returns were discussed in three different categories. These categories included manufacturer returns, distribution returns and consumer or user returns. *Manufacturer returns* included raw material surpluses, quality control returns and production leftovers and by-products. *Distribution returns* included product recalls, commercial returns, stock returns and reusable products and functional returns. *Customer returns* included reimbursement guarantees, warranty and service returns, end-of-use returns and end-of-life returns. In this section, figure 2.3 illustrated these types and reasons for product returns.

- *Discuss the parties involved in the reverse logistics process*

In section 2.5 in chapter 2, the parties involved in reverse logistics were discussed. Different types of parties were identified in sections 2.5.1 to 2.5.3. These parties included forward supply chain actors, specialised reverse chain players and governmental institutions and opportunistic players. The *forward supply chain actors*, discussed in section 2.5.1, included the traditional supply chain parties, namely the supplier, original equipment manufacturer (OEM), distributor or wholesalers and retailer. The *specialised reverse chain players* included third party reverse logistics (3PRL) providers, brokers, jobbers and intermediate processers. These parties were discussed in section 2.5.2. The final group, *governmental institutions* and *opportunistic players*, were elaborated upon in section 2.5.3.

- *Discuss the reverse logistics process, activities and options*

In chapter 2, section 2.6, the reverse logistics process, activities and options were explained. In section 2.6.1, the reverse logistics process was discussed. This process consists of three stages, namely product collection, inspection, separation and sorting and recovery and disposition. In

section 2.6.2 the reverse logistics activities and options were described. Most of these activities or options are difficult to distinguish from one another because they are so closely intertwined. The activities/options included return to seller, reuse, resell, redistribution, salvage, repair, recondition, refurbish, remanufacture, recycle, donation and disposal, which involve incineration and landfill.

As mentioned previously, if it is determined that the organisation has an improved level of understanding or a satisfactory level of maturity in reverse logistics, step 2 of framework 1 can be initiated. The aim of framework 2 is therefore to enable organisations with a lower level of maturity to gain greater insight into the concept of reverse logistics.

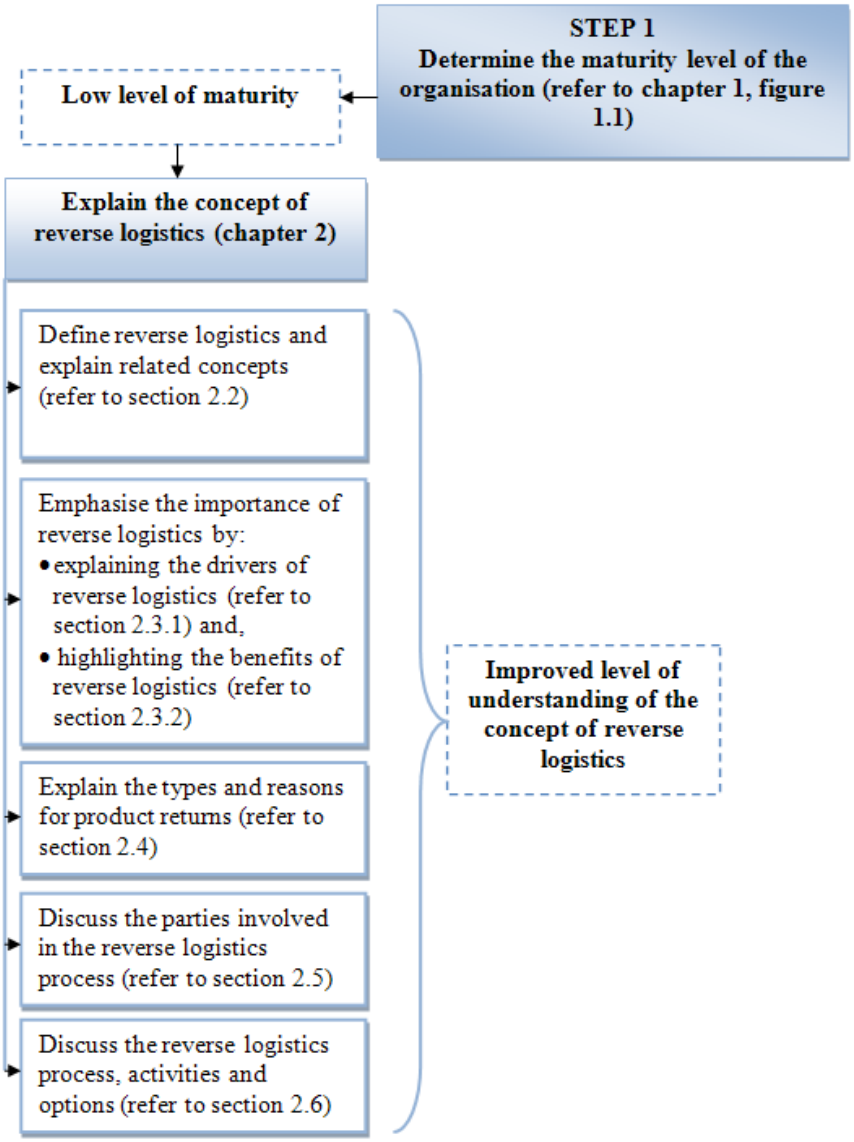

Figure 4.3: Framework 2: conceptual framework for explaining the concept of reverse logistics

Framework 2 is an extension of framework 1, outlining the concept of reverse logistics. It therefore represents step 1 of framework 1. In the next section, framework 3 (step 2) is presented and explained in greater detail.

4.4 FRAMEWORK 3: CONCEPTUAL FRAMEWORK FOR IDENTIFYING PROBLEMS AND CHALLENGES IN REVERSE LOGISTICS

In this section, framework 3 is depicted (see figure 4.4 on page 81) and explained. Framework 3 represents the second step of framework 1 (see figure 4.2 on page 76) and involves identifying problems and challenges in reverse logistics. These problems and challenges, as indicated in framework 3, were discussed in greater detail in chapter 3. It is important to emphasise that these problems and challenges in framework 3 are broad and only represent the major problem categories as identified in chapter 3.

As mentioned earlier, more detailed frameworks (frameworks 5 to 10) will be provided in order to place the problems and challenges that organisations may experience with reverse logistics in a wider context. Hence reference is made to frameworks 5 to 10 in this framework (see figure 4.4). It is therefore evident from framework 3 (figure 4.4) that the problem categories include the following:

- *Cost associated with reverse logistics.* Reference is made to framework 5, which will be illustrated and explained in greater detail in section 4.6.1.

- *Lack of appropriate information system for reverse logistics.* Reference is made to framework 6. Three major problems were identified in this category, namely insufficient IT investment, low reliability of IT solutions and a lack of information visibility and capability. These will be explained in more detail in section 4.6.2.

- *Problems with product returns and reverse logistics processes.* Reference is made to framework 7. The two main problems in this category include uncertainty of product returns and the time and money spent on determining the most suitable disposal option. More detail will be provided in section 4.6.3.

- *Organisational and management-related problems.* Reference is made to framework 8. There are numerous organisational and management-related problems in reverse logistics. These include a lack of strategic planning, a shortage of executive managers for reverse logistics, a lack of top management awareness and commitment, a lack of departmental collaboration and communication and resistance to change and the need for new approaches. More detail will be provided in section 4.6.4.

- *Problems between reverse supply chain partners* Reference is made to framework 9. The problems in this category include a lack of collaboration, a lack of communication and a lack of support from channels members. More detail will be provided in section 4.6.5.

- *Reverse logistics problems relating to customers.* Reference is made to framework 10. The main problems in this category that were identified included a lack of communication and rule enforcement and customer experience and customer dissatisfaction. More detail will be provided in section 4.6.6.

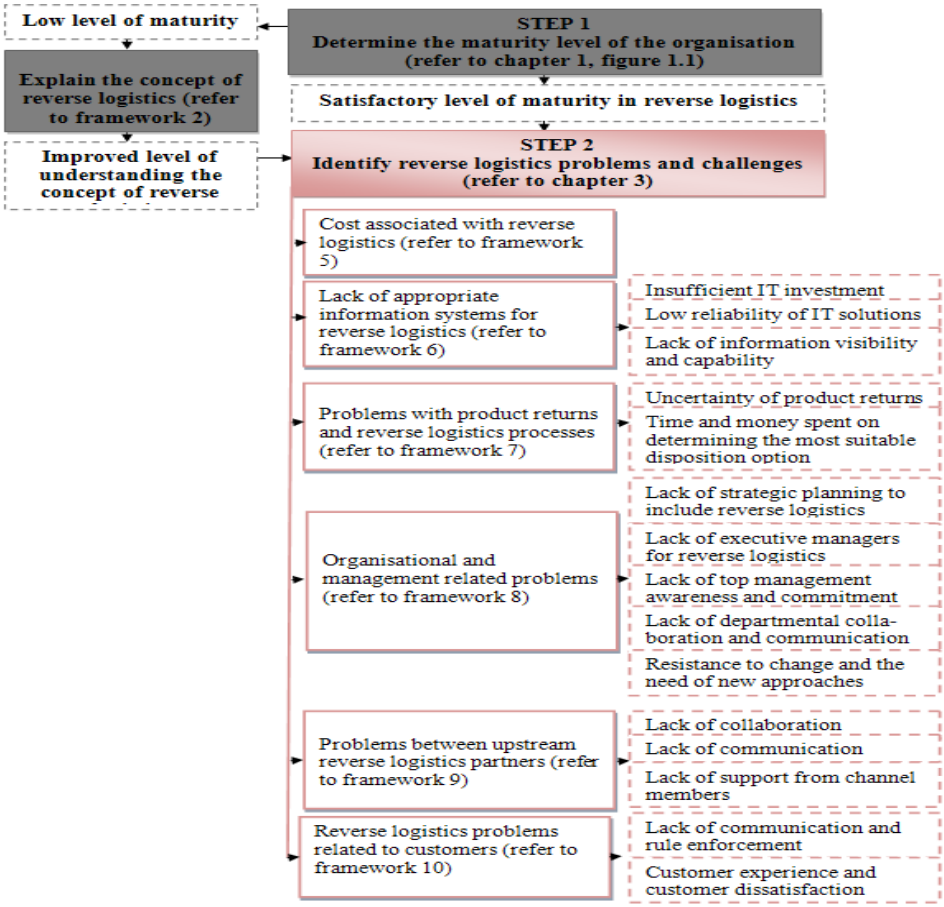

Figure 4.4: Framework 3: conceptual framework for identifying reverse logistics problems and challenges

Framework 4 contains a more detailed outline of the solutions to overcoming these problems and challenges in reverse logistics. Hence step 3 of framework 1 will be discussed in more detail.

4.5 FRAMEWORK 4: CONCEPTUAL FRAMEWORK FOR FINDING POSSIBLE SOLUTIONS TO PROBLEMS AND CHALLENGES IN REVERSE LOGISTICS

In this section, framework 4 is illustrated (see figure 4.5 on page 84) and explained. Framework 4 relates to step 3 in framework 1 (see figure 4.2 on page 76) and involves identifying possible solutions to overcoming the problems and challenges in reverse logistics. The solutions provided in framework 4 were discussed in greater detail in chapter 3. In the same way as framework 3, the solutions in framework 4 also represent the broad categories as discussed in chapter 3.

From figure 4.5 it is clear that there are numerous solutions to overcoming the problems and challenges in reverse logistics. Step 3 (framework 4) thus includes the following elements:

- *Solutions relating to information.* Reference is made to frameworks 5 to 10. Information pertaining to solutions can be applied to each of the problem categories, which were identified in framework 3. The main solutions in this category include, investment in capable IT, information management and data collection and appropriate information systems for reverse logistics. Further details will be provided in sections 4.6.1 to 4.6.2 (frameworks 5 to 10). From this it is evident that solutions relating to information can overcome numerous problems.

- *Solutions relating to reverse logistics flows and processes.* Reference is made to frameworks 5, 6, 7 and 10. Hence these solutions are applicable to the specific problems in these frameworks. Solutions relating to reverse logistics flows and processes can therefore overcome problems in terms of the cost associated with reverse logistics (framework 5), lack of appropriate information systems for reverse logistics (framework 6), problems with product returns and reverse logistics processes (framework 7) and customer-related problems (framework 10). Solutions in this category include solutions in the reverse logistics process, gatekeeping and centralisation. Further details will be provided in sections 4.6.1 to 4.6.3 and 4.6.6 (frameworks 5 to 7 and 10).

- *Human and management-related solutions.* Reference is made to frameworks 5, 7, 8 and 10. Again these solutions can help to overcome the problems that are applicable to the above-mentioned frameworks, which include the cost associated with reverse logistics (framework 5), problems with product returns and reverse logistics processes (framework 7), organisational and management-related problems (framework 8) and reverse logistics problems relating to customers (framework 9). There are numerous solutions in this category, including strategies and planning for reverse logistics, policies, guidelines and programmes for reverse logistics, top management support and staff for reverse logistics, staff training for reverse logistics and coordination of functional departments. Further details will be provided in sections 4.6.1, 4.6.3, 4.6.4 and 4.6.6.

- *Outsourcing as a solution.* Reference is made to frameworks 5 to 9. This makes it clear that outsourcing can be used to overcome most of the problems and challenges that organisations can experience in reverse logistics. Outsourcing can be used to resolve problems relating to cost (framework 5), the lack of appropriate information systems for reverse logistics (framework 6), the problems associated with product returns and reverse logistics processes (framework 7), organisational and management-related problems (framework 8) and problems between reverse supply chain partners (framework 9). Further details will be provided in sections 4.6.1 to 4.6.5.

- *Reverse supply chain partnerships as a solution.* Reference is made to frameworks 5, 9 and 10. These solutions can sort out problems relating to cost (framework 5), problems between reverse supply chain partners (framework 9) and reverse logistics problems relating to customers (framework 10). Further details will be provided in sections 4.6.1, 4.6.5 and 4.6.6.

Besides the solutions provided in framework 4 (step 3), reference was also made to step 4. As previously mentioned, this step involves consulting and implementing best practices that are based on the solutions identified in chapter 3. Reference in step 4 is made to section 4.7, which includes the best practice tables developed for the purpose of this study.

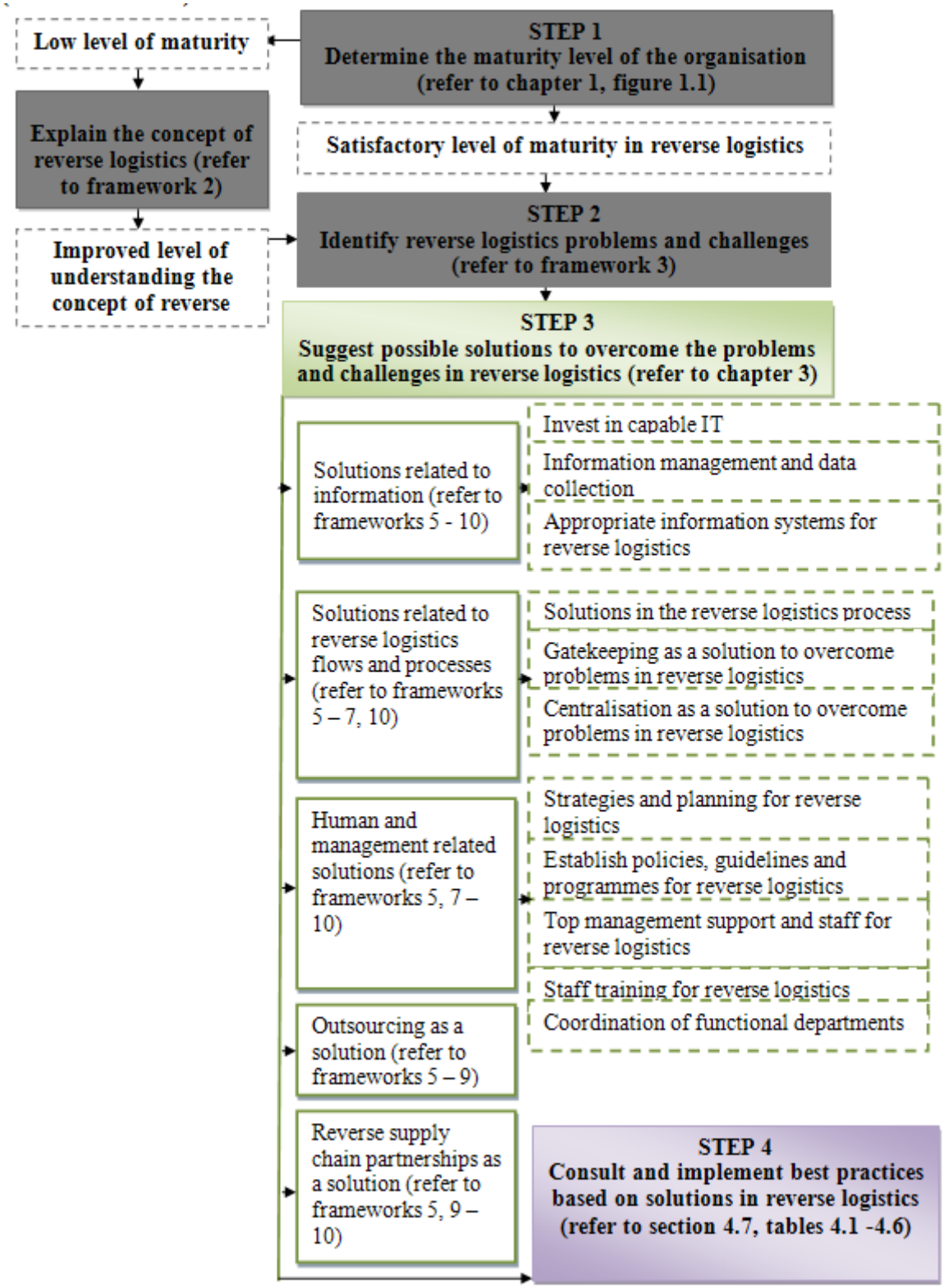

Figure 4.5: Framework 4: Conceptual framework for finding possible solutions to overcoming problems and challenges in reverse logistics

The next section provides more detailed frameworks that were developed, in order to elaborate on frameworks 1, 3 and 4. Each of these frameworks will be illustrated together with an explanation of the elements in each.

4.6 CONCEPTUAL FRAMEWORKS FOR PROBLEMS AND CHALLENGES, SOLUTIONS AND BEST PRACTICES IN REVERSE LOGISTICS

In previous sections, frameworks 1 to 4 were illustrated and explained. Although framework 3 and 4 added more detail to framework 1, more depth is required to determine the necessary and appropriate best practices. Hence another series of more detailed frameworks was developed. These frameworks are based on the problems and challenges (framework 3) and the necessary solutions (framework 4) to resolve these problems. These frameworks also include the best practices of reverse logistics that should be consulted and implemented in order to overcome the specific problems that were identified.

In this section, frameworks 5 to 10 are illustrated and explained. These frameworks include the following:

- a conceptual best practice framework for finding possible solutions to costs associated with reverse logistics (framework 5 on page 90)
- a conceptual best practice framework for finding possible solutions for a lack of appropriate systems for reverse logistics (framework 6 on page 93)
- a conceptual best practice framework for finding possible solutions for problems with product returns and reverse logistics processes (framework 7 on page 97)
- a conceptual best practice framework for finding possible solutions for organisational and management-related problems (framework 8 on page 100)
- a conceptual best practice framework for finding possible solutions for problems between reverse logistics partners (framework 9 on page 103)
- a conceptual best practice framework for finding possible solutions for customer-related problems (framework 10 on page 107)

There are certain similarities in the above-mentioned frameworks. All of them include the following:

- *Step 2.* Identify reverse logistics problems and challenges. Reference is made to framework 3 and section 3.2 in chapter 3. In section 3.2, all the problems and challenges based on various literature sources, which organisations may experience in reverse logistics, are discussed in detail.

- *Step 3.* Suggest possible solutions to overcome the problems and challenges in reverse logistics. Reference is made to framework 4 and section 3.3 in chapter 3. Like the problems and challenges in section 3.2, these solutions were also identified in various literature sources and discussed in detail.

- *Step 4.* Consult and implement best practices based on solutions in reverse logistics. Reference is made to tables 4.1 to 4.6 in section 4.7.

It is evident that the above-mentioned steps are based on steps 2 to 4 in framework 1. Each of the above frameworks will be discussed in greater detail in the sections below.

4.6.1 Framework 5: conceptual best practice framework for finding possible solutions to the costs associated with reverse logistics

Framework 5 is the first framework in the series of detailed frameworks that were developed. Figure 4.6 on page 90 illustrates framework 5, and from this figure it is evident that steps 2 to 4 in frameworks 3 and 4 are elaborated upon.

In this framework, the focus is on the first major problem (step 2), which is the cost associated with reverse logistics (see framework 3). Step 3 in the framework includes possible solutions to resolve the cost-related problems in reverse logistics. Any of these possible solutions from this framework, can be applied to overcome cost-related problems and challenges in reverse logistics (see framework 4). Once the possible solution has been identified, the final part of this framework can be put into action (step 4). In this part of the framework, the particular best practice relating to the solutions from step 3, can then be followed and implemented.

Figure 4.6 should be consulted as each of the steps and elements of framework 5 will now be discussed in greater detail.

- *Step 2: Identify reverse logistics problems and challenges*

The focus of framework 5 is on the problem of the *costs associated with reverse logistics*. In this step, reference is made to framework 3 and section 3.2.1 in chapter 3. Section 3.2.1 provided a detailed discussion of the problems of the cost associated with reverse logistics. According to the literature, the major cost-related problems of reverse logistics include the high cost and various hidden costs involved in the process.

- *Step 3: Suggest possible solutions to overcome the problems and challenges in reverse logistics*

Framework 5 (see figure 4.6) indicates that there are numerous solutions to the cost-related problems in reverse logistics. Reference was made to framework 4 as well as the relevant sections in chapter 3. The solutions included the following:

  - *Solutions relating to information* were discussed in section 3.3.1 in chapter 3. Earlier it was mentioned that three main categories of solutions relating to information were identified, namely invest in capable IT, information management and data collection and appropriate information systems for reverse logistics (see framework 4 and chapter 3, sections 3.3.1.1 to 3.3.1.3). Section 3.3.1 explains that solutions in all the three categories pertaining to information can help to resolve cost-related problems.

  - *Solutions relating to reverse logistics flows and processes* were discussed in section 3.3.2 in chapter 3. Three categories, based on the literature, relating to reverse logistics flows and processes were identified, namely solutions pertaining to the reverse logistics process, gatekeeping and centralisation (see framework 4 and sections 3.3.2.1 to 3.3.2.3). Section 3.3.2 indicates that all the solutions in this category can help to resolve the problems associated with costs in reverse logistics.

  - *Human and management-related solutions* were discussed in section 3.3.3 in chapter 3. As mentioned earlier, there are numerous solutions in this category (see framework 4). These solutions were discussed in various subsections (see sections 3.3.3.1 to 3.3.3.5) in chapter

3, and included strategies and planning for reverse logistics, the establishment of policies, guidelines and programmes for reverse logistics, top management support and staff for reverse logistics and the training of staff for reverse logistics and coordination of functional departments. However, based on the literature, it was found that only the establishment of policies, guidelines and programmes for reverse logistics can help to resolve cost-related problems (see section 3.3.3.2).

- *Outsourcing as a solution* was discussed in section 3.3.4 in chapter 3. The literature indicated that organisations can outsource their reverse logistics activities to 3PL providers or 3PRL providers, if they find that the cost associated with reverse logistics too problematic or challenging.

- *Reverse supply chain partnerships as a solution* was covered in section 3.3.5 in chapter 3. In literature it was found, that in order to minimise cost, organisations should share and integrate information with their partners.

- *Step 4: Consult and implement best practices based on solutions in reverse logistics*

The solutions provided in step 3 serve as a foundation for the best practices given in step 4. It was mentioned earlier, that the best practices were developed from the solutions that were identified in chapter 3. In this step it is therefore apparent that the best practices coincide with the solutions that were discussed above. In step 4, the following best practices can be consulted or implemented in order to solve cost-related problems:

- If *solutions relating to information* are considered, organisations can invest in capable IT, make use of data collection and/or appropriate information systems for reverse logistics. If table 4.1 (see section 4.7.1) is consulted, organisations can either invest in wireless technology or apply the correct state-of-the-art technology. Another option for organisations is to establish effective data collection procedures in order to reduce cost. In terms of appropriate information systems for reverse logistics, organisations can automate their standard information systems. However, if the organisation decides to make use of a specific reverse logistics system, it has the option to implement a reverse logistics system (RLS) or reverse logistics management system (RLMS), use a returns merchandise authorisation (RMA) system and/or implement a web-based RMA system. Other appropriate systems that organisations can consider or implement are a knowledge

management system (KMS), a warehouse management system (WMS) and/or a transportation management system (TMS).

- If *solutions relating to reverse logistics flows and processes* are considered, organisations can make use of solutions applicable to the reverse logistics process, gatekeeping and/or centralisation (see table 4.2 in section 4.7.2). In terms of solutions applicable to the reverse logistics process, organisations have the following best practice options:
  - Streamline the reverse logistics process.
  - Manage the reverse flows and set structured processes.
  - Automate the entire reverse logistics process.
  - Standardise and formalise the reverse logistics process.
  - Establish reverse processes that are uncomplicated, convenient and quick.

  Other options available to organisations are to implement a robust gatekeeping function and/or centralise their return processes.

- If *human and management-related solutions* are considered, organisations can establish policies, guidelines and programmes for reverse logistics. If table 4.3, in section 4.7.3, is consulted it will become evident that organisations can develop decision rules, review current return policies, implement return avoidance or zero-return policies and establish customer-focused policies. Organisations also have the option of developing a well-managed, innovative, sophisticated and formalised reverse logistics programme. If these best practices are implemented, organisations will be able to overcome the problems associated with cost in reverse logistics.

- If the organisation decides on outsourcing as a solution, it can make use of 3PL or 3PRL providers to overcome the high cost associated with reverse logistics (see table 4.4 in section 4.7.4 for details).

- If *reverse supply chain partnerships* are considered as a possible solution, organisations should consider sharing and integrating information with their partners. Best practices in this category are indicated in table 4.5 explained in section 4.7.5.

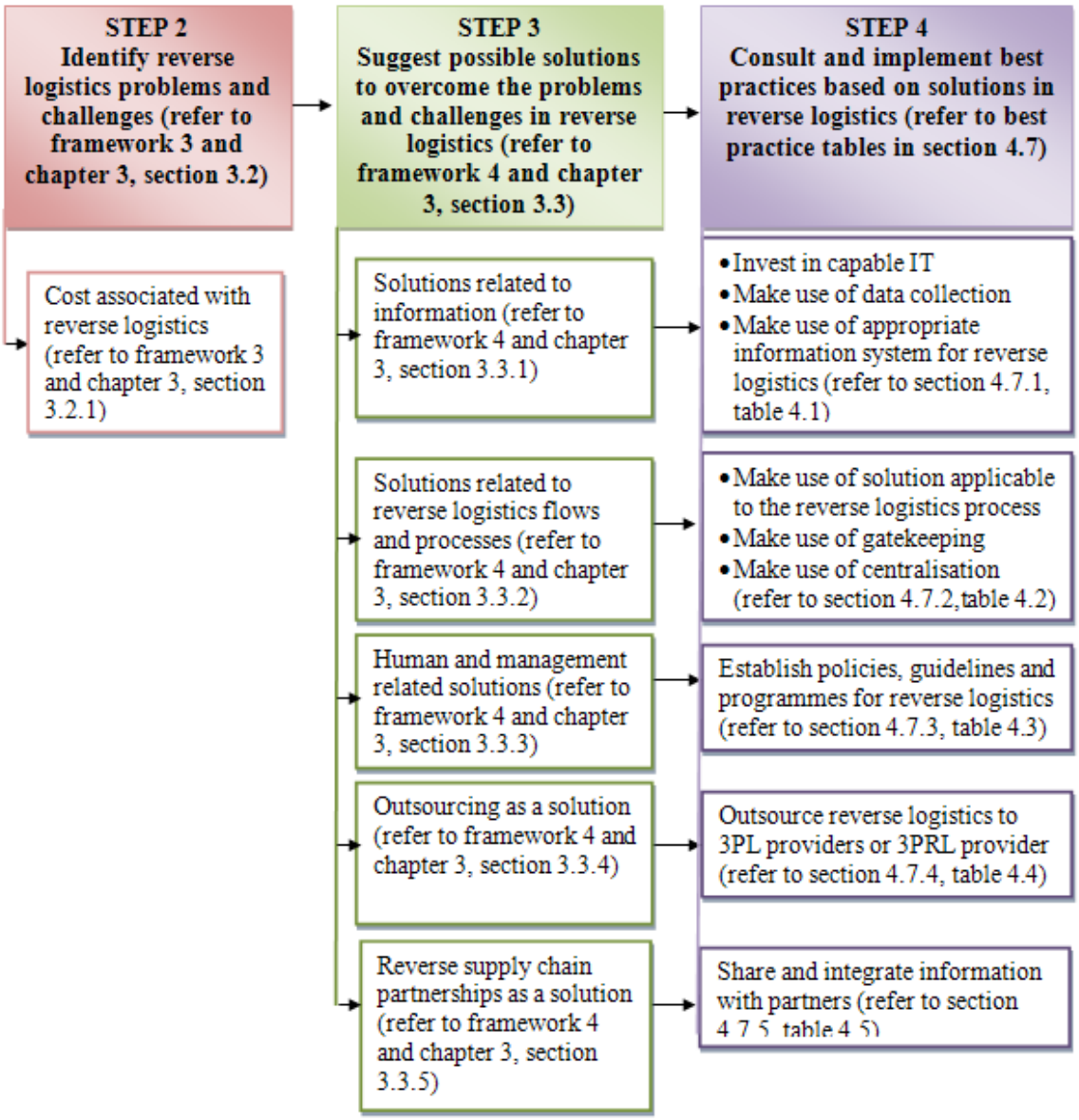

Figure 4.6: Framework 5: conceptual best practice framework for finding possible solutions to cost associated problems in reverse logistics

Framework 5 provides a guideline for organisations experiencing cost-related problems in reverse logistics. It is again important to emphasise that this framework is conceptual and is based solely on the information found in the literature. In the next section, framework 6 will be illustrated and explained.

4.6.2 Framework 6: conceptual best practice framework for finding possible solutions for a lack of appropriate information systems for reverse logistics

Framework 6 is the second framework in the series of detailed frameworks that were developed. Figure 4.7 on page 93 illustrates framework 6. The focus of this framework is on the problems and challenges that organisations may experience with information systems (see framework 3), as identified in chapter 3. This forms part of step 2 of the framework.

Step 3 of the framework includes the possible solutions that organisations may consider if they experience a lack of appropriate information systems for reverse logistics. Any of these possible solutions can be applied to resolve information-related problems in reverse logistics (see framework 4).

Finally, after the identification of the possible solution(s), step 4 of this framework can be applied. In this part of the framework, the particular best practice relating to the solutions, identified in step 2 of the framework, can then be followed and implemented.

With figure 4.7 as a reference, the steps and elements of framework 6 will now be discussed in more detail.

- *Step 2: Identify reverse logistics problems and challenges*

It was mentioned earlier that the focus in framework 6 is on finding possible solutions to solve problems pertaining to a *lack of appropriate information systems for reverse logistics*. In step 2, reference is made to framework 3 and section 3.2.2 in chapter 3. In section 3.2.2, the problems that organisations may experience with information systems were discussed. This section was further divided into subsections (see sections 3.2.2.1 to 3.2.2.3) which included problems with insufficient IT investment, low reliability of IT solutions and a lack of information visibility and capability (see framework 3).

- *Step 3: Suggest possible solutions to overcome the problems and challenges in reverse logistics*

In framework 6 (see figure 4.7), it is apparent that there are only a few solution categories that can be applied to overcome problems relating to a lack of appropriate information systems for

reverse logistics. Reference was made to framework 4 as well as the relevant sections in chapter 3. The solutions included the following:

- *Solutions relating to information* were discussed in section 3.3.1 in chapter 3. As in framework 5, all the solutions relating to information can be considered if organisations experience information-related problems (see framework 4 and sections 3.3.1.1 to 3.3.1.3 in chapter 3).

- *Solutions relating to reverse logistics flows and processes* were discussed in section 3.3.2 in chapter 3. If section 3.3.2 is consulted, it will become apparent that the only solution category that organisations could consider here is centralisation (see section 3.3.2.3).

- *Outsourcing as a solution* was discussed in section 3.3.4 in chapter 3. In the literature it was found that organisations can outsource their reverse logistics activities to 3PL providers or 3PRL providers, if they experience problems with information systems. 3PL and 3PRL providers generally have more resources to implement appropriate systems for the reverse logistics process to be efficient and effective.

- *Step 4: Consult and implement best practices based on solutions in reverse logistics*

In step 4, the following best practices can be consulted or implemented in order to sort out information-related problems:

- If *solutions relating to information* are considered, organisations can invest in capable IT, and make use of data collection and/or appropriate information systems for reverse logistics. Reference is made to table 4.1 (see section 4.7.1), and if consulted, the following best practices can be considered by organisations with information-related problems:
  - Invest in wireless technology.
  - Invest in and apply the correct state-of-the art technology.
  - Apply an integrated information management approach.
  - Incorporate data management.
  - Automate the information system.
  - Implement an information system compatible with other members of the supply chain.
  - Utilise the internet or establish a web-based approach.

- Implement a web-based system.
- Utilise a reverse logistics management system (RLMS).
- Implement and utilise an RLS.
- Utilise an RMA system,
- Utilise or implement a KMS.
- Utilise or implement a WMS.

- If *solutions relating to reverse logistics flows and processes* are considered, organisations have the option of centralisation, by either separating there reverse logistics facilities from forward facilities or by centralising their return processes (see table 4.2 in section 4.7.2).

- In terms of outsourcing as a solution, organisations can make use of 3PL or 3PRL providers to overcome a lack of information systems for reverse logistics (see table 4.4 in section 4.7.4 for details).

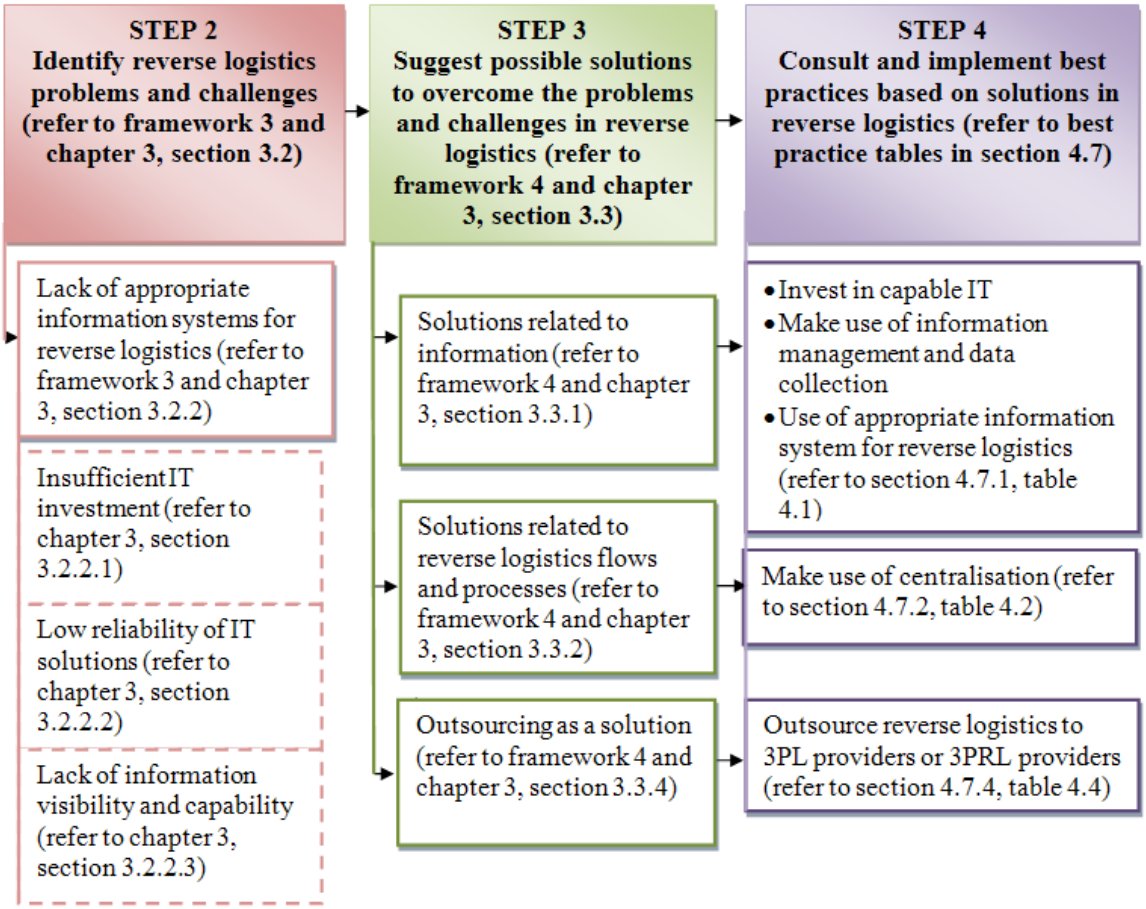

Figure 4.7: Framework 6: conceptual best practice framework for finding possible solutions for a lack of appropriate information systems for reverse logistics

Framework 6 provides a guideline for organisations experiencing problems with a lack of appropriate information systems for reverse logistics. This framework is also conceptual and based solely on what was found in the literature. In the next section, framework 7 will be illustrated and explained.

4.6.3 Framework 7: conceptual best practice framework for finding possible solutions for problems with product returns and reverse logistics processes

Framework 7 represents the third framework in the series of detailed frameworks that were developed. Figure 4.8 on page 97 illustrates framework 7. The focus of this framework is on the problems and challenges that organisations may experience with product returns and the reverse logistics process (see framework 3), as identified in chapter 3. Hence this part of the framework signifies step 2 in framework 1. The next part (step 3) in the framework includes the possible solutions that organisations can consider to resolve problems with product returns and reverse logistics processes (see framework 4).

The final part of this framework can be applied (step 4) once the organisation has identified appropriate solutions. In step 4, the particular best practice relating to the solution, as identified in step 3 of this framework, can then be followed and implemented.

With figure 4.8 as reference, the steps and elements of framework 7 will now be discussed in greater detail below.

- *Step 2: Identify reverse logistics problems and challenges*

The focus of framework 7 is on problems pertaining to *product returns and the reverse logistics processes*. In step 2, reference was made to framework 3 and section 3.2.3 in chapter 3. In section 3.2.3, the problems that organisations can experience with product returns and reverse logistics processes were discussed in detail. These problems were discussed in two different sections (see framework 3), namely uncertainty of product returns (see section 3.2.3.1) and time and money spent on determining the most suitable disposition option (see section 3.2.3.2).

- *Step 3: Suggest possible solutions to overcome the problems and challenges in reverse logistics*

It is evident from figure 4.8 that there are several solutions for problems with product returns and reverse logistics processes. Reference was made to framework 4 and the relevant sections in chapter 3. The solutions in framework 7 include the following:

  - *Solutions relating to information* were discussed in section 3.3.1 in chapter 3. As mentioned in previous sections, these solutions are subdivided into three categories (see framework 4 and sections 3.3.1.1 to 3.3.1.3). If section 3.3.1 is consulted, it will become clear that organisations can either make use of information management and data collection and/or appropriate information systems for reverse logistics as options to overcome problems with product returns and reverse logistics processes.

  - *Solutions relating to reverse logistics flows and processes* were discussed in section 3.3.2 in chapter 3. All three categories relating to reverse logistics flows and processes, namely solutions pertaining to the reverse logistics process, gatekeeping and centralisation (see framework 4 and sections 3.3.2.1 to 3.3.2.3), can be used as possible solutions to problems with product returns and the reverse logistics process.

  - *Human and management-related solutions* were discussed in section 3.3.3 in chapter 3. If section 3.3.3 is consulted, it will become apparent that organisations can make use of strategies and planning for reverse logistics (see section 3.3.3.1), policies, guidelines and programmes for reverse logistics (see section 3.3.3.2) and staff training (see section 3.3.3.4) to sort out problems with product returns and reverse logistics processes.

  - *Outsourcing as a solution* was discussed in section 3.3.4 in chapter 3. In the literature it was found that organisations can outsource their reverse logistics activities to 3PL providers or 3PRL providers in order to overcome some of the problems with product returns and the reverse logistics process.

- *Step 4: Consult and implement best practices based on solutions in reverse logistics*

In step 4, the following best practices can be consulted or implemented in order to resolve problems with product returns and reverse logistics processes:

- If it is decided to consider *solutions relating to information*, organisations can make use of data collection and/or make use of appropriate information systems for reverse logistics. If table 4.1 in section 4.7.1 is consulted, it will become apparent that organisations can use an integrated information management approach which will enable them to overcome the problem with uncertainty in product returns. Another option is to utilise returns data in order to reduce returns which will also help with product return problems. Organisations can also consult and implement the following best practices, in terms of using appropriate information systems for reverse logistics (see table 4.1):
  - Utilise the internet or establish a web-based approach.
  - Utilise special returns software.
  - Implement an RLMS or RLS.
  - Utilise an RMA system.
  - Utilise or implement a WMS.
  - Utilise or implement a TMS.

- If *solutions relating to reverse logistics flows and processes* are considered, organisations can make use of solutions applicable to the reverse logistics process, gatekeeping and/or centralisation. Reference is made to table 4.2 in section 4.7.2. If table 4.2 is referred to, it will become evident that organisations can automate, standardise and formalise their entire reverse logistics process. Organisations can also establish a gatekeeper at the beginning of the reverse logistics process and/or implement a robust gatekeeping function. The final options in terms of finding solutions to reverse logistics flows and processes are that organisations can centralise their return centres and/or return processes.

- If *human and management-related solutions* are decided upon, organisations can make use of strategies and planning for reverse logistics and/or establish policies, guidelines and programmes for reverse logistics as well as make use of staff training. If table 4.3 in section 4.7.3 is consulted, it will become apparent that organisations can implement multiple disposition strategies to assist them with the disposition process. Organisations can also establish clear and uniform policies, create formal policies, simplify return policies and/or implement return avoidance policies to resolve problems they may experience with product returns and the reverse logistics process. Organisations should also consider implementing a well-managed, innovative, sophisticated and formalised

reverse logistics programme. Finally, organisations can train employees involved in the reverse logistics process.

- If the organisation decides to consider outsourcing as a solution, it can make use of 3PL or 3PRL providers to overcome problems with product returns and reverse logistics processes. See table 4.4 in section 4.7.4 for details.

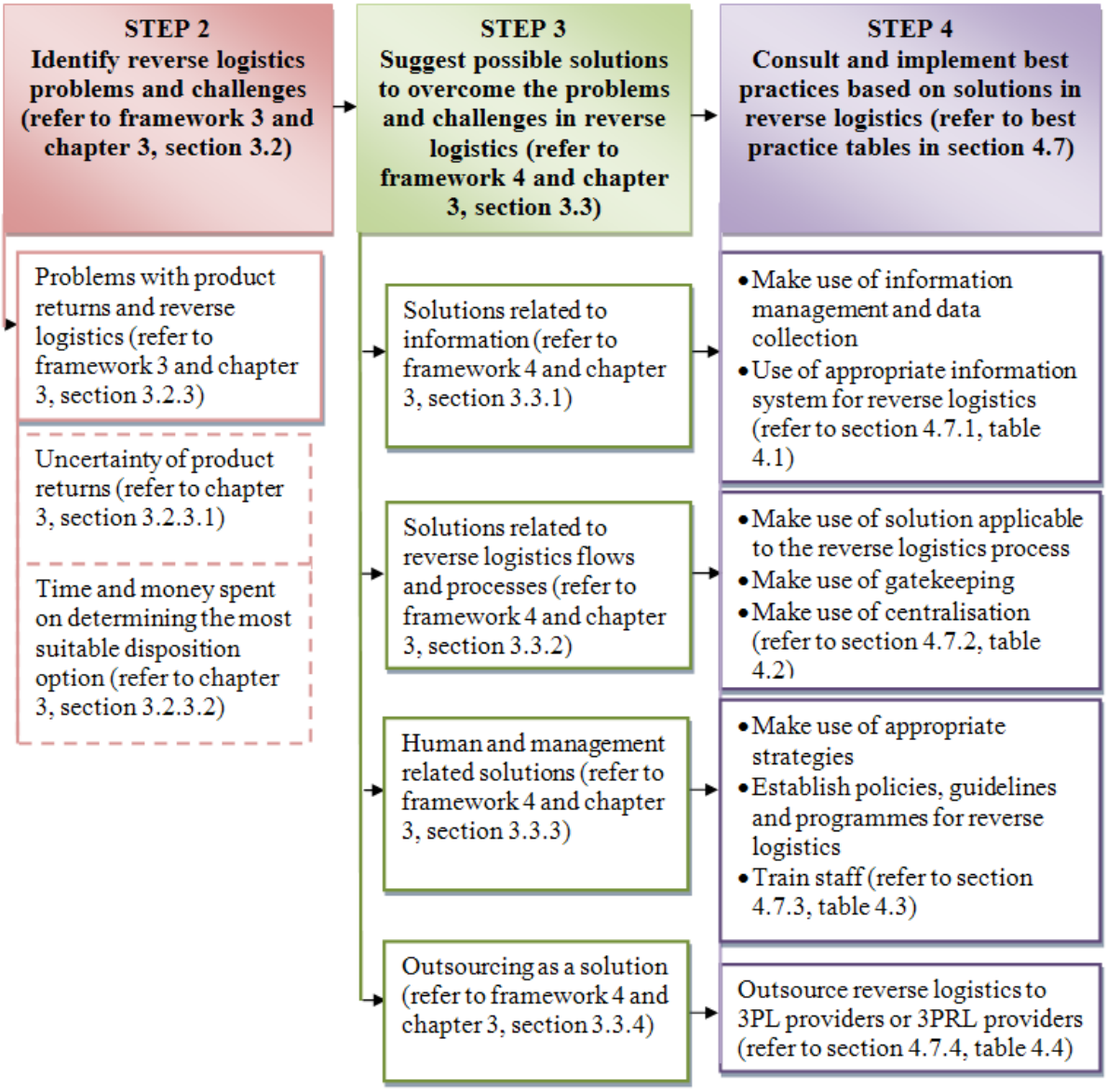

Figure 4.8: Framework 7: conceptual best practice framework for finding possible solutions for problems with product returns and reverse logistics processes

It should be clear from the above discussion that framework 7 provides a guideline for organisations experiencing problems with product returns and the reverse logistics process. It is

a conceptual framework based on the literature examined in chapter 3. In the next section, framework 8 will be illustrated and explained.

4.6.4 Framework 8: conceptual best practice framework for finding possible solutions for organisational and management-related problems

Framework 8 signifies the fourth framework in the series of detailed frameworks that were developed. Figure 4.9 on page 100 illustrates framework 8. The focus of this framework is on organisational and management-related problems that organisations may encounter in reverse logistics (see framework 3), as identified in chapter 3. Therefore the first part of this framework involves step 2 in framework 1.

The second part of the framework (step 3) includes the possible solutions that organisations can consider to overcome organisational and management-related problems (see framework 4). Finally, step 4 in this framework provides the particular best practices based on the solutions that were identified in step 3.

With figure 4.9 as a reference, the steps and elements of framework 8 will now be discussed in more detail below.

- *Step 2: Identify reverse logistics problems and challenges*

The focus of framework 8 is on organisational and management-related problems that organisations may experience with reverse logistics. In step 2, reference is made to framework 3 and section 3.2.4 in chapter 3. As mentioned previously, numerous problems were discussed in section 3.2.4, which include a lack of strategic planning to include reverse logistics, a shortage of executive managers for reverse logistics, a lack of top management and commitment and a lack of departmental collaboration and communication.

- *Step 3: Suggest possible solutions to overcome the problems and challenges in reverse logistics*

It is clear from figure 4.9 (framework 8) that there are only three solution categories that can be considered if organisations experience organisational and management-related problems with

reverse logistics. Reference was made to framework 4 and the relevant sections in chapter 4. The solutions in framework 8 include the following:

- *Solutions relating to information* were discussed in section 3.3.1 in chapter 3. If section 3.3.1 is consulted, it will become clear that organisations can only make use of appropriate information systems for reverse logistics (see section 3.3.1.3) to overcome organisational and management problems.

- *Human and management-related solutions* were discussed in section 3.3.3 in chapter 3. If section 3.3.3 is consulted, it will become evident that organisations can make use of strategies and planning for reverse logistics (see section 3.3.3.1), top management support for reverse logistics (see section 3.3.3.3) and coordination of functional departments (see section 3.3.3.4) to sort out organisational and management-related problems.

- *Outsourcing as a solution* was discussed in section 3.3.4 in chapter 3. If section 3.3.4 is consulted, it will become clear that outsourcing is an option for overcoming organisational and management-related problems with reverse logistics.

- *Step 4: Consult and implement best practices based on solutions in reverse logistics*

In step 4, the following best practices were identified in order to overcome organisational and management-related problems in reverse logistics:

- If *solutions relating to information* are considered, organisations can make use of accurate and flexible information systems for reverse logistics which will assist them with strategic decision making. The organisation can also implement and utilise a RLS which will help it with decision making and departmental coordination (see table 4.1 in section 4.7.1).

- In terms of *human and management-related solutions*, organisations can consult and implement a number of best practices. Reference is made to table 4.3 in section 4.7.3, and if consulted, the following best practices can be considered for implementation:
  - Create a comprehensive strategic plan for reverse logistics.
  - Appoint a dedicated manager for the reverse logistics function.

- Provide top management support where commitment to reverse logistics is demonstrated.
- Establish a cross-functional team to promote coordination and communication in the organisation.

- If *outsourcing* is considered as a solution, the organisation can make use of 3PL or 3PRL providers to sort out all organisational and management-related problems in reverse logistics. See table 4.4 in section 4.7.4 for details.

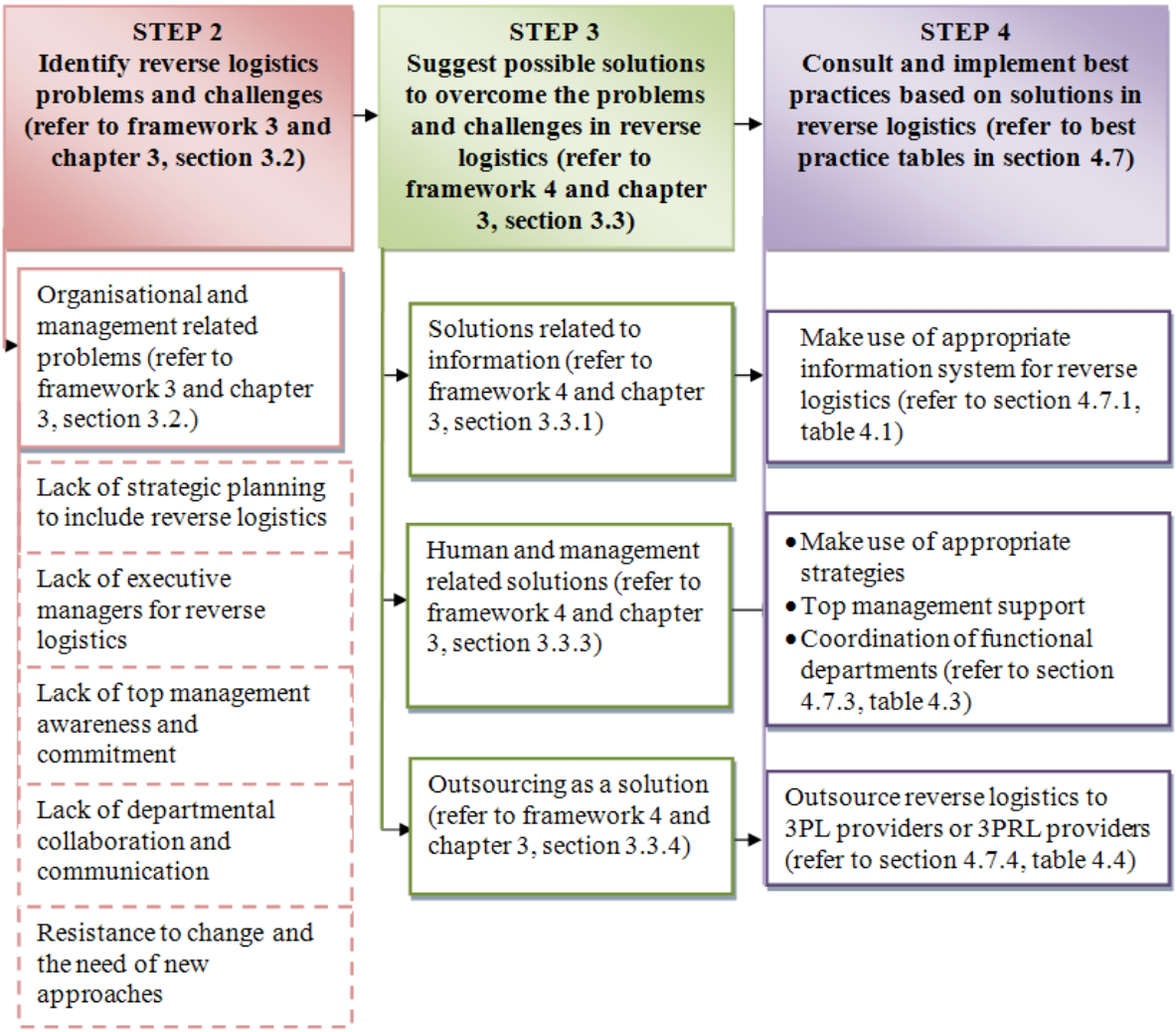

Figure 4.9: Framework 8: conceptual best practice framework for finding possible solutions for organisational and management-related problems

Framework 8 provides a guideline to organisations that experience organisational and management-related problems and challenges in reverse logistics. It is similar to the previous

frameworks in that it is also a conceptual framework and is based on the literature examined in chapter 3. In the next section, framework 9 will be illustrated and explained.

4.6.5 Framework 9: conceptual best practice framework for finding possible solutions for problems between upstream reverse logistics partners

Framework 9 is the second last framework in the series of detailed frameworks that were developed. Figure 4.10 on page 103 illustrates framework 9. In this framework, the focus is on problems between upstream reverse logistics partners as discussed in chapter 3. This part of the framework therefore represents step 2 in framework 1.

The second part or step 3 in the framework includes the possible solutions to overcome these problems. Any of these solutions, given in framework 9, can be applied to resolve problems between reverse logistics partners (see framework 4).

After the identification of the possible solution(s), the final part (step 4) of this framework can be applied. In step 4 of the framework, the particular best practice relating to the solutions, identified in step 4, can then be followed and implemented.

With reference to figure 4.10, each of the steps and elements of framework 9 will now be discussed in greater detail.

- *Step 2: Identify reverse logistics problems and challenges*

As mentioned previously, the focus of framework 9 is on *problems between upstream reverse logistics partners*. In this step, reference is made to framework 3 and section 3.2.5 in chapter 3. In section 3.2.5, the problems that can be experienced among reverse logistics partners were discussed. In the literature it was found that the most common problems included a lack of collaboration, communication and support from channel members.

- *Step 3: Suggest possible solutions to overcome the problems and challenges in reverse logistics*

From framework 9 (see figure 4.10) it is evident that numerous solutions can be used to overcome the problems between reverse logistics partners. Reference was made to framework 4 and the relevant sections in chapter 3. The solutions included the following:

  - *Solutions relating to information* were discussed in section 3.3.1 in chapter 3. In this instance, organisations can either choose to invest in capable IT (see section 3.3.1.1) or implement appropriate information systems (see section 3.3.1.3) to sort out problems with reverse logistics partners.

  - *Human and management-related solutions* were discussed in section 3.3.3 in chapter 3. As mentioned earlier, there are numerous solutions in this category (see framework 4 and sections 3.3.3.1 to 3.3.3.5). If section 3.3.3 is consulted, it will become evident that organisations can only consider the establishment of policies, guidelines and programmes for reverse logistics to solve problems with reverse logistics partners (see section 3.3.3.2).

  - *Outsourcing as a solution* was discussed in section 3.3.4 in chapter 3. If this section is consulted, it is evident that organisations can consider outsourcing to 3PRL providers if they experience any problems with their reverse logistics partners.

  - *Reverse supply chain partnerships as a solution* was discussed in section 3.3.5 in chapter 3.In section 3.3.5 it is clear that there are a number of different solutions that organisations can apply to overcome problems between reverse logistics partners. This is evident in the best practices discussed below.

- *Step 4: Consult and implement best practices based on solutions in reverse logistics*

In step 4, the following best practices can be consulted or implemented in order to overcome problems between upstream reverse logistics partners:

  - If *solutions relating to information* are considered, organisations can invest in capable IT and/or make use of appropriate information systems for reverse logistics. From table 4.1 (see section 4.7.1) it is clear that organisations can invest and apply the right state-of-the-

art technology, which will improve communication between the reverse supply chain partners. Organisations can also implement accurate and flexible information systems that are compatible with other members of the supply chain. The final option in this section is to implement an RLMS which will promote partnership collaboration.

- If *human and management-related solutions* are considered, organisations can establish policies, guidelines and programmes for reverse logistics. If table 4.3 in section 4.7.3 is consulted, it is evident that organisations should establish clear and uniform policies for reverse logistics. This will help promote supply chain collaboration. Hence if these best practices are implemented, they can assist organisations to overcome the problems with reverse logistics partners.

- If organisations decide on *outsourcing as a solution*, they can make use of 3PRL providers since these service providers can assist the overall reverse supply chain with their expertise in the reverse logistics process (see table 4.4 in section 4.7.4).

- If organisations were to consider *reverse supply chain partnerships as a solution*, they could leverage a partnership network or create alliances which would enable them to overcome a lack of support from other channel members. Organisations can also engage with partners through contractual processes which will improve communication. Best practices in this category are provided in table 4.5 in section 4.7.5.

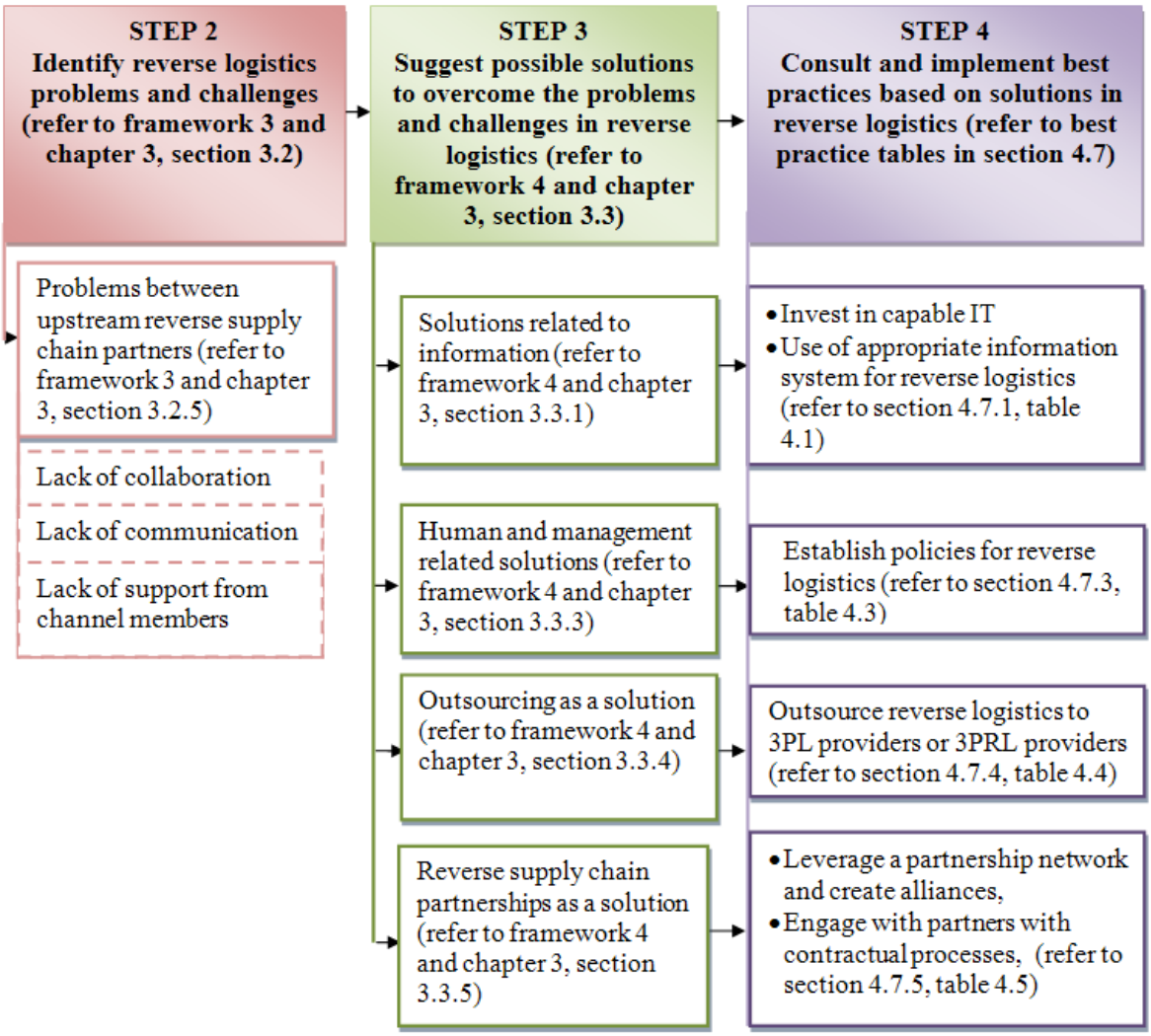

Figure 4.10: Framework 9: conceptual best practice framework for finding possible solutions for problems between upstream reverse logistics partners

It should be clear that framework 9 provides a guideline for organisations experiencing problems with reverse logistics partners. This framework was developed from findings in the literature (see chapter 3). In the next section, framework 10 will be illustrated and explained.

4.6.6 Framework 10: conceptual best practice framework for finding possible solutions for customer-related problems in reverse logistics

Framework 10 is the final framework in the series of detailed frameworks that were developed. Figure 4.11 on page 107 illustrates framework 5. The focus of this framework is on customer-related problems in reverse logistics as discussed in chapter 3. This part of the framework represents step 2 in framework 1.

The second part or step 3 of the framework suggests the possible solutions to customer-related problems in reverse logistics. Any of these possible solutions can be applied to overcome problems relating to customers (see framework 4). In the final part or step 4 of the framework, the particular best practices relating to the solutions can be consulted and implemented.

With reference to figure 4.11, each of the steps and elements of framework 10 will now be discussed in more detail.

- *Step 2: Identify reverse logistics problems and challenges*

It is clear from figure 4.11 that the focus of framework 10 is on the *customer-related problems in reverse logistics.* In step 2, reference is made to framework 3 and section 3.2.6 in chapter 3. This section provided a detailed discussion of problems relating to customers in reverse logistics. Two main areas of concern were identified in this section, namely a lack of communication and rule enforcement, as well as problems in terms of customer experience and dissatisfaction (see framework 3).

- *Step 3: Suggest possible solutions to overcome the problems and challenges in reverse logistics*

It is clear from framework 10 (figure 4.11) that organisations can consider various solutions to resolve problems relating to customers in reverse logistics. Reference was made to framework 4 and the relevant sections in chapter 3. The specific solutions applicable to framework 10 include the following:

  - *Solutions relating to information* were discussed in section 3.3.1 in chapter 3. If section 3.3.1 is consulted, it is clear that solutions in all three categories relating to information can help to sort out customer-related problems in reverse logistics (see sections 3.3.1.1 to 3.3.1.2). Organisations can thus invest in capable IT, make use of information management and data collection and/or utilise appropriate information systems for reverse logistics to come to grips with customer-related problems in reverse logistics.

  - *Solutions relating to reverse logistics flows and processes* were discussed in section 3.3.2 in chapter 3. As previously stated, solutions in this section include solutions pertaining to the reverse logistics process, gatekeeping and centralisation (see framework 4 and sections

3.3.2.1 to 3.3.2.3). If section 3.3.2 is consulted, it will also become apparent that organisations can make use of solutions relating to the reverse logistics process (section 3.3.2.1) to overcome customer-related problems.

- *Human and management-related solutions* were discussed in section 3.3.3 in chapter 3. As mentioned earlier, there are numerous solutions in this category (see framework 4) which were discussed in subsections 3.3.3.1 to 3.3.3.5. If section 3.3.3 is studied, it will become evident that the solutions applicable to customer-related problems in reverse logistics include strategies and planning for reverse logistics, the establishment of policies, guidelines and programmes for reverse logistics and staff training for reverse logistics.

- *Reverse supply chain partnerships as a solution* was discussed in section 3.3.5 in chapter 3. If this section is consulted, it will become clear that organisations should develop long-term relationships with partners which will enable them to overcome problems with customers in reverse logistics.

- *Step 4: Consult and implement best practices based on solutions in reverse logistics*

In step 4, the following best practices can be consulted or implemented in order to solve customer-related problems in reverse logistics:

- If *solutions relating to information* are considered, a number of best practices can be implemented for customer-related problems in reverse logistics. If table 4.1 (see section 4.7.1) is consulted, it will become evident that the following best practices can assist organisations with problems and challenges relating to their customers:
  - Invest and apply the correct state-of-the-art technology.
  - Establish effective data collection processes.
  - Implement accurate and flexible information systems.
  - Utilise the internet or establish a web-based approach.
  - Implement and utilise an RLS.
  - Implement a fast return system.
  - Utilise or implement an RMA system.
  - Utilise or implement a KMS.

- As mentioned earlier, if organisations were to consider *solutions relating to reverse logistics flows and processes*, they could make use of solutions applicable to the reverse logistics process. Reference is made to table 4.2 in section 4.7.2. In this instance, organisations could establish a reverse logistics process that is uncomplicated, convenient and quick.

- In terms of *human and management-related solutions*, organisations can implement a number of best practices. If table 4.3 in section 4.7.3 is consulted, it will become evident that organisations can implement a customer-focused strategy, create formal return policies, establish customer-focused policies and develop a well-managed, innovative, sophisticated and formalised return policy. The final option in this category is for organisations to train their staff in consulting customers on products, which will reduce return incidences and improve customer satisfaction.

Finally, if organisations wish to explore *reverse supply chain partnerships as a solution*, they should build and develop a long-term partnership based on mutual trust and commitment with other channel members in order to improve customer services and create customer satisfaction. Best practices in this category are highlighted in table 4.5 in section 4.7.5.

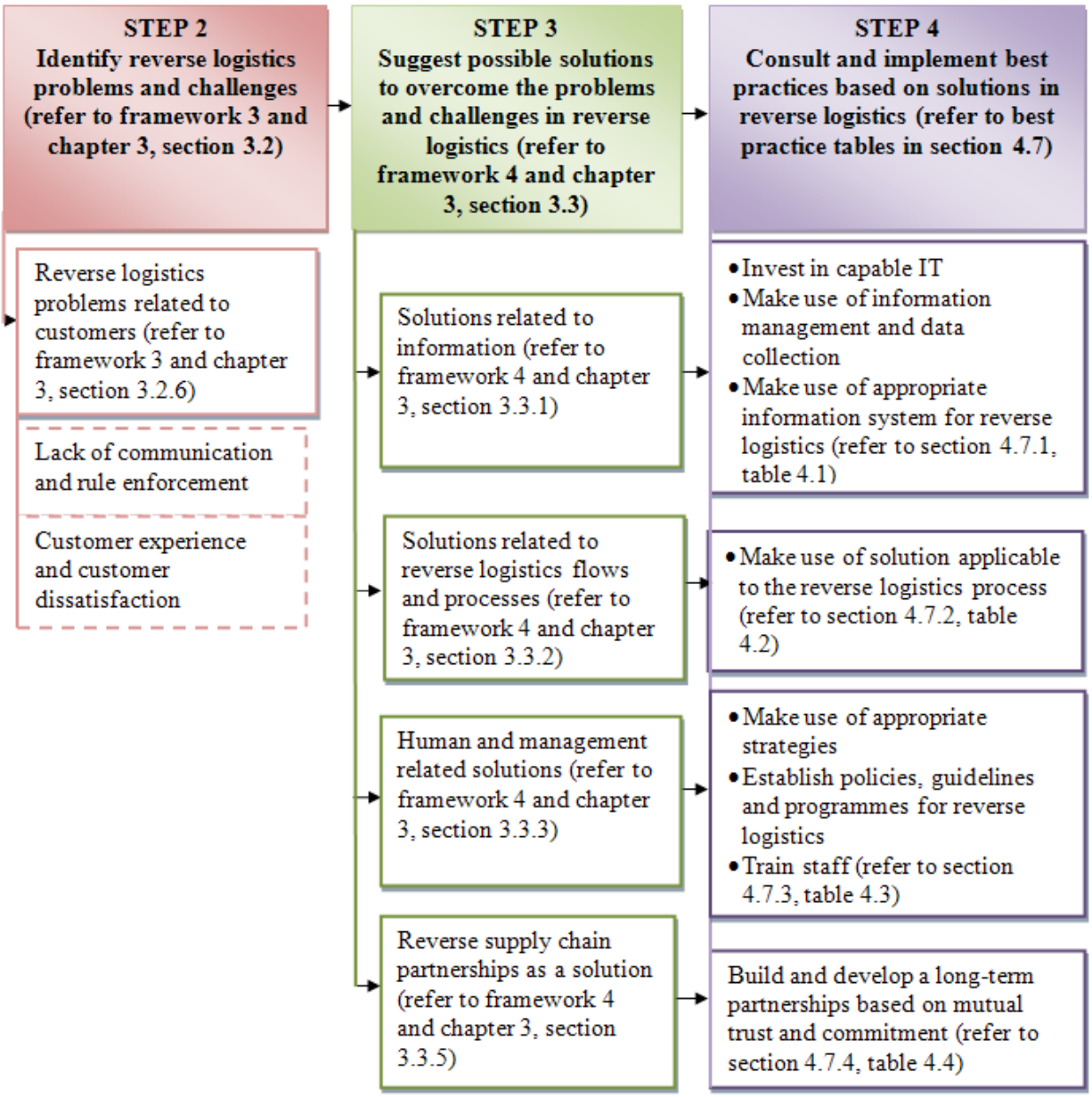

Figure 4.11: Framework 10: conceptual best practice framework for finding possible solutions for customer-related problems in reverse logistics

Framework 10 provides a guideline for organisations experiencing customer-related problems in the reverse logistics process. Framework 10 is also the final framework of all the frameworks that were developed for the purpose of this study. Framework 10 is also conceptual and based on the findings in chapter 3. In the next section, the best practices in reverse logistics are presented in a series of tables and explained in relevant sections.

4.7 BEST PRACTICES IN REVERSE LOGISTICS

This section presents the reverse logistics best practice tables. These tables were referred to in the previous sections, and based on the solutions discussed in chapter 3.

There are five tables in this section which are presented and described in sections 4.7.1 to 4.7.5. Each table is based on the solution categories (see framework 4 and chapter 3, section 3.3) and its title is as follows:

- Table 4.1: Best practices relating to information
- Table 4.2: Best practices relating to reverse logistics flows and processes
- Table 4.3: Human and management-related best practices
- Table 4.4: Outsourcing as a best practice
- Table 4.5: Best practices relating to reverse supply chain partnerships

The format of the tables is the same. Each table has four columns, containing the solution dimensions, best practices, problems and challenges and justification for best practices. In each table, the subsections or categories of the solutions are given in rows. Reference was made to the relevant frameworks and sections in chapter 3. The rows also contain the best practices, problems and challenges and the justification for the best practices, which is relevant to the solution category.

The tables contain the following information:

- The *first column* provides the main solution categories. Reference is made to relevant frameworks and section 3.3 in chapter 3, which discusses these solutions.

- The *second column* contains the relevant best practices. Reference is to the various subsections in section 4.6 of this chapter. The literature source is also indicated since these best practices were identified in the literature.

- The *third column* indicates the problems and challenges in reverse logistics. This is necessary because the specific problems and challenges have to be addressed if these best practices are to be implemented. Reference is made to each relevant framework that the

specific problem represents as well as the relevant sections in chapter 3.

- The *final column* contains the justification for the best practices. As in the best practices, literature references are also provided since these justifications are based on various literature sources. These justifications are also given section 3.3, in addition to the best practices in chapter 3.

In the following sections, each best practice table in reverse logistics is provided together with a short introduction to each. The above should be kept in mind because it is applicable to each table and will not be repeated in the sections to follow.

4.7.1 Best practices in reverse logistics relating to information

In this section, the best practices in reverse logistics relating to information are outlined in table 4.1. Reference is made to section 3.3.1 in chapter 3, as well as the relevant frameworks that are applicable to solutions pertaining to information.

Table 4.1 serves as a reference guide to the frameworks developed for the purpose of this study. Hence organisations that are considering overcoming certain problems and challenges in reverse logistics, with solutions relating to information, can consult table 4.1 for guidance.

Table 4.1: Best practices relating to information

SOLUTION DIMENSION (see framework 4 and chapter 3, section 3.3)	BEST PRACTICE (see frameworks 5–10, section 4.6 and chapter 3, section 3.3)	PROBLEMS AND CHALLENGES (see framework 3 and chapter 3, section 3.2)	JUSTIFICATION FOR BEST PRACTICE IMPLEMENTATION (see chapter 3, section 3.3)
INVEST IN CAPABLE IT (see frameworks 5, 6, 9 and 10 and chapter 3, section 3.3.1.1)	**Invest in wireless technology (e.g. RFID)** (Caston, 2008:34) **Invest and apply the correct state-of-the-art technology** (Pollock, 2008:25; Schatteman, 2003:276) *(See sections 4.6.1, 4.6.2, 4.6.5 and 4.6.6)*	**Costs associated with reverse logistics** (see framework 5 and chapter 3, section 3.2.1) **Lack of appropriate information systems for reverse logistics** (see framework 6 and chapter 3, section 3.2.2):	• Reduce manpower and human error • Cut costs • Improve bottom line (Caston, 2008:34) • Reduce operating cost (Pollock, 2008:25) • Increase customer

		• Insufficient IT investment • Low reliability of IT solutions **Customer-related problems** (see framework 10 and chapter 3, section 3.2.6)*:* • Lack of communication • Customer experience and dissatisfaction **Problems between upstream reverse logistics partners** (see framework 9 and chapter 3, section 3.2.5): • Lack of communication	satisfaction • Improve business performance • Improve communication between supply chain partners and return processes (Schatteman, 2003:276)
INFORMATION MANAGEMENT AND DATA COLLECTION **(see frameworks 5, 6, 7 and 10 and chapter 3, section 3.3.1.2)**	**Apply an integrated information management approach** (Jayaraman et al., 2008:416) *(See sections 4.6.2 and 4.6.3)* **Utilise returns data** (Harps, 2003:3) *(See section 4.6.3)* **Establish effective data collection** (O'Neill & Chu, 2008:8; Rupnow, 2010:50; Rupnow, 2006:30) *(See sections 4.6.1 and 4.6.6)*	**Cost associated with reverse logistics** (see framework 5 and chapter 3, section 3.2.1) **Lack of information visibility and capability** (see framework 6 and chapter 3, section 3.2.2.3) **Uncertainty of product returns** (see framework 7 and chapter 3, section 3.2.3.1) **Customer-related problems** (see framework 10 and chapter 3, section 3.2.6):	• Predict uncertainty • Exert a buffer action of information • Exchange validity of information of physical resources (Jayaraman et al., 2008:416) • Reduce returns (Harps, 2003:3) • Reduce returns incidences • Improve customer service • Reduce costs (O'Neill & Chu, 2008:8; Rupnow, 2010:50; Rupnow, 2006:30)

	Incorporate data management (Zheng et al., 2005:853) *(See section 4.6.2)*	• Lack of communication • Customer experience and dissatisfaction	• Track the flow of information • Distinguish the rate of return goods • Improve the reliability of the product • Identify problems in the reverse logistics process (Zheng et al., 2005:853)
APPROPRIATE INFORMATION SYSTEMS FOR REVERSE LOGISTICS: (see frameworks 5–10 and chapter 3, section 4.3.1.3)			
(a) Standard information systems ***(See frameworks 5, 6 and 8-10)***	**Implement an accurate and flexible information system** (Monaham et al., 2004:21; Harps, 2003:7; Harrington, 2006:15; Rogers & Tibben-Lembke, 1998:191; Zheng et al., 2005:852) *(See sections 4.6.4-4.6.6)* **Automate information system** (Hammrich, 2007:28) *(See sections 4.6.1 and 4.6.6)* **Implement an information system that is compatible with other members of the supply chain** (Daugherty et al., 2002:89)	**Cost associated with reverse logistics** (see framework 5 and chapter 3, section 3.2.1) **Lack of appropriate information systems for reverse logistics** (see framework 6 and chapter 3, section 3.2.2): • Insufficient IT investment • Low reliability of IT solutions • Lack of information visibility **Organisational and management problems** (see framework 8 and chapter 3, section 3.2.4): • Lack of strategic planning to include	• Improve efficiency and effectiveness of the reverse logistics process • Integrate current and future partners • Increase customer satisfaction (Monaham et al., 2004:21; Harps, 2003:7; Harrington, 2006:15; Rogers & Tibben-Lembke, 1998:191; Zheng et al., 2005:852) • Assist in strategic decision making (Lee et al., 2002:155) • Improve information visibility • Reduce costs (Hammrich, 2007:28) • Improve

	(See sections 4.6.2 and 4.6.5)	reverse logistics • Lack of departmental collaboration and communication **Problems between upstream reverse logistics partners** (see framework 9 and chapter 3, section 3.2.5): • Lack of collaboration • Lack of communication • Lack of support from channel members **Customer-related problems** (see framework 10 and chapter 3, section 3.2.6): • Lack of communication • Customer experience and dissatisfaction	communication in the reverse supply chain • Ensure effective information sharing between partners (Daugherty et al., 2002:89)
(b) Internet and web-based system ***(See frameworks 6, 7 and 10)***	**Utilise the internet or establish a web-based approach** (Hammrich, 2007:28; Patrican & Kirk, 2009:14; Rukavina in Walsh, 2007:43) *(See sections 4.6.2, 4.6.3 and 4.6.6)* **Implement a web-based system** (Rukavina in Walsh, 2007:43) *(See section 4.6.2)*	**Lack of appropriate information systems for reverse logistics** (see framework 6 and chapter 3, section 3.2.2): • Insufficient IT investment • Low reliability of IT solutions • Lack of information visibility	• Improve information visibility (Hammrich, 2007:28; Patrican & Kirk, 2009:14; Rukavina in Walsh, 2007:43) • Capture the reasons for returns • Determine the quality of new products

		Uncertainty about product returns (see framework 7 and chapter 3, section 3.2.3.1) **Customer-related problems** (see framework 10 and chapter 3, section 3.2.6): • Lack of communication • Customer experience and dissatisfaction	• Evaluate customer return habits (Hammrich, 2007:28) • Provide real-time information • Provide data integrity • Make electronic data transfers possible (Rukavina in Walsh, 2007:43)
(c) Specific reverse logistics systems *(see frameworks 5-10)*	**<u>Reverse logistics management systems</u>** **Utilise and implement an RLMS or RLS** (Blumberg, 2006:57; Rupnow, 2011:35) *(See sections 4.6.1 – 4.5.6)* **<u>Special returns software and return systems</u>** **Utilise special returns software** (Rukavina in Walsh, 2007:43) *(See section 4.6.3)* **Implement a fast return system** (Riedel in Biederman, 2004:1; Enarsson, 2006:186) *(See section 4.5.6)*	**Cost associated with reverse logistics** (see framework 5 and chapter 3, section 3.2.1) **Lack of appropriate information systems for reverse logistics** (see framework 6 and chapter 3, section 3.2.2): • Insufficient IT investment • Low reliability of IT solutions • Lack of information visibility **Problems with product returns and reverse logistics processes** (see framework 7 and chapter 3, section 3.2.3): • Uncertainty of product returns • Time and money spent on determining the most suitable disposition option	• Create information knowledge and wisdom (Rupnow, 2011:35) • Assist with the inspection of returned goods • Facilitate the disposition process • Facilitate monitoring and evaluating product return flows (Rukavina in Walsh, 2007:43) • Cover gaps not addressed by ERP • Provide tools for visibility • Automate processes • Assist in the decision-making process • Assist in partnership collaboration and departmental coordination (Rupnow, 2011:35)

	<u>Return merchandise authorisation (RMA) system</u> **Utilise an RMA system** (Dampier, 2006:22; Mollenkopf & Closs, 2005:42; Patrican & Kirk, 2009:14; Stock in Kuzeljevich, 2004:38) *(See sections 4.6.1 – 4.5.3 and 4.6.6)* **Implement a web-based RMA system** (Reece & Norman, 2006:1) *(See section 4.6.1)*	**Organisational and management-related problems** (see framework 8 and chapter 3, section 3.2.4): • Lack of strategic planning to include reverse logistics • Lack of departmental collaboration and communication **Problems between reverse logistics partners** (see framework 9 and chapter 3, section 3.2.5): • Lack of collaboration • Lack of communication • Lack of support from channel members **Customer-related problems** (see framework 10 and chapter 3, section 3.2.6): • Lack of communication • Customer experience and dissatisfaction	• Overcome problems with information visibility • Reduce costs • Improve customer satisfaction (Blumberg, 2006:57) • Important for customer service • Improve sales • Gain market share (Riedel in Biederman, 2004:1; Enarsson, 2006:186) • Overcome uncertainty in timing of product returns • Reduce costs • Create visibility • Identify reasons for returns • Improve customer service • Collect information on individual return items • Overcome forecast problems (Dampier, 2006:22; Mollenkopf & Closs, 2005:42; Patrican & Kirk, 2009:14; Stock in Kuzeljevich, 2004:38) • Cut costs • Achieve return on investment (Reece & Norman, 2006:1)
(d) Other appropriate systems ***(See frameworks 5-7 and 10)***	**Utilise/implement KMS** (Cope, 2008:23) *(See sections 4.6.1, 4.5.2 and 4.6.6)*	**Cost associated with reverse logistics** (see framework 5 and chapter 3, section 3.2.1)	• Improve customer service • Reduce costs • Improve information flow (Cope, 2008:23)

		Lack of appropriate information systems for reverse logistics (see framework 6 and chapter 3, section 3.2.2): • Insufficient IT investment • Low reliability of IT solutions • Lack of information visibility **Customer-related problems** (see framework 10 and chapter 3, section 3.2.6): • Lack of communication • Customer experience and dissatisfaction	
	Utilise/implement WMS (Rukavina in Walsh, 2007:43) *(See sections 4.6.1 – 4.5.3)*	**Cost associated with reverse logistics** (see framework 5 and chapter 3, section 3.2.1) **Lack of appropriate information systems for reverse logistics** (see framework 6 and chapter 3, section 3.2.2): • Insufficient IT investment • Low reliability of IT solutions • Lack of information visibility	• Assist with the handling of product returns • Gain control over handling of returned goods • Reduce freight costs • Improve inventory record accuracy, data entry and data accuracy (Rukavina in Walsh, 2007:43)

		Problems with product returns and reverse logistics processes (see framework 7 and chapter 3, section 3.2.3): • Uncertainty of product returns • Time and money spent on determining the most suitable disposition option	
	Utilise/implement TMS (Rukavina in Walsh, 2007:43) *(See sections 4.6.1 and 4.5.3)*	**Cost associated with reverse logistics** (see framework 5 and chapter 3, section 3.2.1) **Problems with product returns and reverse logistics processes** (see framework 7 and chapter 3, section 3.2.3): • Uncertainty of product returns • Time and money spent on determining the most suitable disposition option	• Improve visibility problems • Reduce transport and handling cost (Rukavina in Walsh, 2007:43)

Table 4.1 is the first table that was developed for the purpose of this study. It should be clear that this table is applicable to the solutions relating to information. The next section includes the best practice table in reverse logistics with regard to reverse logistics flows and processes.

4.7.2 Best practices in reverse logistics relating to reverse logistics flows and processes

In this section, the best practices in reverse logistics relating to reverse logistics flows and processes are outlined in table 4.2. Reference is made to section 3.3.2 in chapter 3, as well as the relevant frameworks that are applicable to solutions pertaining to reverse logistics flows and processes.

Table 4.2 serves as a reference guide to the frameworks that were developed for the purpose of this study. Hence organisations considering overcoming certain problems and challenges in reverse logistics, with solutions relating to reverse logistics flows and processes, can consult table 4.2 for guidance.

Table 4.2: Best practices relating to reverse logistics flows and processes

SOLUTION DIMENSION (see framework 4 and chapter 3, section 3.3)	BEST PRACTICE (see frameworks 5–10, section4.6 and chapter 3, section 3.3)	PROBLEMS AND CHALLENGES (see framework 3 and chapter 3, section 3.2)	JUSTIFICATION FOR BEST PRACTICE IMPLEMENTATION (see chapter 3, section 3.3)
REVERSE LOGISTICS PROCESS (see frameworks 5, 7 and 10 and chapter 3, section 3.3.2.1)	**Streamline the reverse logistics process** (Patrican & Kirk, 2009:15; Riedel, 2004:1) *(See section 4.6.1)* **Manage the reverse flows and set structured processes** (Verstrepen & Neyens, 2007:38) *(See section 4.6.1)*	**Cost associated with reverse logistics** (see framework 5 and chapter 3, section 3.2.1)	• Reduce manpower and human error • Increase bottom-line profitability (Patrican & Kirk, 2009:15; Riedel, 2004:1) • Realise cost savings (Verstrepen & Neyens, 2007:38)
	Automate the entire reverse logistics process (Kim, 2001:2; Norman & Sumner, 2007:2; Patrican & Kirk, 2009:14; Pollock, 2010:9) *(See sections 4.6.1 and 4.6.3)*	**Cost associated with reverse logistics** (see framework 5 and chapter 3, section 3.2.1) **Problems with product returns and reverse logistics processes** (see framework 7 and chapter 3, section 3.2.3): • Uncertainty of product returns • Time and money spent on determining the most suitable disposition option	• Cut cost (Gartner in Rowlands, 2002:2) • Create visibility in the supply chain • Reduce shipping and labour cost (Hammrich, 2007:28) • Realise cost savings (Kim, 2002:2; Norman & Sumner, 2007:2; Patrican & Kirk, 2009:14; Pollock, 2010:9) • Facilitate assessing the return product • Determine the condition of return products • Route products to the specific destination

			• Reduce the amount of staff required • Lower production and inventory levels (Kim, 2001:2)
	Standardise and formalise the reverse logistics process (Genchev et al., 2011:257; Patrican & Kirk, 2009:14; Pollock & Dutta, 2009:27; Pollock, 2010:9) *(See sections 4.6.1 and 4.6.3)*	**Cost associated with reverse logistics** (see framework 5 and chapter 3, section 3.2.1) **Problems with product returns and reverse logistics processes** (see framework 5 and chapter 3, section 3.2.3): • Uncertainty of product returns • Time and money spent on determining the most suitable disposition option	• Improve management of reverse logistics process • Reduce costs • Create visibility in returns (Genchev et al., 2011:257; Patrican & Kirk, 2009:14; Pollock & Dutta, 2009:27; Pollock, 2010:9)
	Establish a reverse logistics process that is uncomplicated, convenient and quick (Greer, 2004:1; Murphy, 2007:4; O'Neill & Chu, 2001:8; Rogers, 2010:38; Rupnow, 2010:50; Smith, 2005:170) *(See sections 4.6.1 and 4.6.6)*	**Cost associated with reverse logistics** (see framework 5 and chapter 3, section 3.2.1) **Customer-related problems** (see framework 10 and chapter 3, section 3.2.6): • Lack of communication • Customer experience and dissatisfaction	• Realise cost savings (Greer, 2004:1; Murphy, 2007:4; O'Neill & Chu, 2001:8; Rogers, 2010:38; Rupnow, 2010:50; Smith, 2005:170) • Improve customer satisfaction and experience • Enhance revenue stream that goes directly to the bottom line (Greer, 2004:1; Murphy, 2007:4; O'Neill & Chu, 2001:8; Rogers, 2010:38)

GATE-KEEPING (see frameworks 5 and 7 and chapter 3, section 3.3.2.2)	**Establish a gatekeeper at the start of the reverse logistics process** (Hoffman, 2006:1) *(See section 4.5.6.3)* **Implement a robust gatekeeping function** (Murphy, 2007:4; Patrican & Kirk, 2009:14; ; Ravi & Shankar, 2005:1015; Rogers & Tibben-Lembke, 1998:38) *(See sections 4.6.1 and 4.6.3)*	**Cost associated with reverse logistics** (see framework 5 and chapter 3, section 3.2.1) **Problems with product returns and reverse logistics processes** (see framework 7 and chapter 3, section 3.2.3): • Uncertainty of product returns • Time and money spent on determining the most suitable disposition option	• Help with decision making in the returns process (Hoffman, 2006:1) • Reduce system costs (Rogers & Tibben-Lembke, 1998:38) • Improve reverse flows (Murphy, 2007:4; Patrican & Kirk, 2009:14; Ravi & Shankar, 2005:1015; Rogers & Tibben-Lembke, 1998:38) • Assist in handling and managing of returns • Determine the quality of the product • Facilitate decisions about disposal options (Ravi & Shankar, 2005:1014-1015)
CENTRALI-SATION (see frameworks 5-7 and chapter 3, section 3.3.2.3)	**Separate reverse logistics facilities from forward facilities by establishing central return centres** (Dutton, 2010:1; Gooley, 2002:42; Harrington, 2006:15; Hoffman, 2006:1; Patrican & Kirk, 2009:15) *(See section 4.6.3)* **Centralise return processes** (Lang in Hoffman, 2006:1; Rogers & Tibben-Lembke, 1998:50) *(See sections 4.6.1 -4.6.3)*	**Cost associated with reverse logistics** (see framework 5 and chapter 3, section 3.2.1) **Lack of information visibility and capability** (see framework 6 and chapter 3, section 3.2.2.3) **Problems with product returns and reverse logistics processes** (see framework 7 and chapter 3, section 3.2.3): • Uncertainty of product returns • Time and money spent on determining the most suitable disposition option	• Create a streamlined process (Gooley, 2002:42; Patrican & Kirk, 2009:15) • Improve efficiency • Facilitate the effective handling of returns (Dutton, 2010:1; Gooley, 2002:42; Harrington, 2006:15; Hoffman, 2006:1; Patrican & Kirk, 2009:15) • Prevent reverse bottlenecks (Lang in Hofmann, 2006:1) • Save costs • Improve quality • Improve visibility • Improve information management (Rogers & Tibben-Lembke, 1998:50)

Table 4.2 is the second table that was developed for the purpose of this study. It should be clear that this table is applicable to the solutions relating to reverse logistics flows and processes. In the next section, the best practice table in reverse logistics regarding human and management-related solutions is provided.

4.7.3 Human and management-related best practices in reverse logistics

In this section, the human and management-related best practices are highlighted in table 4.3. Reference is made to section 3.3.3 in chapter 3, as well as relevant frameworks, that are applicable to human and management-related solutions.

Table 4.3 serves as a reference guide to the frameworks that were developed for the purpose of this study. Hence organisations that are considering overcoming certain problems and challenges in reverse logistics pertaining to human and management-related solutions, can consult table 4.3 for assistance.

Table 4.3: Human and management-related best practices

SOLUTION DIMENSION (see framework 4 and chapter 3, section 3.3)	BEST PRACTICE (see frameworks 5–10, section 4.6 and chapter 3, section 3.3)	PROBLEMS AND CHALLENGES (see framework 3 and chapter 3, section 3.2)	JUSTIFICATION FORBEST PRACTICE IMPLEMENTATION (see chapter 3, section 3.3)
STRATEGIES AND PLANNING (see frameworks 7, 8 and 10 and chapter 3, section 3.3.3.1)	**Create a comprehensive strategic plan for reverse logistics** (Ravi & Shankar, 2005:1027) *(See section 4.6.4)*	**Organisational and management-related problems** (see framework 8 and chapter 3, section 3.2.4): • Lack of strategic planning to include reverse logistics • Lack of top management awareness and commitment towards reverse logistics	• Create awareness of the importance of reverse logistics (Ravi & Shankar, 2005:1027)

	Implement a customer-focused strategy (Harps, 2003:4) *(refer to section 4.6.6)*	**Customer experience and dissatisfaction** (see framework 10 and chapter 3, section 3.2.6)	• Improve customer satisfaction (Harps, 2003:4)
	Implement multiple disposition strategies (Stock in Kuzeljevich, 2004:39; Rogers, 2010:39) *(See section 4.6.3)*	**Problems with product returns and reverse logistics processes** (see framework 7 and chapter 3, section 3.2.3): • Uncertainty of product returns • Time and money spent on determining the most suitable disposition option	• Assist in the disposition process • Realise higher recovery rates • Return value of return products (Stock in Kuzeljevich, 2004:39; Rogers, 2010:39)
POLICIES, GUIDELINES AND PRO-GRAMMES (see frameworks 5, 7, 9 and 10 and chapter 4, section 4.3.3.2)	**Establish clear and uniform policies** (Biederman, 2004:1; Monaham et al., 2004:21;Murphy, 2007:6; Patrican & Kirk, 2009:14) *(See sections 4.6.3 and 4.6.5)* **Create formal return policies** (Autry, 2005:750; Genchev et al., 2011:251; Richey et al., 2005b:831) *(See sections 4.6.3 and 4.6.6)* **Develop decision rules** (Mollenkopf & Closs, 2005:43) *(See section 4.6.1)*	**Cost associated with reverse logistics** (see framework 5 and chapter 3, section 3.2.1) **Problems with product returns and reverse logistics processes** (see framework 7 and chapter 3, section 3.2.3): • Uncertainty of product returns • Time and money spent on determining the most suitable disposition option	• Govern disposition of returns (Monaham et al., 2004:21;Murphy, 2007:6; Patrican & Kirk, 2009:14; Richey et al., 2005b:831) • Improve control over returns • Minimise abuse from customer in terms of product returns (Autry, 2005:750; Genchev et al., 2011:251) • Promote supply chain collaboration (Biederman, 2004:1) • Achieve return on investment • Minimise costs (Mollenkopf & Closs, 2005:43) • Reduce returns (Patrican & Kirk, 2009:14; Rogers & Tibben-Lembke,

	Review current return policies and customer service practices (Patrican & Kirk, 2009:14) *(See section 4.6.1)* **Simplify return policies** (Tompkins, 2010:1) *(See section 4.6.3)* **Implement return avoidance policies or zero-return policies** (Patrican & Kirk, 2009:14; Rogers & Tibben-Lembke, 1998:61) *(See section 4.6.3)* **Establish customer-focused policies** (Harps, 2003:4; O'Neill & Chu, 2001:6) *(See sections 4.6.1 and 4.6.6)*	**Problems between reverse logistics partners** (see framework 9 and chapter 3, section 3.2.5): • Lack of collaboration • Lack of support from channel members **Customer-related problems** (see framework 10 and chapter 3, section 3.2.6): • Lack of communication • Customer experience and dissatisfaction	1998:61;Tompkins, 2010:1) • Reduce costs (Patrican & Kirk, 2009:14; Rogers & Tibben-Lembke, 1998:61) • Improve customer service • Realise cost savings (Harps 2003:4; O'Neill & Chu, 2001:6)
	Develop a well-managed, innovative, sophisticated and formalised reverse logistics programme (Autry, 2005:755; Dampier, 2006:22: Dutton, 2010:2; Gooley, 1998:1; Greer, 2004:1; Richey et al., 2005a:235) *(See sections 4.6.1, 4.6.3 and 4.6.6)*	**Cost associated with reverse logistics** (see framework 5 and chapter 3, section 3.2.1) **Problems with product returns and reverse logistics processes** (see framework 7 and chapter 3, section 3.2.3): • Uncertainty of product returns • Time and money spent on	• Improve end-customers experience • Realise cost savings • Improve the management of inventory and return flows • Create a competitive advantage (Autry, 2005:755; Dampier, 2006:22: Dutton, 2010:2; Gooley, 1998:1; Greer, 2004:1; Richey et al., 2005a:235)

		determining the most suitable disposition option **Customer experience and dissatisfaction** (see framework 10 and chapter 3, section 3.2.6)	
MANAGE-MENT AND STAFF (see frameworks 7, 8 and 10 and chapter 3, sections 3.3.3.3 and 3.3.3.4)	**Employ a dedicated manager** (Stock in Harps, 2003:7) **Guidance and support of top management and executive team to implement a successful reverse logistics programme** (Mollenkopf & Closs 2005:42) **Top management who demonstrate commitment to reverse logistics and align it with the organisation's goals** (Ravi & Shankar, 2005:1016) (See section 4.6.4)	**Organisational and management-related problems** (see framework 8 and chapter 3, section 3.2.4): • Lack of strategic planning to include reverse logistics • Shortage of executive managers for reverse logistics • Lack of top management awareness and commitment towards reverse logistics • Resistance to change and the need for new approaches	• Necessary for the successful management of reverse logistics (Dowlatshahi, 2005:3474; Mollenkopf & Closs, 2005:42)
	Train staff in consulting the customers on products (Melzer in Blanchard, 2005:8) **Conduct formal training of employees involved in the reverse logistics process** (Stock in Kuzeljevich, 2004:38) *(See sections 4.6.3-4.6.6)*	**Problems with product returns and reverse logistics processes** (see framework 7 and chapter 3, section 3.2.3): • Uncertainty of product returns • Time and money spent on determining the most suitable disposition option	• Improve customer satisfaction • Reduce returns (Melzer in Blanchard, 2005:8) • Improve the efficiency of the return process (Stock in Kuzeljevich, 2004:38)

		Customer-related problems (see framework 10 and chapter 3, section 3.2.6): • Lack of communication • Customer experience and dissatisfaction	
FUNC-TIONAL DEPART-MENTS (see framework 8 and chapter 4, section 4.3.3.5)	**Establish cross-functional teams** (APQC, 2011:1; Dowlatshahi, 2005:3474; Lang in Hoffman, 2006:1) *(See section 4.6.4)*	**Lack of departmental collaboration and communication** (see framework 8 and chapter 3, section 3.2.4.)	• Improve coordination and communication within the organisation (Lang in Hoffman, 2006:1) • Necessary for the effective design and implementation a reverse logistics (APQC, 2011:1; Dowlatshahi, 2005:3474)

Table 4.3 is the third table that was developed for the purpose of this study. It should be clear that this table is applicable to human and management-related solutions. The next section includes the best practice table in reverse logistics regarding outsourcing as a solution.

4.7.4 Outsourcing as a best practice in reverse logistics

In this section, outsourcing as a best practice in reverse logistics is outlined in table 4.4. References are made to section 3.3.4 in chapter 3, as well as relevant frameworks, that are applicable to outsourcing as a solution.

Table 4.4 serves as a reference guide to the frameworks that were developed for the purpose of this study. Hence organisations considering overcoming certain problems and challenges in reverse logistics, with outsourcing as a solution, can consult table 4.4 for assistance.

Table 4.4: Outsourcing as best practices

SOLUTION DIMENSION (see framework 4 and chapter 3, section 3.3)	BEST PRACTICE (see frameworks 5–10, section 4.6 and chapter 3, section 3.3)	PROBLEMS AND CHALLENGES (see framework 3 and chapter 3, section 3.2)	JUSTIFICATION FOR BEST PRACTICE IMPLEMENTATION (see chapter 3, section 3.3)
OUT-SOURCING (see frameworks 5-9 and chapter 3, section 3.3.4)	**Outsource reverse logistics activities** (IRMS, 2005:1) **Outsource returns to 3PL providers** (TMSi, [s.a.]:3; Witt, 2007:29) **Utilise 3PL providers for reverse logistics** (Bernon et al., 2004:18; Cain, 2008:1; Meng et al., 2009:632; Rukavina in Walsh, 2007:42; Smith, 2005:179) *(See sections 4.6.1 - 4.6.4)*	**Cost associated with reverse logistics** (see framework 5 and chapter 3, section 3.2.1) **Lack of appropriate information systems for reverse logistics** (see framework 6 and chapter 3, section 3.2.2): • Insufficient IT investment • Low reliability of IT solutions • Lack of information visibility and capability **Problems with product returns and reverse logistics processes** (see framework 7 and chapter 3, section 3.2.3): • Uncertainty of product returns • Time and money spent on determining the most suitable disposition option **Organisational and management-related problems** (see framework 8 and chapter 3, section 3.2.4): • Lack of strategic planning to include reverse logistics • Shortage of executive	• Bring expertise, knowledge and experience in reverse logistics (TMSi, [s.a.]:3; Witt, 2007:29) • Realise cost savings (Smith, 2005:179) • Strong information system capabilities (Meng et al., 2009:632) • Provide economies of scale (Bernon et al., 2004:18) • Specialise in the disposition process (Rukavina in Walsh, 2007:42) • Increase efficiency of operations (Haibo, 2008:372)

		managers for reverse logistics • Lack of top management awareness and commitment towards reverse logistics • Lack of departmental collaboration and communication • Resistance to change and the need for new approaches	
	Utilise 3PRL providers (Efendigil et al., 2007:270; Kannan et al., 2009:164; TMSi, [s.a.]:3) *(See sections 4.6.1-4.6.5)*	**Cost associated with reverse logistics** (see framework 5 and chapter 3, section 3.2.1) **Lack of appropriate information systems for reverse logistics** (see framework 6 and chapter 3, section 3.2.2): • Insufficient IT investment • Low reliability of IT solutions • Lack of information visibility and capability **Problems with product returns and reverse logistics processes** (see framework 7 and chapter 3, section 3.2.3): • Uncertainty of product returns • Time and money spent on determining the most suitable disposition option **Organisational and management-related problems** (see framework 8 and chapter 3, section 3.2.4):	• Benefit overall reverse supply chain (TMSi, [s.a.]:2) • Provide opportunity to increase profit margins • Differentiate service from competitors • Attract new clients • Reap benefits of well-managed reverse logistics practices • Improve status in global supply chain networks (Efendigil et al., 2007:270; TMSi, [s.a.]:3) • Provide economies of scale (Kannan et al., 2009:164)

		• Lack of strategic planning to include reverse logistics • Shortage of executive managers for reverse logistics • Lack of top management awareness and commitment towards reverse logistics • Lack of departmental collaboration and communication • Resistance to change and the need for new approaches **Problems between reverse logistics partners** (see framework 9 and chapter 3, section 3.2.4): • Lack of collaboration • Lack of communication	

Table 4.4 is the second last table that was developed for the purpose of this study. It should be apparent that this table is applicable to outsourcing as a solution. The next section includes the best practice table in reverse logistics regarding reverse supply chain partnerships.

4.7.5 Best practices in reverse logistics relating to reverse supply chain partnerships

In this section, the best practices in reverse logistics relating to reverse supply chain partnerships are outlined in table 4.5. Reference is made to section 3.3.5 in chapter 3 as well as relevant frameworks that are applicable to solutions relating to reverse supply chain partnerships.

Table 4.5 serves as a reference guide to the frameworks that were developed for the purpose of this study. Hence organisations considering overcoming certain problems and challenges in reverse logistics, with reverse supply chain partnerships as a solution, can consult table 4.5 for assistance.

Table 4.5: Best practices relating to reverse supply chain partnerships

SOLUTION DIMENSION (see framework 4 and chapter 3, section 3.3)	BEST PRACTICE (see frameworks 5–10, section 4.6 and chapter 3, section 3.3)	PROBLEMS AND CHALLENGES (see framework 3 and chapter 3, section 3.2)	JUSTIFICATION FOR BEST PRACTICE IMPLEMENTATION (see chapter 3, section 3.3)
Reverse supply chain partnerships (see frameworks 5, 9 and 10 and chapter 3, section 3.3.5)	**Leverage a partnership network and create alliances** (Pollock, 2010:8; Stock, 1998:115) *(See section 4.6.5)* **Engage with partners through contractual processes** (Breen, 2006:546) *(See section 4.6.5)* **Build and develop a long-term partnership based on mutual trust and commitment** (Daugherty et al., 2003:57) *(See section 4.6.6)* **Share and integrate information with supply chain partners** (Rupnow, 2007:1; Olorunniwo & Li, 2010:460) *(See section 4.6.1)*	**Cost associated with reverse logistics** (see framework 5 and chapter 3, section 3.2.1) **Problems between reverse logistics partners** (see framework 9 and chapter 3, section 3.2.5): • Lack of collaboration • Lack of communication • Lack of support from channel members **Customer-related problems** (see framework 10 and chapter 3, section 3.2.6): • Lack of communication • Customer experience and dissatisfaction	• Overcome the lack of support between channel members • Improve returns to the bottom line (Pollock, 2010:8; Stock, 1998:115) • Improve communication between partners (Breen, 2006:546) • Improve performance and management of reverse logistics • Improve customer service • Create customer satisfaction (Daugherty et al., 2003:57) • Minimise cost • Realise faster turnaround times (Rupnow, 2007:1; Olorunniwo & Li, 2010:460)

Table 4.5 is the final table developed for the purpose of this study. It should be clear this table is applicable to the solutions pertaining to reverse supply chain partnerships. In this section, all the tables of best practices in reverse logistics were presented.

4.8 CONCLUSION

In this chapter a series of frameworks and tables was provided for the purpose of finding the best practices in reverse logistics. All the frameworks and tables were based on the literature findings on the topic of reverse logistics.

Framework 1 was illustrated and discussed at the beginning of the chapter (see figure 4.2). This framework represented the main conceptual framework for best practices in reverse logistics. Framework 1 therefore serves as a foundation for the rest of the frameworks as illustrated in this chapter. Framework 1 consists of four steps that are necessary to determine the relevant best practices that require implementation.

The first step was to *determine the maturity level of the organisation* regarding reverse logistics. If it was found that the organisation has a low level of maturity in reverse logistics, the concept of reverse logistics should first be explained to the organisation before the next step can be applied. Framework 2 (see figure 4.3) was developed for this purpose, and it contains all the elements of the concept of reverse logistics. These elements were discussed in chapter 2 and are based on the literature on the topic.

The second step was to *identify reverse logistics problems and challenges.* In this step, organisations should identify the problems and challenges they are experiencing in reverse logistics. Framework 3 (see figure 4.4) was developed for this purpose. This framework 3 outlines the problems and challenges in reverse logistics, as discussed in section 3.2 in chapter 3. These problems and challenges were also based on the findings in the literature.

The third step was to *suggest possible solutions to overcome problems and challenges in reverse logistics.* Framework 4 was developed (see figure 4.5) for this purpose. The solutions provided in framework 4 only represented the main solution categories as discussed in section 3.3 in chapter 3. These solutions were also based on the findings in the literature.

The final step, in framework 1, was to *consult and implement best practices based on solutions in reverse logistics.* A series of more detailed frameworks was developed for the purpose of finding the relevant best practices in reverse logistics (see frameworks 5 to 10 in section 4.6). These frameworks provided more detail on steps 2 to 4 in frameworks 1, 3 and 4.

Frameworks 5 to 10 (see figures 4.6 to 4.11) were each based on the specific problems and challenges in reverse logistics as set out in framework 3. These problems thus represented step 2 in the conceptual framework. The solutions outlined in frameworks 5 to 10 are applicable to the problems and challenges in step 1. These solutions can thus be applied to overcome the specific problem or challenge that an organisation can experience in reverse logistics. These solutions represented step 3 in the conceptual framework. Finally, the relevant best practices that were based on the solutions in step 2 were outlined. These best practices represented step 4 in the conceptual framework.

A series of tables was compiled, providing the best practices in reverse logistics. These tables were used as a reference guide (of literature sources) for frameworks 5 to 10. Each table represented a solution category as was provided in framework 4. These tables contained the solution dimensions, best practices, problems and challenges as well as justification for the best practices. These tables were also based on the literature and compiled on the basis of the findings in chapter 3 of this study.

The next chapter deals with the research methodology of this study.

CHAPTER 5
RESEARCH METHODOLOGY

5.1 INTRODUCTION

Research methodology provides a means to systematically solve a research problem (Kothari, 2004:8). In other words, research methodology is the overall approach the researcher adopts to carry out the research project (Leedy & Ormrod, 2010:12). Chapter 5 describes the methodology used in this research. As mentioned in chapter 1, this study was conducted in several phases. *Phase 1* consisted of an extensive literature study to

- explore the concept of reverse logistics (chapter 2)
- identify the problems and challenges in reverse logistics (chapter 3)
- identify the solutions to overcome the problems and challenges in reverse logistics (chapter 3)
- develop a conceptual framework for best practices in reverse logistics (chapter4)

Phase 2 involved empirical research in which a survey method was used. The purpose of this was to refine the conceptual framework for best practices in reverse logistics in a more practical and workable instrument. The outline of chapter 5 is provided in figure 5.1.

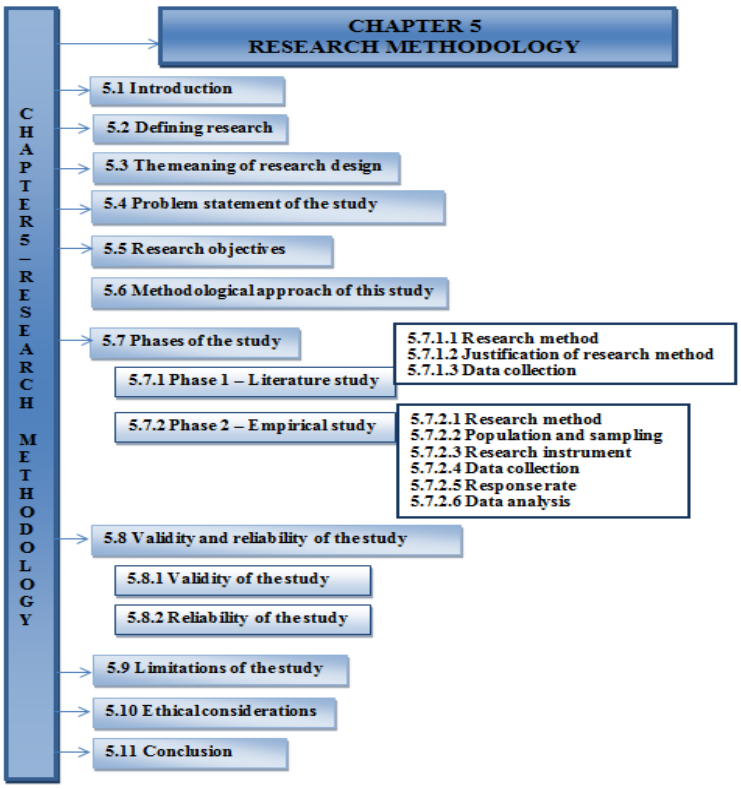

Figure 5.1: Outline of Chapter 5

5.2 DEFINING RESEARCH

According to Brynard and Hanekom (2006:3), research is "a procedure or scientific enquiry by means of which an endeavour is made to obtain answers to questions and to solve identified problems in a systematic manner with the support of verifiable facts. In other words, research can be defined as a "systematic process of collecting, analysing, and interpreting information (data) in order to increase our understanding of a phenomenon about which we are interested or concerned" (Leedy & Ormrod, 2010:2).

Even though research projects differ in complexity and duration, research typically has eight distinctive characteristics (Leedy & Ormrod, 2010:2-3):

- It originates with a question or problem.
- It requires clear articulation of a goal.
- It requires a specific plan for the procedure to be followed.
- It generally divides the principal problem into more manageable subproblems.
- It is guided by the particular research problem, question or hypothesis.
- It accepts certain critical assumptions.
- It requires the collection and interpretation of data in an effort to resolve the problem that initiated the research.
- It is by nature cyclical.

Research is therefore the pursuit of truth by means of study, observation, comparison and experiment. It is the objective and systematic search for knowledge in order to find solutions to problems. The purpose of research is to find answers to questions through the application of scientific procedures, and the core aim is to find the truth which is hidden and waiting to be discovered (Kothari, 2004:1-2).

5.3 THE MEANING OF RESEARCH DESIGN

Research design can be defined as "plans and the procedures for research that span the decisions from broad assumptions to detailed methods of data collection and analysis" (Creswell, 2009:3). In other words, research design is a master plan that stipulates the methods and processes for collecting and analysing the required information (Zikmund, Babin, Carr & Griffing, 2010:657).

Research design can be placed in three main categories, namely exploratory, descriptive and causal research. Each of the categories is described as follows:

- *Exploratory research* is conducted to clarify uncertain situations or determine possible business opportunities (Zikmund et al., 2010:54). The main purpose of exploratory research is that of formulating a problem for a more detailed investigation or developing the working hypotheses from an operational standpoint. The main emphasis thus lies on finding ideas and insights (Kothari, 2004:36).The research methods used in an exploratory research design are qualitative, which includes literature reviews as well as in-depth interviews (Tustin et al., 2005:84).

- *Descriptive research* describes the characteristics of objects, people, groups, organisations or environments. In contrast to exploratory research, descriptive studies are conducted after the researcher has gained a firm understanding of the situation being studied (Zikmund, et al., 2010:55). The main purpose of descriptive research is to describe the state of affairs as it exists at present (Kothari, 2004:2). Descriptive research is usually concerned with measuring or estimating the sizes, quantities or frequencies of things (Kent, 2007:18). The research methods used in descriptive studies are structured and quantitative. Typical descriptive approaches include in-house personal interviews, intercept surveys, telephone interviewing, mail surveys and on-line quantitative surveys (Tustin et al., 2005:86).

- *Causal research* seeks to identify a cause-and-effect relationship, which means it brings it about or makes it happen. Before causal research studies are conducted, the researcher usually has a sound understanding in the phenomenon being studied (Zikmund et al., 2010:57).

In essence, research design is a procedural plan adopted by the researcher to answer questions validly, objectively, accurately and economically. Hence through research design, the researcher (Kumar, 2005:84)

- conceptualises an operational plan to take on different procedures and tasks required to complete a research study

- ensure that these procedures are adequate to achieve valid and accurate answers to research questions

5.4 PROBLEM STATEMENT OF THIS STUDY

There are pressures on organisations to act responsibly in terms of the protection of the environment and create value for all stakeholders (Nylund, 2012:9). This includes responsibility towards the internal and external customers of the organisation. If organisations do not have policies and systems in place regarding the return, repair and reuse of goods and the removal of scrap (reverse logistics elements) they will harm their image, frustrate internal customers and lose external customers (Jayaraman & Luo, 2007:56).

Reverse logistics can cause considerable cost but also provides numerous opportunities and can therefore be regarded as a key element and part of the supply chain, even though it is often hidden (Horowitz, 2010:1). There are major barriers and obstacles, which make it difficult to manage reverse logistics efficiently and proactively (Ravi & Shankar, 2005:1012; Zheng, et al., 2005:852). Therefore many organisations ignore reverse logistics functions and regard them as a nuisance (Greve, 2010:1; Daugherty, Richey, Genchev & Chen, 2005:78).

From the literature it is clear that the problem is that organisations do not know where to start, what processes and procedures to follow and how to manage the process efficiently and effectively. This study will endeavour to make a contribution to the problems and challenges that organisations face with regard to reverse logistics, by identifying solutions and providing best practices that will enable organisations to successfully implement and manage their reverse logistics processes.

The problem statement in this study was therefore formulated as follows:

What are the best practices in reverse logistics that could be included in a framework to assist organisations to overcome problems and challenges in reverse logistics as well as improve and effectively manage their reverse logistics processes?

5.5 RESEARCH OBJECTIVES

The primary objective of this study was to *determine the best practices in reverse logistics and compile a framework to help organisations manage their reverse logistics more efficiently.*

The secondary objectives in this study were to

(1) investigate the concept of reverse logistics
(2) determine the importance of reverse logistics
(3) explore the drivers and benefits of reverse logistics
(4) explore all the dimensions and elements of reverse logistics
(5) identify the problems and challenges in reverse logistics
(6) find solutions to the problems and challenges in reverse logistics
(7) compile a conceptual best practice framework based on the literature study
(8) seek inputs from industry in order to refine the best practice framework into a workable instrument in practice

The first six secondary objectives were achieved by conducting an extensive literature study on the topic of reverse logistics. The last secondary objective was achieved by conducting a survey by means of a structured questionnaire.

5.6 METHODOLOGICAL APPROACH ADOPTED IN THIS STUDY

There are three types of research approaches or strategies, namely qualitative research, quantitative research and mixed method research. Creswell (2009:4) describes these research approaches as follows:

- Qualitative research is a means for exploring and understanding the meaning individuals and groups attribute to a social or human problem.
- Quantitative research is a means for testing objective theories by examining the relationship between variables.
- Mixed method research is an approach to inquiry that combines or associates both qualitative and quantitative forms.

Table 5.1 provides an overview of the differences between these research approaches.

Table 5.1: Research approaches

Qualitative, quantitative and mixed method approaches			
Tend to or typically...	**Qualitative approaches**	**Quantitative approaches**	**Mixed method approaches**
Use these philosophical assumptions	• Constructivist/ advocacy/participatory knowledge claims	• Post-positive knowledge claims	• Pragmatic knowledge claims
Employ these strategies of inquiry	• Phenomenology, grounded theory, enthnography, case study and narrative	• Surveys and experiments	• Sequential, concurrent and transformative
Employ these methods	• Open-ended questions, emerging approaches, text or image data	• Close-ended questions, predetermined approaches, numerical data	• Both open- and close-ended questions, both emerging and predetermined approaches and both quantitative and qualitative data analysis
Use these practices of research as the researcher	• Positions himself or herself • Collects participant meanings • Focuses on a single concept or phenomenon • Brings personal values into the study • Studies the context or setting of	• Test or verifies theories or explanations • Identifies variables to study • Relates variables in questions or hypotheses • Uses standards of validity and reliability • Observes and	• Collects both quantitative and qualitative data • Develops a rationale for mixing • Integrates the data at different stages of inquiry • Presents visual pictures of the procedure in the study

	participants • Validates the accuracy of findings • Interprets the data • Creates an agenda for change or reform • Collaborates with participants	measures information numerically • Uses unbiased approaches • Employs statistical procedures	• Employs the practices of both qualitative and quantitative research

Source: Adapted from Creswell (2009:17)

This study followed the mixed method approach. There are different types of mixed method strategies that are is divided into two major categories, namely sequential mixed method strategies and concurrent mixed method strategies (Creswell, 2009:209).

Sequential mixed method strategies include the following (Creswell, 2009:211-213):

- *The sequential explanatory strategy* is characterised by the collection and analysis of qualitative data in the second phase that builds on the outcomes of the initial quantitative findings.
- *The sequential exploratory strategy* entails the first phase of qualitative data collection and analysis, followed by the second phase of quantitative data collection and analysis which builds on the results of the first qualitative phase.
- *The sequential transformative strategy* involves a two-phase research project by means of a theoretical lens, overlaying the sequential processes. This strategy also involves a first phase which can be either qualitative or quantitative followed by a second phase that can also be either qualitative or quantitative.

Concurrent mixed method strategies include the following (Creswell, 2009:213-216):

- The *concurrent triangulation strategy* is an approach in which the researcher gathers both quantitative and qualitative data concurrently and then compares the two databases in order to determine if there is a convergence, difference or a combination of the two. This research strategy consists of one phase in which both the qualitative

and quantitative data are collected at the same time, and the goal is to merge the data or integrate or compare the results of the two databases in a discussion.

- The *concurrent embedded strategy* also takes place in one phase in which both quantitative and qualitative data are collected simultaneously. This approach has a primary method that guides the research project and a secondary database that provides a supportive role in the process.
- The *concurrent transformative strategy* is a approach in which the researcher uses a specific theoretical perspective as well as the concurrent collection of both quantitative and qualitative data, which may be based on ideologies or a conceptual or theoretical framework.

The mixed method approach adopted in this study was a *sequential exploratory strategy*. Emphasis is normally placed on the first phase, and the data are mixed by connecting the qualitative data analysis and the quantitative data collection (Creswell, 2009:211). This strategy is often a procedure of choice where the researcher needs to develop an instrument because the existing instruments are inadequate or unavailable. This approach usually occurs in the following three phases (Creswell, 2009:212):

- In *phase 1,* the researcher first gathers qualitative data and analyse it.
- In *phase 2,* the researcher uses the analysis to develop an instrument.
- In *phase 3,* the researcher administers the instrument to a sample of a population.

The advantage of the sequential exploratory strategy is that it is easy to implement and straightforward to describe and report on. It is also useful for a researcher wishing to explore a phenomenon, but also wanting to expand on the qualitative findings. However, this strategy requires a substantial length of time to complete both data collection phases. Also, the researcher should make key decisions about which findings from the initial qualitative phase will be focused on in the quantitative phase (Creswell, 2009:212)

It is clear from the above explanation, that this study follows a qualitative dominant mixed method approach. In qualitative dominant mixed methods, the researcher is compelled to include quantitative data and approaches in an otherwise qualitative research approach (Johnson et al., 2007:124). A qualitative dominant mixed method approach is thus the "type of research in which one relies on a qualitative, constructivist-poststructuralist-critical view of the research

process, while concurrently recognizing that the addition of quantitative data and approaches are likely to benefit most research projects" (Johnson et al., 2007:124). The nature of this study is therefore both exploratory and descriptive and contains qualitative and quantitative elements. Figure 5.2 illustrates an exploratory mixed method design.

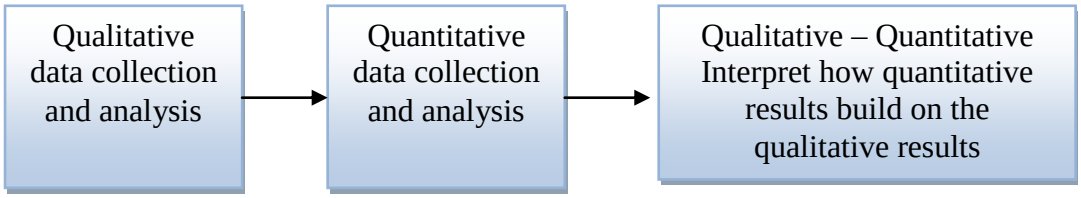

Figure 5.2 Exploratory mixed method design

Source: Ivankova, Creswell and Plano Clark (2009:265)

The exploratory design is used in cases where the researcher first needs to explore a topic using qualitative data before attempting to test or measure the data quantitatively (Ivankova et al., 2009:265). This study was therefore exploratory since a literature study was conducted to

- explore the concept of reverse logistics
- identify problems and challenges in reverse logistics
- identify solutions to overcome the problems and challenges in reverse logistics
- identify the best practices in reverse logistics

However, the study also included descriptive research. As previously mentioned, descriptive research describes the characteristics of objects, people, groups, organisations or environments. In order to refine the framework into a more workable instrument in practice, a survey was conducted by means of a questionnaire. In the next section, the phases of the study will be discussed and more detail provided on the research methods used in the study.

5.7 PHASES OF THE STUDY

This study consisted of two phases. In the first phase, a literature study was conducted in order to achieve the first six objectives of this study. In the second phase, empirical research was conducted in order to attain the final objective of the study. Both of these phases contributed to the primary objective of this study.

5.7.1 Phase 1: Literature study

The main objective of the study was to develop a conceptual framework of best practices in reverse logistics. Based on the literature, best practices in certain industries were identified, analysed and compared, to find generic best practices which could be used to develop a framework that would be applicable in most industries. An exploratory literature study was thus conducted in order to develop a conceptual best practice framework of reverse logistics. In this section, the research method, justification for the research method and the data collection for this phase will be discussed.

5.7.1.1 Research method

In this phase of the study, the research method is qualitative because it can be viewed as a conceptual study. Cooper and Schindler (2006:716) define qualitative research as nonquantitative data collection used to increase understanding of a topic. The defining characteristics of a conceptual study are that it is mostly based on secondary sources, that it critically engages with the understanding of concepts and that it aims to add to an existing body of knowledge and understanding and therefore creates knowledge (Nieuwenhuis, 2009:71).

This research was inductive, which means that it sets out to explore the field. Inductive methods are exploratory, in other words, they seek to build accounts of what is going on from the data collected (David & Sutton, 2004:36). Exploratory research often relies on secondary research such as reviewing available literature and/or data, or other qualitative approaches such as informal discussions with consumers, employees, management or competitors and more formal approaches through in-depth interviews, focus groups, projective methods, case studies or pilot studies. (Saunders, Lewis & Thornhill, 2003:97).

The main purpose of using a literature study is to enable the researcher to develop a sound understanding of and insight into relevant previous research and trends that have emerged (Saunders, Lewis & Thornhill, 2009:61).There are numerous reasons for making use of a literature study, and researchers normally opt for this type of research method because it may (Leedy & Ormrod, 2010:66)

- offer new ideas, perspectives and approaches
- inform the researcher about other researchers who have done work in this area

- indicate how other researchers have handled methodological and design issues
- reveal different sources of data
- introduce the researcher to measurement tools
- reveal methods of dealing with problem situations
- help the researcher to interpret and make use of their findings

Additional reasons could be that it promotes a sound understanding of the issues and debates in a subject area, current theoretical thinking and definitions, and previous studies and their results, which often lead to theoretical insights (Mouton, 2001:180). It also provides a framework for establishing the importance of the study and a benchmark for comparing the results with other findings (Creswell, 2009:25). It therefore enables the researcher to gain perspective on the most recent research findings relating to the topic of research, to obtain an indication of the best methods, instruments for measurement and statistics which can be used and help determine the actuality of the research on a particular topic (Brynard & Hanekom, 2006:38).

5.7.1.2 Justification for the research method

Exploratory studies are generally used when the study area is new or vague and exploration is necessary. The goal is to improve the final research design by becoming familiar with basic facts, developing a picture of what is taking place, generating tentative assumptions and determining the feasibility of more rigorous follow-up. Hence exploratory studies tend to be mainly qualitative (Burns & Burns, 2008:82).

The reason for conducting an extensive literature study is because reverse logistics is a relatively new unrecognised field, especially in South Africa, and only few organisations really understand the importance of reverse logistics. However, some researchers around the world, over the years, have endeavoured to better understand the concept, its importance, benefits, problems, internal and external barriers, and the differences between forward and reverse logistics. It is thus necessary to explore reverse logistics on the basis of the work or research of these scholars.

In short, the reasons for conducting a literature study in this research were as follows:

- It was necessary to find relevant topics for the study to provide a meaningful overview of reverse logistics and its significance.

- The increasing interest in reverse logistics in other countries has resulted in a wealth of literature on the subject. It was thus deemed sufficient to explore the subject based on previous research.
- It was necessary to provide a solid background in order to progress to the aim of providing a general conceptual best practice framework.
- The aim was to develop a conceptual best practice framework in reverse logistics.

5.7.1.3 Data collection

Qualitative data can be obtained from many sources. In this phase of the study, secondary data collection was conducted. Secondary information sources refer to written sources (including the internet) which discuss, comment on, debate and interpret primary sources of information (Mouton, 2001:71).

The types of secondary sources consulted in this study included

- books, conference proceedings and reference materials
- journal articles
- newspapers, magazines and reports
- theses and dissertations
- company and association websites

Most of the sources were found by using the internet through internet search engines and electronic global databases. The majority of the sources are international sources owing to a lack of South African sources. It is also necessary to point out that not all the sources that were consulted were based on scholarly work in the field of reverse logistics. The web pages of numerous companies and associations were consulted to gain a more practical overview in the field of reverse logistics and to identify some of the best practices in reverse logistics. A major source of expert knowledge and opinions in the field of reverse logistics was found in an on-line magazine produced by the Reverse Logistics Association (RLA) which consists of a board of advisors comprising industry experts.

The various sources consulted in this study were used to

- determine the current state of research in reverse logistics
- gain an in-depth understanding into the field of reverse logistics

- identify the problems and challenges in reverse logistics
- find solutions to these problems and challenges
- ultimately identify the best practices in reverse logistics

5.7.2 Phase 2: empirical study

In this phase, an empirical study was conducted in order to obtain practical input from industry experts in South Africa. The aim was to refine the framework that was developed in the first part of the study. The framework developed in the first part of the study was comprehensive and the idea of refining the framework was to streamline it and determine which best practices were less important and could be omitted from the framework. Furthermore, in refining the framework, an effort was made to prioritise the best practices for implementation. In this section, the research method, population and sampling, data collection, response rate and data analysis of the empirical study will be discussed.

5.7.2.1 Research method

The research method selected and identified for this phase of the research study was a survey. In order to refine the framework into a more practical and workable instrument, a survey was deemed the most appropriate method. Survey research involves collecting information on one or more groups of people (Leedy & Ormrod, 2010:187). Surveys provide fast, inexpensive, efficient and accurate means of assessing information about a population (Zikmund et al., 2010:187).

In business research, the most common method of generating primary data is the survey (Zikmund et al., 2010:67). The type of information gathered in a survey differs significantly, depending on its objective (Zikmund et al., 2010:186). A survey method involves studies that are normally quantitative and endeavour to provide a broad overview (Mouton, 2001:152). In other words, a survey design provides a quantitative or numerical explanation of trends, attitudes or views of a population, by studying a sample of that population (Creswell, 2009:145). It is important to note that not all surveys are quantitative. Qualitative surveys normally ask open-ended questions and generally do not create quantitative results (Punch, 2003:3).

Although surveys are typically large in scale in terms of sample sizes, this study involved a small-scale survey because the researcher had a limited pool of respondents and was therefore somewhat limited in the size and scope of the survey (Punch, 2003:3). In the next section, the population and sampling will be discussed in more detail.

5.7.2.2 Population and sampling

In primary research it is important for the researcher to select respondents who are representative of all the elements (population) from which information is required (McDaniel & Gates, 2001:328). A population refers to a group in the universe which has specific characteristics (Brynard & Hanekom, 2006:55).

According to Brynard and Hanekom (2006:54), sampling is a "technique employed to select a small group (the sample) with a view to determining the characteristics of a large group (the population)". Sampling involves any technique that draws conclusions based on the dimensions of a portion of the population. A sample is thus a subset of a large population (Zikmund et al., 2010:68).

Samples are used to (Brynard & Hanekom, 2006:54)

- simplify the research – it is easier to study a representative sample of a population than to study the population in total
- save time – studying an entire population is time-consuming, particularly if the population is large and spread over a large geographical area
- cut costs – distributing questionnaires to the entire population can be costly, especially if the population is large and spread over a large geographical area
- determine specific properties of the whole

Determining a sample requires identifying the types of respondent to be included in the research, the number of respondents needed and the method according to which individual respondents will be selected (Wilson, 2008:153). Important questions to ask in sampling include, who is to be sampled, what the sample size should be and how the sample should be selected (Zikmund et al., 2010:68).

Sampling methods belong to two major classes, namely probability and nonprobability sampling. Probability sampling is a technique in which every member of the population has a known nonzero probability of selection (Maree & Pietersen, 2009c:172; Zikmund et al., 2010:395). In other words, with probability samples, the chance of each case being selected from the population is known and is usually equal for all cases (Saunders, Lewis & Thornhill, 2012:61). There are four types of probability samples, namely simple random, systematic, stratified and cluster sampling (Maree & Pietersen, 2009c:172). Table 5.2 provides a summary of the different probability sampling techniques.

Nonprobability sampling, however, is a technique in which units of the sample are selected on the basis of personal judgement or convenience (Zikmund et al., 2010:395). In nonprobability samples, the probability of each case being selected from the entire population is unknown (Saunders et al., 2009:212). There are four types of nonprobability sampling methods, namely convenience, quota, snowball and purposive sampling (Maree, 2009:176). Table 5.3 provides a summary of the nonprobability sampling techniques.

Table 5.2: Probability sampling techniques

Probability sampling				
Sampling technique	**Description**	**Cost and degree of use**	**Advantages**	**Disadvantages**
Simple random samplings	Every element in the population not already included has the same probability of being selected. The researcher assigns each member of the sampling frame a number and then selects sample units using a random method	High cost, moderately used in practice	• Minimal knowledge of population is needed • Easy to analyse data and compute error	• Requires a sampling frame to work from • Does not use knowledge of population that researcher may have • Large errors for same sampling size than in stratified sampling • Respondents may be widely spread • Cost may be higher

Stratified random sampling	Elements are randomly selected after the population has been stratified according to some characteristics Variations include proportional, disproportional and optimal allocation of subsample sizes	High cost, moderately used	• Ensures representation of all groups in sample • Characteristics of each stratum can be estimated and comparisons made • Reduces variability of same sample size	• Requires accurate information on proportion in each stratum • If stratified list is not available, it may be costly to prepare
Cluster sampling	The population is divided into mutually exclusive groups that are internally heterogeneous for, say, naturally occurring groups. Clusters are then selected randomly	Low cost and frequently used	• If clusters are geographically defined, this may yield lowest field cost • Requires listing of clusters, but individuals only within clusters • Can estimate characteristics of clusters as well as the population	• Large error for comparable size than with other probability samples • Researcher must be able to assign population members to unique clusters or else duplication or omission of individuals will result • If the stratified list is not available, it may be costly to prepare

Systematic sampling	The researcher uses natural ordering, selects an arbitrary starting point and then selects items at a preselected interval. Every k^{th} element is drawn, where k is predetermined	Moderate cost, moderately used	• Simple to draw sample • Easy to check	• If sampling interval is related to periodic ordering of the population it may introduce increased variability

Source: Adapted from Pellissier (2007:32); Zikmund et al. (2010:405)

Table 5.3: Nonprobability sampling techniques

Nonprobability sampling				
Sampling technique	**Description**	**Cost and degree of use**	**Advantages**	**Disadvantages**
Convenience sampling	Items are selected for the convenience of the researcher because they are readily available, nearby or willing to participate	Very low cost, extensively used	• No need for list of population	• Unrepresentative samples likely • Random sampling error estimates cannot be made • Projecting data beyond sample is relatively risky
Judgement sampling/ Purposive sampling	Items are selected or chosen by the sound judgement of the researcher to fulfil a purpose, such as ensuring that all members have certain characteristics	Moderate cost, average use	• Useful for certain types of forecasting • Sample guaranteed to meet specific objectives	• Bias because of researcher's beliefs may make sample unrepresentative • Projecting data beyond sampling is risky

Quota sampling	The population is stratified with respect to some characteristics, and elements are then selected through a nonrandom method	Moderate cost and very extensively used	• If clusters are geographically defined, this can yields lowest field cost • Requires listing of clusters, but individuals only within clusters • Can estimate characteristics of clusters as well as the population	• Introduces bias in researcher's classification subjects • Nonrandom selection within classes means error from population cannot be estimated • Projecting data beyond sample is risky
Snowball sampling	Elements are selected on the basis of referral from other survey respondents who fit the required profile	Low cost, used in special situations	• Useful in locating members of rate populations	• High bias because sample units are not independent • Projecting data beyond sample is risky

Source: Adapted from Pellissier (2007:32); Zikmund et al. (2010:405)

Nonprobability sampling and purposive sampling methods were used for this study. Judgemental sampling is a type of purposive sampling, where the researcher selects sample members to fit some criterion (Cooper & Schindler, 2003:201). It therefore enables researchers to select cases that will best enable them to achieve their research objectives (Saunders et al., 2012:287). In this study it was necessary to select respondents who met certain criteria. Respondents (managers at organisations) who offered reverse logistics as a service or specialised in reverse logistics in South Africa were selected in the sample.

The research population for this research included South African organisations that specialise in reverse logistics or provide logistics as a service to organisations that outsource their logistics functions. In an initial search, using Google, it was found that only a few logistics organisations actually specialise in reverse logistics or provide it as a service in South Africa. Since only these

companies could be included in the study, judgemental sampling was used. The sample included 19 organisations that either specialise in reverse logistics or provide it as service.

In order to increase the sample size, the questionnaire was subsequently also forwarded to the members of the Chartered Institute of Logistics and Transport South Africa (CILTSA). Most of their members do not engage in reverse logistics practices. However, two organisations indicated that they do practice reverse logistics and were willing to participate. Two responses were thus received, which were then included in the sample. The nonprobability sample thus included 21 organisations (see appendix B).

5.7.2.3 Research instrument

A questionnaire was used to collect the primary data needed for this study. Questionnaires are collections of items or questions intended to reveal levels of information not readily observable (Bernhardt & Geise, 2009:37).

A research instrument is a significant component in research and the physical design and layout, order of questions and instructions are critical in gaining the respondents' interest, which results in a fully completed questionnaire. Questionnaire design is a vital part of the research process because this is where the data are generated (Maree & Pietersen, 2009b:158). The construction of questionnaires requires skill and an understanding of the key issues and objectives of the research study, and the researcher needs to also focus on the following (Maree & Pietersen, 2009b:158):

- the appearance of the questionnaire
- question sequence
- the wording of questions
- the response categories

Additional significant considerations in questionnaire designs include the following (Kent, 2007:155-169):

- question formats
- question content
- question wording
- question sequence

- the length of the assessment instrument
- the layout of the assessment instrument

The advantage of questionnaires is that respondents have time to think about the answers. Also, a large number of respondents can be reached, over a large geographical area (Brynard & Hanekom, 2006:46). Questionnaires are also usually inexpensive to administer, require little training develop them and can be easily and quickly analysed once completed (Wilkinson & Birmingham, 2003:8). However, the disadvantage is that the researcher is not present to explain uncertainties (Brynard & Hanekom, 2006:46).

In many surveys, the presence of the researcher is not required. Questionnaires can be printed on paper, but can also be posted on the internet or sent via email (Zikmund et al., 2010:219). These are known as self-administered questionnaires. For the purpose of this study, a self-administered questionnaire approach was followed. Here, the respondent is responsible for reading and answering the questions (Zikmund et al., 2010:219). Self-administered questionnaires are thus filled in by the participants in the absence of the researcher (Mitchell & Jolley, 2010:263). Figure 5.3 depicts the different forms of self-administered questionnaires.

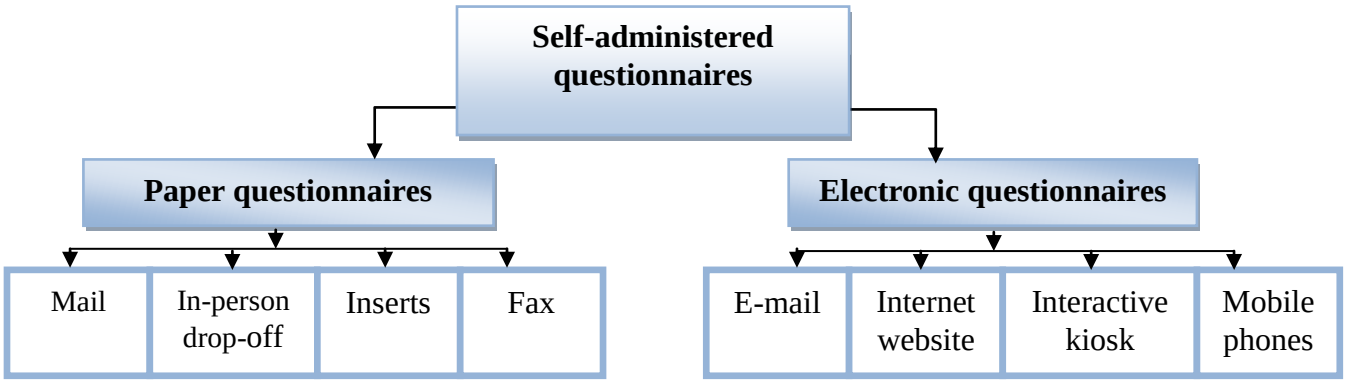

Figure 5.3: Self-administered questionnaires

Source: Zikmund et al. (2010:219)

Questionnaires normally contain a number of different approaches to asking questions. These question varieties include closed questions, multiple-choice or ranking questions and open-ended questions (Wilkinson & Birmingham, 2003:10).

Questionnaires generally contain a collection of closed questions where the possible answers are already provided. This can include “yes” or “no” answers. Many questionnaires also include

multiple-choice questions, which provide a number of defined responses which allow the researcher some control over the responses (Wilkinson & Birmingham, 2003:11).

However, open-ended questions entail none of the restrictions of closed or multiple-choice questions. These questions allow for the recording of any response to question provided by the respondent. This can make analysis difficult in the sense that each response must be recorded and analysed or coded to reveal the meaning of the response (Wilkinson & Birmingham, 2003:11).

Many different types of scales can be used in questionnaires. Examples of scales are nominal, ordinal, interval and ratio scales (Bernhardt & Geise, 2009:37). Nominal scales assign numbers to categories such as 1 = male, 2 = female. Ordinal scales provide information about direction and ranking, say, from 0 (none of the time) to 10 (all of the time). Interval scales create meaning between the intervals, such as a strongly disagree, disagree, neither agree nor disagree and agree or strongly agree. Ratio scales have equal intervals and an absolute zero point such as age (Bernhardt & Geise 2009:37). Table 5.4 provides a summary of measurement scales, their characteristics and their statistical implications.

Table 5.4: Measurement scales, their characteristics and statistical implications

	Measurement scale	Characteristics of the scale	Statistical possibilities of the scale
Noninterval scales	Nominal scale	A scale that measures in terms of names or designations of discrete categories	Enables the researcher to determine the mode, the percentage values or the chi-square
	Ordinal scale	A scale that measures in terms of values as “more” or “less”, “larger” or “smaller” but without specifying the size of the intervals	Enables the researcher to determine the median, percentile rank and rank correlation

Interval scales	Interval scale	A scale that measures in terms of equal intervals or degrees of difference, but whose zero point or point of beginning is randomly established	Enables the researcher to determine the mean, standard deviation and product moment correlation. It allows the researcher to conduct most inferential statistical analysis
	Ratio scale	A scale that measures in terms of equal intervals and an absolute zero point of origin	Enables the researcher to determine the geometric mean and the percentage variation. It allows the researcher to conduct virtually any inferential statistical analysis

Source: Leedy and Ormrod (2010:28)

In the questionnaire for this study, a Likert-type response format was used for some of the items. A Likert item is a statement that the respondent is asked to evaluate according to a subjective or objective criteria, usually the level of agreement or disagreement. Several kinds of response options can be used such as the following (Bernhardt & Geise, 2009:37):

- *endorsement:* strongly disagree, disagree, neutral, agree, strongly agree
- *frequency:* never, almost never, sometimes, very often, always
- *intensity:* really apprehensive, somewhat apprehensive, mixed feelings, somewhat excited, really excited
- *influence:* major problem, moderate problem, small problem, very small problem, no problem
- *comparison:* much less than others, less than others, about the same as others, more than others, much more than others

Table 5.5 provides a comprehensive summary of the different types of questions, their advantages, disadvantages and areas of appropriateness.

Table 5.5: Question types in questionnaires

TYPE OF QUESTION	EXAMPLES	ADVANTAGE	DISADVANTAGE	APPROPRIATE WHEN
Written (open-ended)	What do you think are the main challenges in reverse logistics?	• Naturalness of the response • Can gain in-depth understanding • Can use to build multiple-choice questions • Respondents can provide quotable information • Can ask different types of individuals	• Needs to transcribe • Time-consuming • Coding can be unreliable • Cannot always read response (if hand-written) • Difficult to interpret • Difficult to categorise when taking frequencies of types of responses	• Not sure about what the respondents are thinking or feeling about a topic • Want to gain insight into the respondents' thinking • Is in the process of designing closed-ended questions • Want to supplement or better understand closed-ended responses
Multiple choice (nominal, close-ended)	According to you, which one of the following is the most significant challenge in reverse logistics (circle the most appropriate option below)? 1. Cost 2. Information 3. Returns	• Quick to complete • Respondents do not need to write • Relatively inexpensive • Easy to administer • Easy to score • Allows for comparison • Responses can be easily interpreted	• Can be time-consuming • Easy to make mistakes • Loses spontaneity • Not always sure about the results • Respondents are not always fond of these questions • Some respondents may resent the questioner's preselected choices • Easy to make wrong assumptions in analysing the results when response options are not the same as what respondents are thinking	• Want to make group comparisons • Know some of the responses that the sample is considering, and want to know which option the respondents are leaning towards • Have large samples • Want to provide the respondents with finite response choices
Ranking (ordinal, closed-ended)	What are the reasons for your organisation choosing to outsource reverse logistics?	• Allows understanding of all reasons in priority order	• More than seven response options will confuse respondents • May leave out important item	• Want to know all responses in order • Are clear on common response options

	(Marks a 1 for the most important reasons, 2 for the second most important reason, etc. ---- No time ---- Lack of expertise ---- Expensive)		response options • Relatively hard to analyse	• Do not want respondents to add to the list
Rating (interval, closed-ended)	To what extent does your organisation experience cost-related problems in reverse logistics (circle the number that best reflects your response)? Lesser extent Greater extent 1 2 3 4 5	• Allows one to see passion behind the respondent's feelings • Easy to administer • Can compare group responses • If ordinal scale is created an average of the results can be obtained • Numerous ways to analyse the results • Frequencies of each response can be taken, along with mode in order to determine most popular responses	• Uncertain about whether each respondent is reading the question and response options in the same way • Do not know what you have when *neutral* or *don't know* is circled • Can be expensive, time-consuming and mistakes can be made • Questions are more difficult to formulate than open-ended questions • If charted together, questions must be written so the desired responses fall in the same directions	• Want respondents to rate or order choices • Want to make group comparisons • Have large samples • Want to understand where problems are in the organisations
Yes – No (closed-ended)	Does your organisation outsource reverse logistics?	• Very easy to score, analyse and to chart	• Uncertain about the meaningfulness of the data • Respondents do not give enough information	• Want all or nothing responses • Want to know if the respondents resemble the population
Nominal (categorical)	Please circle the applicable answer I am the • owner • manager • employee	• Factual: no value judgement • Useful for disaggregating other question responses • Indicates if the sample is representative of the	• Some respondents choose not to respond to these types of questions • Some respondents can respond falsely to these questions • With small groups, it	• Want to disaggregate data by programme, position and ethnicity • Want to determine the impact of the programme on different types of individuals

	total population	is possible to identify the respondent in an anonymous questionnaire owing to demographic information provided	• Want to determine if the respondents resemble the populations

Source: Adapted from Bernhardt and Geise (2009:34-35)

A questionnaire was developed for this study and divided into several parts. This was to simplify the completion and analysis of the results. In this context, the questionnaire consisted of two parts.

- **Part 1** contained the general information on the study and survey as indicated below.
  - general information on the researcher
  - the focus and aim of the study
  - instructions on the completion of the questionnaire
  - the confidentiality of the questionnaire
  - the contact details of the researcher
  - the expected date of completion

- **Part 2** included the questions (inputs expected of respondents) and was divided into the following sections:

  - ***Section 1: general information***

    This section consisted of the company profile such as the name of the company, the position and title of the person who completed the questionnaire, the size of the company in terms of annual turnover and number of employees and status of the company. The data collected in this section were used to categories the companies for analysis purposes.

  - ***Section 2: problems and challenges in reverse logistics***

    This section consisted of questions focusing on the problems and challenges in reverse logistics. These questions were placed in six categories, namely cost associated with reverse logistics, information systems, product returns and reverse logistics processes, organisational and management-related problems, problems with

supply chain partners, customer-related problems. These categories were based on the categories identified in the literature study.

- ***Section 3: best practices in reverse logistics***

  This section consisted of questions focusing on the best practices in reverse logistics. These questions were placed in five categories, namely information-related best practices, best practices relating to reverse logistics processes, organisational and management-related best practices, best practices relating to outsourcing and partnerships. These categories were based on the categories identified in the literature study.

The format of the questionnaire used in part 2 is summarised in table 5.6 below. The questionnaire used in this study appears in appendix A.

Table 5.6: Format of survey questions in study

Type of question	Questions in questionnaire
Open-ended question	**Section 1**: 1.1 **Section 1**: 1.2
Closed-ended questions	
Categorical questions allow the respondent to select only one answer to the questions	**Section 1**: 1.3 **Section 1**: 1.4
Rating questions consisted of a list of questions which the respondents were asked to rate by means of a five-point Likert type response format.	**Section 2:** 2.1 – 2.6 (1) "Lesser extent" to "greater extent" **Section 3:** 3.1 – 3.4 (1) Lesser extent to greater extent (2) "Very easy", "somewhat easy", "moderately difficult", "somewhat difficult", "extremely difficult"

It is also important to add that in both sections 2 and 3, the respondents were given the option to add comments if they wished to expand on or clarify any specific issues. In section 2, there was also an option of "not a problem" and in section 3 there was an option of "don't know".

5.7.2.4 Data collection

No one data collection method is best for all situations. It is up to researchers to appraise the data needs of each problem, together with the time and cost limitations of the study in order to achieve the best results. In quantitative research, the researchers identify one or few variables they intend to study and then collect data explicitly relating to those variables (Leedy & Ormrod, 2010:95)

The data collection process in this research started with obtaining the contact information of the sample that the researcher had chosen for the study. The focus of contact was on either the owners/CEO of the organisation or the manager responsible for the reverse logistics operations or functions in the chosen organisation. The contact information was obtained from the organisation's online web pages. In instances where no contact details were provided on the organisation's website, LinkedIn was used. LinkedIn is the world's largest online professional network, where members can exchange knowledge, ideas and opportunities (LinkedIn Learning Center, 2012).

Owing to the geographical distances between the organisations, it was decided to contact these organisations via email. The initial email contained a brief introduction on the researcher and provided information on the research sponsor and the topic and the purpose of the research study. In the initial email, the executives were also asked if they would be willing to participate in the research study. As previously indicated, an email with the same information was sent to the CILTSA requesting permission to administer the questionnaires to their members. To those executives who indicated their willingness to participate, a follow-up email was sent. The respondents were thanked for their willingness to participate and it was stated that the questionnaire would be sent to them in a week's time.

In the third email dated 29 October 2012, the questionnaire was sent as an attachment in a word document. Owing to time constraints, the participants were asked to send the completed questionnaire via email no later than 5 November 2012. Because most organisations did not comply with the due date, several follow-up emails were sent as reminders to complete the questionnaire. Most executives indicated that owing to their busy time schedules, they would only be able to send it at a later stage. The researcher finally decided to extend the deadline to 7 December 2012. On the 3 December 2012, a final email was sent to the executives as a

reminder. Once the completed questionnaires had been received, the respondents were thanked for their time and willingness to participate.

5.7.2.5 Response rate

As stated previously, the focus of this research was on organisations that either specialise in reverse logistics or provide reverse logistics as a service. Emails were sent to 19 organisations and the members of the CILTSA. Two organisations from the institute responded, and these were then included in the sample, as previously indicated. A summary of the response results of this study is provided in table 5.7

Table 5.7: Survey response results

	Final results
Completed questionnaires from the 19 organisations	8
Completed questionnaires from members of CILTSA who were involved in reverse logistics	2
Participants who were willing to participate and received reminders, but did not complete the questionnaire before the final completion date	1
Participants who did not wish to participate	2
Participants who did not respond to initial email	8
Total respondents who completed the questionnaire	10

5.7.2.6 Data analysis

Data analysis is the application of reasoning to understand the data that have been gathered. In its simplest from, it may involve determining consistent patterns and then summarising the significant details discovered in the investigation (Zikmund et al., 2010:70).

The data analysed in the empirical study used both descriptive and inferential statistical methods. Statistics has two principle functions to help the researcher describe the data and draw inferences from them. Descriptive statistics summarises the overall nature of the data obtained, while inferential statistics enables the researcher to make decisions about the data (Leedy & Ormrod, 2010:30). In this section, the descriptive statistics and inferential statistics used in this study will be described.

(a) Descriptive statistics

Descriptive statistics are used to summarise the basic features of data sets through measures of central tendency (mean, mode and median), dispersion (standard deviation, range, variance and quartiles) and distribution (skewness and kurtosis) (O'Leary, 2005:269). Descriptive statistics allow the researcher to describe variables numerically (Saunders et al., 2012:502). Frequencies, means and medians were the descriptive statistics used in the current study.

The mean represents the single point at which two sides of the distribution balance. The mean is calculated as the sum of all the scores and then divided by the total number of scores (Leedy & Ormrod, 2010:266). This is known as the average that includes all data values in its calculation (Saunders et al., 2012:503).

The median is the numerical centre of data, with exactly as many scores above it as below it - hence the median is the one precisely in the middle of the series (Leedy & Ormrod, 2010:265-266). In other words, it is the middle value or mid-point after the data have been ranked (Saunders et al., 2012:504). In this study, graphs and tables were used to present descriptive statistics.

(b) Inferential statistics

While the goal of descriptive statistics is to describe and summarise data, the goal of inferential statistics is to draw conclusions that extend beyond immediate data (O'Leary, 2005:243). In this section, the inferential techniques used to derive inferential statistics will be discussed.

Inferential statistics has two main functions, (1) to estimate a population parameter from a random sample, and (2) to test statistically based hypotheses (Leedy & Ormrod, 2010:275). Inferential statistics allows the researcher to assess the probability that an observed difference is not merely a chance finding (O'Leary, 2005:243).

It is important to explain the concept of statistical significance in inferential statistics. Statistical significance refers to a measure or a p-value that assesses the actual probability of findings - in other words, that the findings are more than coincidental. The lower the p-value, the more confident researchers can be that the findings are genuine (O'Leary, 2005:243). For the purpose

of this study, the level of 0.05 was used as the level of statistical significance indicated as a two-tailed p-value.

The choice of statistical procedure will also depend on the nature of the data and the extent to which the data reflect a normal distribution (Leedy & Ormrod, 2010:265). There are two types of statistical tests, namely parametric and nonparametric tests. *Parametric tests* are based on certain assumptions about the nature of the population in question (Leedy & Ormrod, 2010:265). Parametric statistics are therefore used with numerical data (Saunders et al., 2012:508). *Nonparametric tests* are not based on assumptions, and are appropriate for data that are ordinal (Leedy & Ormrod, 2010:265). Nonparametric statistics are therefore designed to be used when data are not normally distributed (Saunders et al., 2012:508).

In this study, nonparametric tests were used for the following reasons:

- Nonparametric tests are free of assumptions that are made when using parametric tests.
- The data that are used are ordinal.
- The realised sample size was very small.

Nonparametric statistics have the following advantages (Black, 2010:672):

- In some instances, there is no parametric alternative to the use of nonparametric statistics.
- Certain nonparametric tests can be used to analyse nominal data.
- Certain nonparametric tests can be used to analyse ordinal data.
- The computations are less complicated than parametric statistics, especially for small samples.
- Probability statements are exact probabilities.

In this study, a Mann-Whitney U test was used as an inferential statistical procedure. The purpose of a Mann-Whitney U test is to compare two groups of data that are ordinal instead of interval (Leedy & Ormrod, 2010:282).

In addition, it is useful to apply this test rather than the *t*-test when the samples from the population are small (less than 30) and it cannot be assumed that the study variable is normally distributed in the populations (Petersen & Maree, 2009d:233).

The Mann-Whitney U test makes use of the ranks of the study variable instead of the actual values. This means that extreme values have far less influence on the outcome than they would if a *t*-test were used. The reasoning behind a Mann-Whitney test is that the values of the study variable are ranked, ignoring to which group the values belong, and the ranks should be evenly spread across two groups if the two populations have equal medians (Petersen & Maree, 2009d:233).

Although the Mann-Whitney U test is an acceptable option for data analysis, the following assumptions underlie it (Black, 2010:678):

- The samples are independent.
- The level of data is at least ordinal.

The following two-tailed hypotheses are tested using a Mann-Whitney U test (Black, 2010:678):
$H_{0:}$ The two populations are identical.
$H_{1:}$ The two populations are not identical.

According to the null hypothesis test in the Mann-Whitney U-test, there is no difference between the two groups in terms of location, focusing on the median as a measure of central tendency (Tustin et al., 2005:624).

(c) Gap and opportunity analysis

As indicated in the introduction in section 5.7.2, a gap and opportunity analysis was performed to refine the framework. The idea is to identify practices that may be eliminated from the framework and to prioritise the practices included in the framework. This was done by using radar graphs (gap analysis) and portfolio matrixes (opportunity analysis).

A short description of the radar graphs and portfolio matrixes used in this study is provided below.

(d) Radar graphs

In some instances, there are data for which the meaning is not clear when presented in a tabular or text format (Saary, 2008:311). One of the more advanced chart types are radar graphs (Gross,

Akalwa & Nordquist, 2011:201). Radial plots have existed for a number of years and are an important descriptive tool for multivariate data (Saary, 2008:311). Radar graphs are a powerful method of displaying and comparing data across categories (Gross et al., 2011:204). In other words, graphical displays are most suitable for illustrating relationships and trends concisely (Saary, 2008:311).

A common feature of the radar screens is that they are a circular graphing technique and have a series of rays projecting from a central point (Saary, 2008:311). The values thus radiate from the centre of the chart in such a way that they can be compared to radar screen plots, showing the distance of an object from the radar centre (Gross et al., 2011:201).

Figure 5.4 illustrates the radar graphs used in this study. The purpose was to determine the relationship between the contribution of the best practices and the difficulty in implementing it.

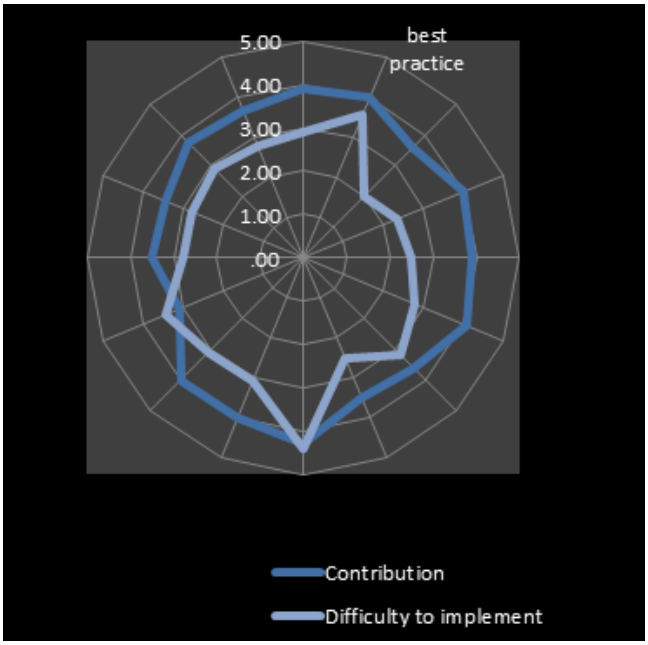

Figure 5.4: Radar graph used in the study

In essence, the radar graph form of graphical representation is a more efficient way of displaying a variety of data in a single picture (Saary, 2008:311).

(e) Portfolio matrixes

The purpose of the portfolio matrix is to determine in which category a best practice can be placed in order to determine whether or not it should be implemented. Figure 5.4 illustrates the portfolio matrix used to analyse the data in this study.

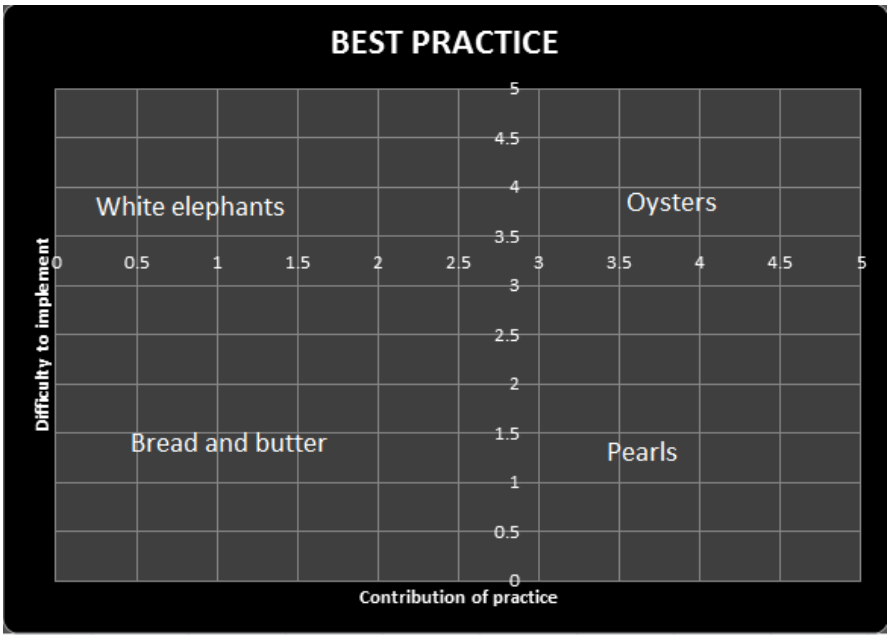

Figure 5.5: Portfolio matrix used in the study

Source: Adapted from Van der Rohe (1998:203)

In the above portfolio matrix, there are four quadrants and two axes. The vertical axis represents the difficulty of implementing the best practice (in mean values), whereas the horizontal axis represents the level of contribution of the best practice (in mean values). A mean value of three indicates the average.

The four quadrants are as follows:

- *White elephants*. The upper left quadrant indicates those best practices that are difficult to implement but do not have a high contribution level. These best practices should therefore not be included in the framework.
- *Oysters*. The upper right quadrant signifies those best practices that have a high contribution but are also difficult to implement. Hence they require careful consideration before they should be implemented. The cost-benefit analysis should thus be done first.

- *Bread and butter*. The lower left quadrant signifies those best practices that are easy to implement but do not have a high contribution value. These best practices should therefore not be implemented.
- *Pearl quadrant*. The lower right quadrant indicates those best practices that have a high contribution level and are also easy to implement. These best practices should thus be implemented first.

Chapter 6 deals with the analysis and application of the radar graphs and portfolio matrixes. In the next section, the validity and reliability of the study will be discussed.

5.8 VALIDITY AND RELIABILITY OF THE STUDY

In this section, the validity and reliability of the study will be discussed. Since the study follows a mixed method approach, the validity and reliability will be discussed in terms of both qualitative and quantitative validity and reliability.

Both validity and reliability are crucial aspects of quantitative research. However, in qualitative research, they are normally referred to as credibility and trustworthiness (Nieuwenhuis, 2009:80). According to Pellissier (2007:12), *validity* is the degree to which a measure accurately reflects the concept it is supposed to measure and *reliability* is the extent to which an assessment or instrument consistently measures an attribute. Validity implies reliability, meaning that a valid measure must be reliable, but a reliable measure may not be necessarily valid. Usually reliability is low and validity is high in qualitative research, but in quantitative research reliability is normally higher than validity (Pellissier, 2007:12). In essence, both validity and reliability reflect the degree to which an error can occur in measurements (Leedy & Ormrod, 2010:29).

5.8.1 Validity of the study

Validity is alternative word for the truth (Silverman, 2005:210). Validity in qualitative research means that the researcher checks the accuracy of the findings by employing certain procedures (Creswell, 2009:232).

In qualitative research, the validity can only be applied to the analysis and interpretations performed by the researcher on the data. Since there is no correct way of performing qualitative analysis, there is no agreed way in assessing validity (Kent, 2007:238)

Validity in quantitative research, however, implies that the instrument that is used is said to be valid if it measures what it is supposed to measure (Brynard & Hanekom, 2006:47; Maree & Pietersen, 2009a:147). Hence validity in quantitative research refers to whether the researcher can draw meaningful and useful interpretations from scores on specific instruments (Creswell, 2009:235).

Two questions should be asked when considering the validity of a study. Firstly, does the study have adequate controls to guarantee that the conclusions drawn are truly warranted by the data? And secondly, can the researcher use what has been observed in the research situation to make generalisations about the world, beyond that specific situation. To answer these questions, the issues of internal validity and external validity should be addressed (Leedy & Ormrod, 2010:97).

The internal validity of a research study is the extent to which its design and the data it produces enable the researcher to draw accurate conclusions about cause-and-effect and other relationships in the data (Leedy & Ormrod, 2010:97). The external validity of a research study is the extent to which the results apply to certain situations beyond the study itself - in other words, the degree to which the conclusions drawn can be generalised to other contexts.

The validity of a measurement instrument is the extent to which the instrument measures what it is intended to measure (Leedy & Ormrod, 2010:28). Validity assumes four different forms, namely face, content, criterion and construct validity.

- *Criterion-related validity* involves testing whether or not an instrument selected for data collection measures what is expected to measure.
- *Construct validity* refers to the degree to which a measurement technique uncovers the information it is designed to uncover.
- *Face validity* refers to the way an instrument appears to the participants.

- *External validity* refers to the applicability to similar problems of the conclusions drawn from the research, provided that the sample is representative and the study is a simulation of real-life situations.
- *Content validity is* the degree to which the measurement instrument is representative of the sample of the context domain being measured.

In the current study, the type of validity that was used to establish the trustworthiness of the results from the survey was *content validity.* It is the extent to which the measurement device, in this case a questionnaire, provides sufficient coverage of the investigative study (Saunders et al., 2012:429). After the questionnaire had been designed, an experienced field worker was consulted about the content formulation and scope of the questions included in this survey instrument to ensure that it had an acceptable level of content validity.

5.8.2 Reliability of the study

Reliability is the consistency with which the measuring instrument produces a certain result when the unit that is being measured has not changed (Leedy & Ormrod, 2010:29). Reliability in quantitative research has to do with the consistency or repeatability of an instrument. High reliability is established when the instrument will give the same results if the research is repeated on the same sample (Maree & Pietersen, 2009a:147).When qualitative research is conducted, reliability is sometimes difficult to justify. Some researchers argue that the concepts of validity and reliability are drawn from quantitative research and are not appropriate for qualitative research (Kent, 2007:277).

In terms of the reliability of the instrument (framework), a large sample is required to test reliability in terms of internal consistency (the Cronbach coefficient alpha). The sample size required for the calculation of the Cronbach alpha should include at least 200 respondents (Yurdugül, 2008:405). Hence owing to the identified target population and subsequent small realised sample size, no measure of internal consistency was calculated. The study, however, did allow the explorative testing of the instrument (framework).

It should be noted that owing to the mixed method approach followed in this study, crystallisation could be used to establish both credibility and trustworthiness. Crystallisation gives the researcher a complex and deeper understanding of a phenomenon (Nieuwenhuis,

2009:81). Crystallisation arises from various data gathering techniques and data analysis employed and represents the researcher's own reinterpreted understanding of the phenomenon. What the researcher then describes as his/her findings are those that crystallise from the data. This crystallised reality is credible in so far as those reading the data and analysis of the research study will be able to see the same emerging patterns, which can add to the trustworthiness of the research (Nieuwenhuis, 2009:81).

The credibility of this study was established by using triangulation, which refers to the interpretation of findings by mixing qualitative and quantitative research methods (De Vos in Maree, 2009:296). In using triangulation, the researcher gives credibility to the methods of data collection and analysis in order to determine discrepancies in their findings (Maree, 2009:297). In this study, the framework was developed from the literature and the findings of the empirical study provided an indication of the credibility of the framework.

5.9 LIMITATIONS OF THIS STUDY

Possible limitations could affect the research such as time limitations, access to participants and how the researcher intended dealing with these concerns (Maree & van der Westhuizen, 2009:42). In terms of the research approach of this study, time constraints were a major limitation. According to Creswell (2009:212), a sequential exploratory research approach requires a substantial length of time in both the data collection phases. Hence the following factors posed a challenge in this research strategy:

- A substantial amount of literature was required to develop the best practice framework.
- Developing the best practice framework in itself was time-consuming.
- Searching for organisations that specialise in reverse logistics or provide it as service in South Africa was also challenging. The researcher found only a limited number of organisations in South Africa that specialise in reverse logistics, which explains the small sample size.
- Although a number of organisations were willing to participate, many did not complete the questionnaire before the due date. Numerous reminders had to be sent out, and it proved difficult to obtain completed questionnaires. This also resulted in a lower response rate.
- Validity and reliability were also a factor because of the nature of the study.

In essence, the major limitations of this study were time constraints, sample size and the reliability and validity of the study.

5.10 ETHICAL CONSIDERATIONS

Research ethics relates to right and wrong when conducting research. Although researchers have the right and the moral obligation to search for the truth, this should not be at the expense of the rights of individuals or groups in society (Brynard & Hanekom, 2006:84-85). According to Saunders et al. (2009:184), research ethics relates to "questions about how we formulate and clarify our research topic, design our research and gain access, collect data, process and store our data, analyse data and write up our research findings in a moral and responsible way".

Ethical questions are apparent in matters such as personal disclosure, legitimacy and the credibility of the research report, the role of the researcher in cross-cultural contexts and issues of personal privacy through forms of internet data collection (Punch in Creswell, 2009:87).

General ethical issues falls into the following categories (Saunders et al., 2009:185):

- the privacy of possible or actual participants
- the voluntary nature of participation and the right to withdraw at any stage
- consent and possible deception on the part of the participants
- maintaining the confidentiality of data provided by identifiable participants, and their anonymity
- the reactions of participants to the way the researcher collects the data
- the effects of participants on the way the researcher uses, analyses and reports the data
- the behaviour and objectivity of the researcher

Normally ethical issues arise in the data collection phase (Creswell, 2009:89). In this study, the ethical consideration relating to the literature study involved plagiarism. According to Brynard and Hanekom (2006:86), plagiarism is defined as "the act of passing off as one's own the ideas or writing of another". Full acknowledgement of all material belonging to other researchers is mandatory. It is highly unethical if the researcher copies the thoughts, ideas or words belonging to another researcher without acknowledgement (Leedy & Ormrod, 2010:104).

It is important to provide references in order to avoid plagiarism. In this study, all the information that was obtained was properly referenced and recorded in such a way that no plagiarism was conducted. Also, other researchers' thought, ideas or words were fully acknowledged.

In terms of the ethical issues that can arise in the empirical research of this study, it was necessary for the researcher to obtain informed consent from the participants before conducting the research (Creswell, 2009:89). According to Leedy and Ormrod (2010:102), the following elements should be included in a consent form:

- a brief description of the nature of the study
- a description of what participation would involve in terms of activities and duration
- a statement indicating that participation is voluntary and can be terminated at any time without penalty
- a list of potential risk that participants may encounter
- the researcher's name, plus additional information on how the researcher could be contacted
- an offer to provide detailed information on the study

Confidentiality and anonymity were shown to be of immense importance to all the participants. Hence the questionnaire and initial contact email to the participants in the study contained both the above-mentioned information and guarantee of confidentiality. In addition, the name of the sponsor institute was provided, and the participants were also informed that they could request an executive report on the results once the research had been completed.

In essence, the ethical aspect of research is the issue of confidentiality of results and findings of the study and the protection of participants' identities (Maree & van der Westhuizen, 2009:41-42). Regarding ethical issues in the findings, it should be noted that all the results were based on completed questionnaires and were presented honestly without any distortion.

5.11 CONCLUSION

In this chapter, the research methodology of this study was discussed. The first few sections dealt with the meaning of research design, the problem statement and research objectives of the study and the methodological approach. The phases of the study were then discussed in detail.

The study was conducted in two phases, namely the literature study and the empirical study. In this chapter, the methodology used in both these phases was discussed in separate sections. In phase 1, the literature study, a discussion was included on the research method, justification for use of the method and data collection. In phase 2, the empirical study, the research method, population and sampling, data collection, response rate and data analysis were explained.

The validity and reliability of the study were discussed in terms of both the qualitative and quantitative elements of the study. Finally, the limitations of the study and the ethical considerations were highlighted.

In the next chapter, the results and findings of the study will be discussed in terms of descriptive statistical data analysis, inferential statistical analysis, a gap analysis and an opportunity analysis. The next chapter will also provide the refined best practice framework, derived from the results of the empirical study.

CHAPTER 6
EMPIRICAL RESULTS AND FINDINGS

6.1 INTRODUCTION

The previous chapter outlined the research methodology used in this study. The focus was on the research approach, problem statement and objectives, the research methodology in the first and second phases of this study, the validity and reliability and limitations of the study as well as the ethical considerations. In this chapter, the results and findings of the empirical study are discussed.

As stated in the previous chapter, the research data were collected by means of descriptive research, which focused on a nonprobability purposive sample of organisations in South Africa that either specialise in reverse logistics, or provide it as a service to other organisations that outsource their reverse logistics function. The sample included 21 organisations, and ten completed questionnaires were received.

The data received from the questionnaire were captured on an Excel spreadsheet and analysed using SPSS v17 (Statistical Package for the Social Sciences).

In terms of the results of this study, the following will be discussed in this chapter:

- descriptive statistical analysis
- inferential statistical analysis
- opportunity and gap analyses - the extent of the contribution of best practices and the extent of difficulty implementing them
- refined best practice framework for reverse logistics by means of the gap and opportunity analyses

6.2 DESCRIPTIVE ANALYSIS

In the previous chapter, it was mentioned that descriptive statistics were used to summarise the basic features of data sets. In this section, the descriptive statistical results will be discussed with specific reference to the organisational information of the respondents, the levels of problems

experienced in reverse logistics and the level of best practices in reverse logistics. The results will be discussed by means of tables and graphs.

6.2.1 Organisational information

The response to part 1 of the questionnaire described the organisational characteristics of the respondents. As discussed in the previous chapter, ten organisations participated in the survey. In question 1.1, the participants were asked to give the name of their company. In the rest of the section, the results of the position/titles of the participants in their organisation and the size and status of their organisation will be discussed.

6.2.1.1 Position in organisation

In question 1.2 of the questionnaire, the participants were asked to state their position or title in the company for which they work. Table 6.1 provides the results of the position/titles of the participants who completed the questionnaire.

Table 6.1: Position/title of participants

		Frequency	Valid percent
Valid	Business development director	1	10.0
	Commercial director	1	10.0
	Commercial manager	1	10.0
	General manager/ director	1	10.0
	Logistics manager	1	10.0
	Managing director	3	30.0
	Supply chain consultant	1	10.0
	Warehouse manager-JHB hub	1	10.0
	Total	10	100.0

From table 6.1 it is clear that the position or titles of the participants ranged significantly. However, 30% of the participants were the managing directors of the organisations, while the rest had various other positions or titles.

6.2.1.2 Size of the organisation

Question 1.3 of the questionnaire focused on the size of the company in terms of annual turnover and the number of employees. The number of organisations in each category is indicated below.

Table 6.2: Size of responding organisations

No. of employees / Level of turnover (Rm)	Less than 50	51–200	201–500	501–1 000	1 001 – 5 000	More than 5 000	Total
Less than R10 million p.a.	3						3 (30%)
R10 – 100 million p.a.		1		1			2 (20%)
R101 – 500 million p.a.				1	1		2 (20%)
More than R500 million p.a.					1	2	3 (30%)
Total	3 (30%)	1 (10%)		2 (20%)	2 (20%)	2 (20%)	10 (100%)

Table 6.2 will now be discussed.

- Three (30%) of the organisations had an annual turnover of less than R10 million with less than 50 employees.
- Two (20%) of the organisations had an annual turnover between R10 and 1 000 million, one of which had between 51 and 200 employees, and the other between 501 and 1 000 employees.
- Two (20%) organisations had an annual turnover between R101 and 500 million. One these organisations had between 501 and 1 000 employees, while the other had between 1 001 and 5 000 employees.
- Three (30%) organisations had an annual turnover of more than R500 million. One of these organisations indicated that they had between 1 001 and 5 000 employees, while the other two indicated that they had more than 5 000 employees.
- It is clear that 50% of the respondents were smaller organisations and the other half larger organisations.

6.2.1.3 Status of the organisation

In question 1.4, the participants were asked to indicate the status of the organisation they worked for. The options that were given to the participants included head office, holding company, branch, subsidiary and an independent unit. The results indicate that 70% of the participants were active in the head office. The rest of the participants (30%) indicated that they were part of a holding company (10%), subsidiary (10%) and an independent unit (10%). None of the participants chose branch as an option.

6.2.2 Level of problems experienced in reverse logistics

This section deals with the results of part 2, section 2, of the questionnaire. The questions in section 2 were based on the problems and challenges in reverse logistics. Section 2 was divided into subsections 2.1 to 2.6, namely the cost associated with reverse logistics, information systems, product returns and reverse logistics processes, organisational and management-related problems, problems with supply chain partners and customer-related problems. The results of each subsection will now be discussed in further detail.

6.2.2.1 Cost associated with reverse logistics

In section 2.1 the participants were asked to indicate the extent to which their organisation experiences problems with reverse logistics in terms of (1) the inability to reduce cost, (2) the high cost associated with reverse logistics, and (3) the lack of awareness of the hidden cost of reverse logistics. Table 6.3 indicates the means and median values for each of the potential cost problems/challenges.

Table 6.3: Means and median values for cost problems

	Mean	**Median**
The inability to reduce cost	3.6	3.5
The high cost associated with reverse logistics	4	4

The lack of awareness of the hidden cost of reverse logistics	3.8	4

Graph 6.1 indicates the mean values for each of the three potential cost challenges.

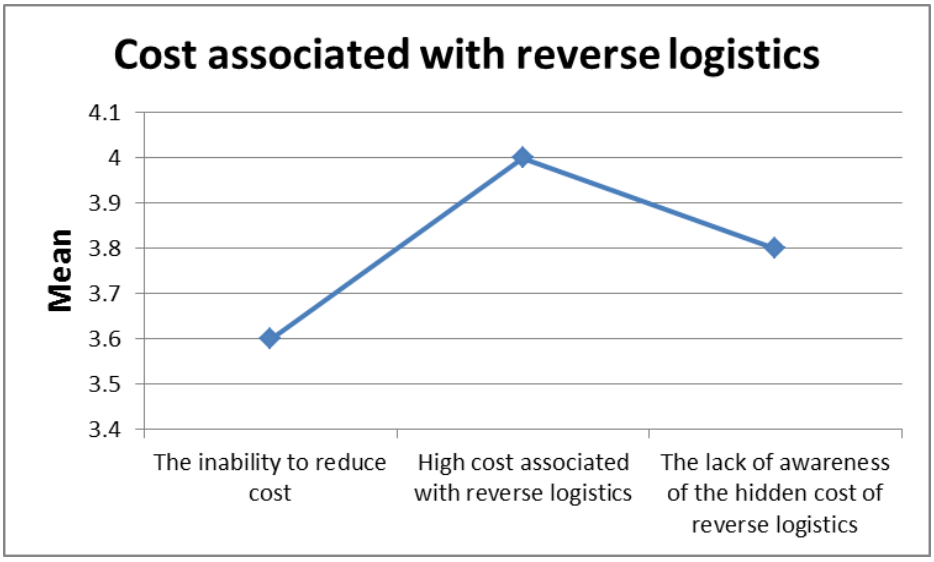

Figure 6.1: Mean values for cost associated with reverse logistics

The range of the mean and median values (3.6–4 and 3.5–4) respectively indicated that the inability to reduce cost, the high cost associated with reverse logistics and the lack of awareness of hidden cost of reverse logistics all tend to be perceived as a problem/challenge to a great extent. The high cost associated with reverse logistics is perceived to be the main problem/challenge, with a mean and median value of 4.

As mentioned in the previous chapter, the respondents were also afforded the opportunity to provide comments. Generally speaking, those respondents who did include comments in this section highlighted the fact that reverse logistics is extremely costly, and that most of their clients have little awareness of what happens when it comes to reverse logistics. Another participant stated that the principle of costs tends to vary on the transportation side and the warehousing side in reverse logistics.

6.2.2.2 Information systems

In section 2.2, the participants were asked to indicate the extent to which their organisation experiences problems with reverse logistics in terms of the following: (1) insufficient investment in information technology, (2) low reliability of IT solutions, (3) lack of information visibility, and (4) insufficient, abundant, ambiguous or conflicting data. Table 6.4 indicates the means and median values for each of the potential information-related problems/challenges in reverse logistics.

Table 6.4: Means and median values for information-related problems

	Mean	**Median**
Insufficient investment in information technology	3.89	4
Low reliability of IT solutions	3	3
Lack of information visibility	3.6	4
Insufficient, abundant, ambiguous or conflicting data	3.33	3

Graph 6.2 indicates the mean values for each of the potential information-related problems/challenges in reverse logistics.

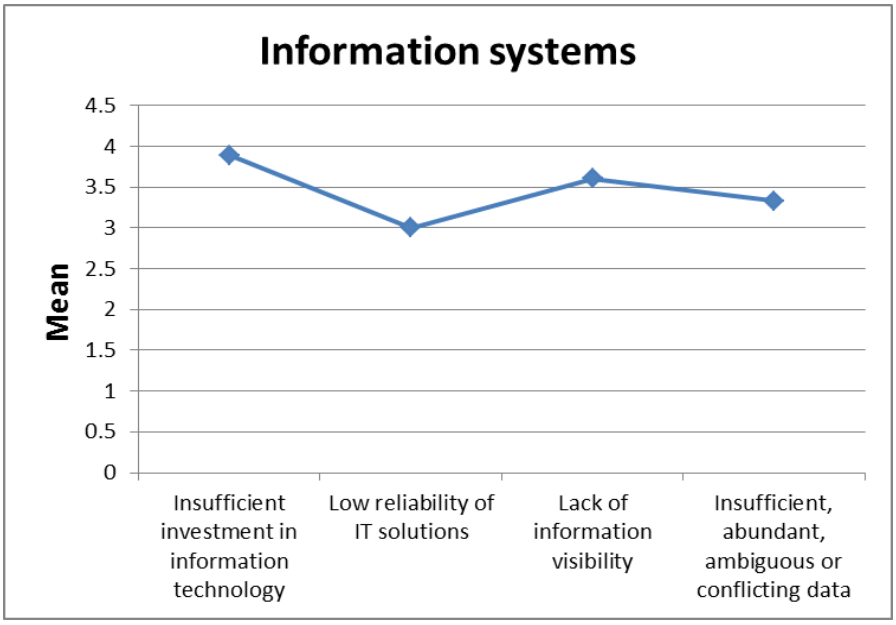

Figure 6.2: Mean values for problems relating to information systems

The range of the mean and median values (3.33–3.89 and 3–4) respectively indicated that insufficient investment in information technology, lack of information visibility and insufficient, abundant, ambiguous or conflicting data all tended to be perceived as a problem/challenge from a moderate to a great extent. However, low reliability of IT solutions was perceived to be the least significant problem, with a mean and median value of 3. Insufficient investment in information technology was perceived to be the greatest problem with a mean value of 3.89 and median value of 4.

The comments made in this section of the questionnaire indicated that information technology is a problem. One respondent stated that there is less or no focus on reverse logistics in relation to information systems. Another respondent stated that there are no current systems in the market that specifically deal with reverse logistics. This again corresponds to the results of the study relating to information technology.

6.2.2.3 Product returns and reverse logistics processes

In section 2.2, the participants were asked to indicate the extent to which their organisation experienced problems with reverse logistics in terms of (1) uncertainties relating to product returns (e.g. irregular material flows and infrequent and erratic timing patterns of returns or condition or quality of product returns); (2) uncertainty about the appropriate disposition option

to follow; (3) a lack of knowledge about the time and costs involved in the disposition of product returns. Table 6.5 indicates the means and median values for each of the potential problems/challenges relating to product returns and reverse logistics processes.

Table 6.5: Means and median values for problems relating to product returns and reverse logistics processes

	Mean	Median
Uncertainties relating to product returns	3.8	4
Uncertainty about appropriate disposition option to follow	2.4	2.5
A lack of knowledge about the time and costs involved in the disposition of product returns	3.7	4

Graph 6.3 indicates the mean values for each of the potential problems/challenges relating to product returns and reverse logistics processes.

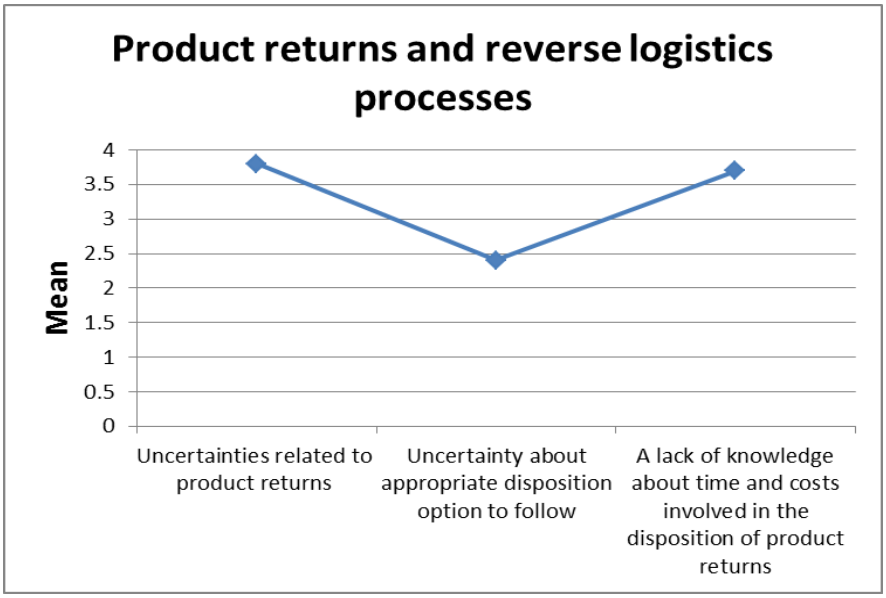

Figure 6.3: Mean values for problems relating to product returns and reverse logistics processes

Uncertainties relating to product returns and a lack of knowledge about the time and costs involved in the disposition returns had the highest mean and median values (3.7–3.8 and 4), and these uncertainties tend to be perceived as a problem/challenge to a great extent. The uncertainty about the appropriate disposition option to follow had the lowest mean and median value (2.4 and 2.5) and was therefore perceived to be a problem/challenge to a little extent.

In terms of the comments on problems relating to product returns and reverse logistics processes, one respondent stated that very few businesses and traditional distribution service providers understand the reverse logistics flow of goods. Another respondent indicated that in most instances, product returns are only thought of when new products are rolled out and the clients realise that they have given no thought to what to do with their old stock. In such a situation, their clients have no space to house their redundant products, and as a result, typically require a fast solution, which will also lead to cost and other more severe implications. The same respondent also highlighted the fact that safety is a vital consideration but is often forgotten. In this instance, the respondent stated that IT equipment sometimes contains sensitive data, which must be handled under high security. Their clients seem to forget this, and data leaks stem from their clients owing to failure to implement effective security controls.

6.2.2.4 Organisational and management-related problems

In section 2.4, the participants were asked to indicate the extent to which their organisation experienced reverse logistics-related problems with regard to (1) not including reverse logistics in strategic planning; (2) a lack of top management awareness of the importance of reverse logistics; (3) a lack of top management commitment to reverse logistics; (4) a lack of departmental collaboration/communication/cooperation in reverse logistics; and (5) the resistance to change in respect of reverse logistics. Table 6.6 indicates the means and median values for each of the potential organisational and management-related problems in reverse logistics.

Table 6.6: Means and median values for organisational and management-related problems

	Mean	Median
Not including reverse logistics in strategic planning	3.63	4
Lack of top management awareness of the importance of reverse logistics	3.86	4
Lack of top management commitment to reverse logistics	4	4
Lack of departmental collaboration/communication/cooperation regarding reverse logistics	3.78	4
Resistance to change to include reverse logistics	3.25	3

Graph 6.4 indicates the mean values for each of the potential organisational and management-related problems in reverse logistics.

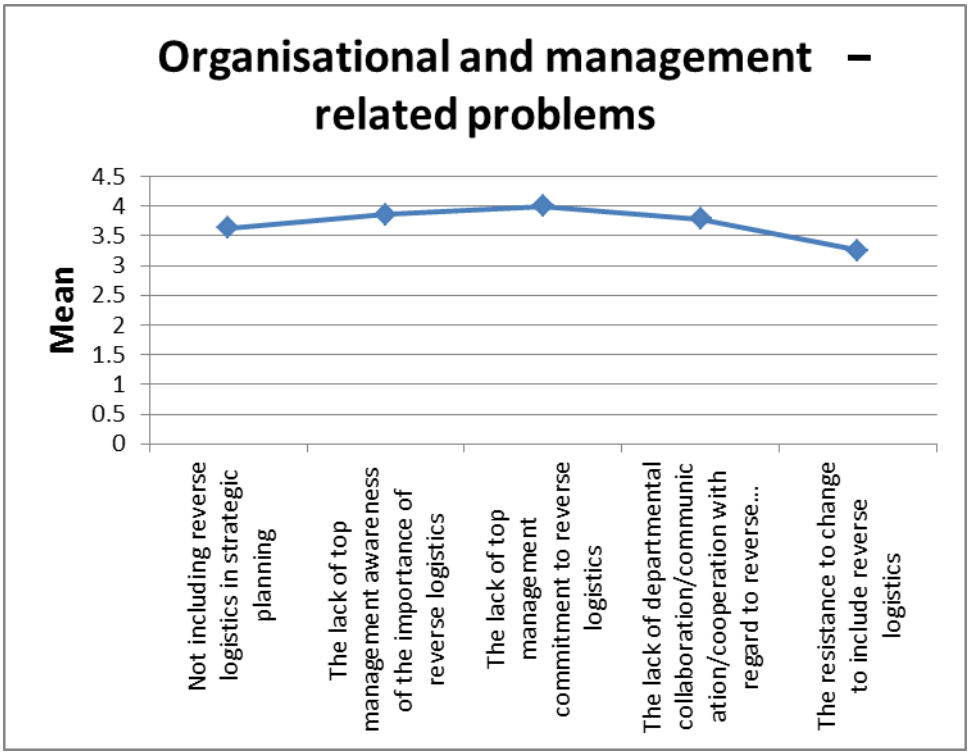

Figure 6.4: Mean values for organisational and management-related problems

The range of the mean and median values (3.25–4 and 3–4) respectively indicated that not including reverse logistics in strategic planning, the lack of top management awareness of the importance of reverse logistics, the lack of top management commitment to reverse logistics and the lack of departmental collaboration/communication/cooperation with regard to reverse logistics all tend to be perceived as a problem/challenge to a great extent. However, resistance to change to include reverse logistics was perceived to be the least significant problem, with a mean value of 3.25 and median value of 3. The lack of top management commitment to reverse logistics was perceived to be the main problem, with a mean and median value of 4.

In terms of the comments on organisational and management-related problems, one respondent stated that a lack of strategic priority in reverse logistics affects the bottom line, and a lack of understanding by top management is also a huge issue that can have an effect on operations. However, another respondent stated that organisations do seem to be more aware of the need to focus more on reverse logistics but much development is still needed in this area.

6.2.2.5 Problems with supply chain partners

In section 2.5, the participants were asked to indicate the extent to which their organisation experiences problems with reverse logistics in terms of (1) a lack of collaboration with supply chain partners regarding reverse logistics; and (2) a lack of communication with supply chain partners regarding reverse logistics. Table 6.7 indicates the means and median values for each of the potential problems/challenges with supply chain partners.

Table 6.7: Mean and median values for problems with supply chain partners

	Mean	**Median**
Lack of collaboration with supply chain partners regarding reverse logistics	2.8	3.5
Lack of communication with supply chain partners regarding reverse logistics	2.89	3

Graph 6.5 indicates the mean values for each of the two potential problems relating to supply chain partners regarding reverse logistics.

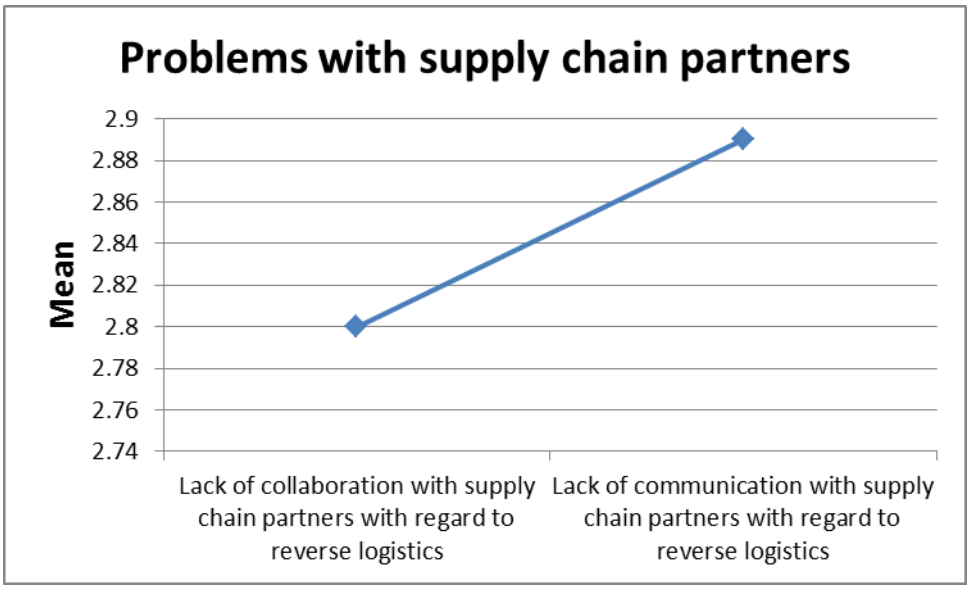

Figure 6.5: Mean values for problems with supply chain partners

The range of the mean and median values (2.8–2.89 and 3–3.5) respectively indicated that a lack of collaboration with supply chain partners regarding reverse logistics and a lack of communication with supply chain partners in respect of reverse logistics both tended to be perceived as a problem/challenge to a moderate extent.

In terms of the comments in this section, one respondent stated that problems with supply chain partnerships normally occur more when traditional distributors attempt to become involved with reverse logistics. According to this respondent, the traditional distributors are effective with forward logistics but ineffectual in reverse logistics, and that these distributors do not fully realise that the two processes are entirely different. Another respondent commented that there is a huge amount of willingness between the manufacturer and the service provider to collaborate, but the problem persists with the involvement of the customer or retailer.

Another respondent stated that major suppliers have partnerships with reverse logistics vendors. According to this respondent, the reason for this is that supply chain partners do realise that if there is not an effective reverse logistics partner in place, their forward logistics is placed on hold while old products are disposed of.

Another respondent stated that the industry has an excellent understanding of the multitude of operational issues that influence reverse logistics, but the ongoing problem is achieving full collaboration between all role players in the supply chain. According to this respondent, this area of logistics still contributes to a large amount a waste (cost) in the supply chain.

The above comments mirror the results relating to the lack of collaboration between reverse logistics partners, which clearly indicates that it is not a major problem in comparison with other problems that were identified.

6.2.2.6 Customer-related problems

In section 2.2, the participants were asked to indicate the extent to which their organisation experiences problems with reverse logistics in terms of (1) the lack of clear policies on returns of products; (2) customer abuse of return policies; (3) unauthorised return allowance; and (4) customers' negative perception of returning the products. Table 6.8 indicates the means and median values for each of the potential customer-related problems/challenges in reverse logistics.

Table 6.8: Means and median values for customer-related problems

	Mean	**Median**
Lack of clear policies on return of products	2.67	2
Customer abuse of return policies	4	4
Unauthorised return allowance	3.44	4
Customers' negative perception of returning the products	2.88	3

Graph 6.6 indicates the mean values for each of the potential customer-related problems in reverse logistics.

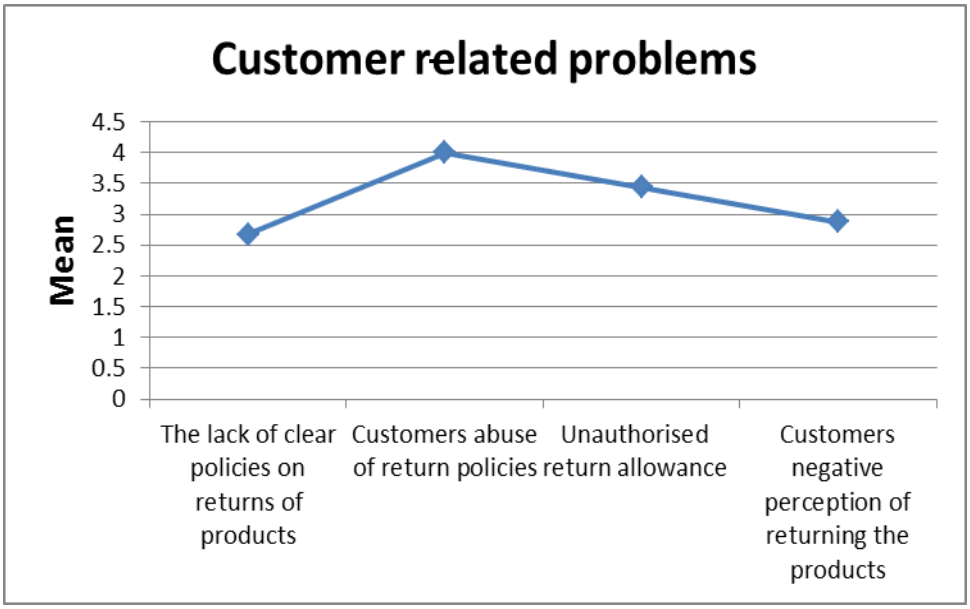

Figure 6.6: Mean values for customer-related problems

The range of the mean and median values (2.67–2.88 and 2–3) indicated that the lack of clear policies on the returns of products and customers' negative perception of returning products both tend to be perceived as a problem/challenge to a moderate extent. However, the range of the mean and median values (3.44–4 and 4) respectively indicated that customers' abuse of return policies and unauthorised return allowance both tended to be perceived as a problem/challenge to a great extent. Customers' abuse of return policies was perceived as being the principal problem/challenge, with a mean and median of 4. In this section, no comments were provided that were relevant to customer-related problems.

Based on the results of this section, the high cost associated with reverse logistics, insufficient investment in IT, uncertainties relating to product returns, a lack of top management commitment to reverse logistics and customers' abuse of return policies, were all perceived to be the main problem/challenge in reverse logistics. The next section deals with the level of best practices in reverse logistics.

6.2.3 Level of best practices in reverse logistics

In this section, the results in section 3 of the questionnaire will be discussed. These related to best practices and solutions in reverse logistics. Section 3 was divided into four subsections (3.1–3.4), namely information-related best practices, best practices relating to reverse logistics

processes, organisational and management-related best practices and best practices relating to outsourcing and partnerships. Each of the subsections contained three sets of instructions. *Firstly*, the respondents were asked to indicate to what extent the specific practice or solution could contribute to the efficient management of reverse logistics. *Secondly*, the respondents were asked to indicate the difficulty of implementing that specific best practice or solution. *Finally*, the respondents were asked to make comments if they had anything to add. The focus of this section is the analysis of the first and third instructions. The second instruction in section 3 will be discussed in subsequent sections (gap and opportunity analysis).

6.2.3.1 Information-related best practices

Section 3.1 was about best practices and solutions relating to information. Table 6.9 indicates the means and median values for each of the potential best practices and solutions relating to information.

Table 6.9: Mean and median values for information-related best practices

	Mean	**Median**
Invest in state-of-the-art technology for reverse logistics	3.90	4.00
Apply an integrated information management approach	4	4
Analyse returns data to optimise decision making	3.60	3.50
Establish effective data collection	4	4
Use data management to track the flow of information	3.9	4
Implement an accurate information system	4.1	4.5

Implement a flexible information system	3.6	3.5
Automate information	3.5	4
Implement an information system that is compatible with supply chain partners (customers and suppliers)	4.3	4.5
Utilise the internet or establish a web-based approach	4	4
Use a reverse logistics information management system	4	4
Use special return software	3.11	4
Use a return merchandise authorisation (RMA) system	3.5	3.5
Utilise a knowledge management system (KMS)	3.44	4
Utilise a warehouse management system (WMS)	3.78	4
Utilise a transportation management system (TMS)	3.67	4

Graph 6.7 indicates the mean values for each of the potential information-related best practices and solutions.

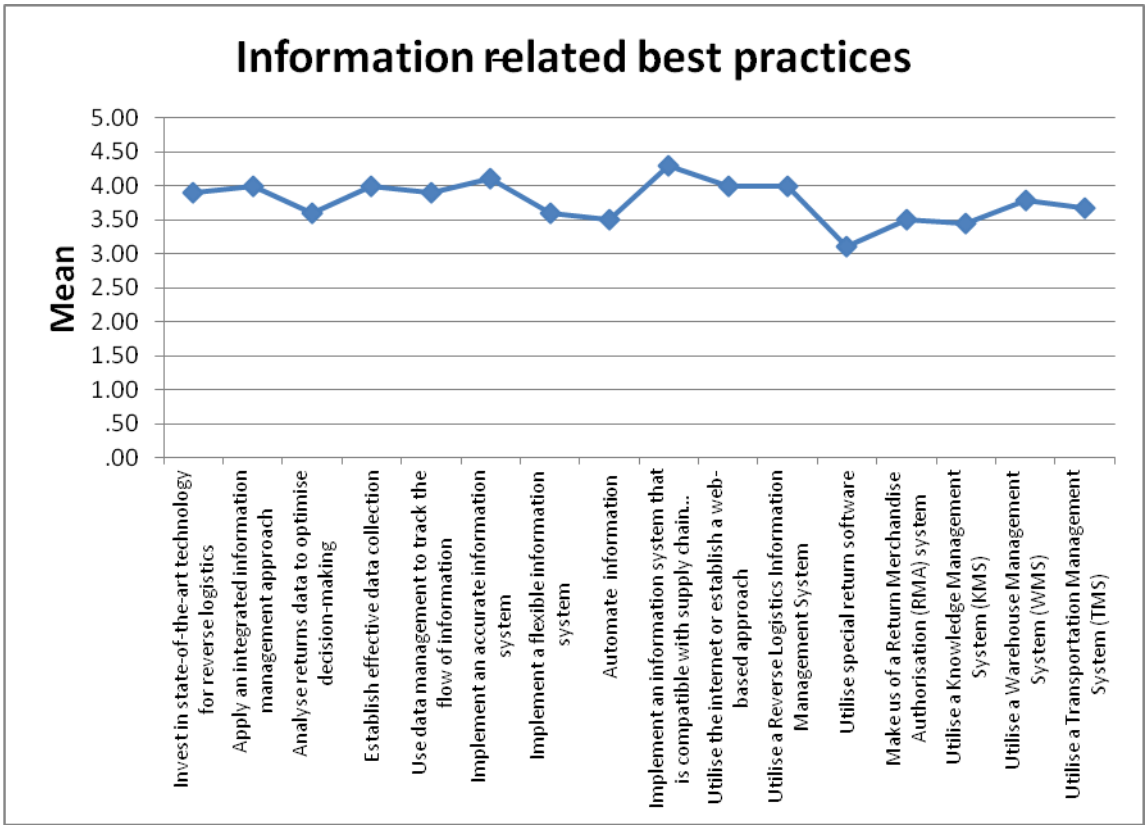

Figure 6.7: Mean values for information-related best practices

The range of the mean and median values of (3.44–4.3 and 3.5–4) respectively indicated that all the best practices relating to information tended to be perceived as a potential best practice/solution, which could contribute to the efficient management of reverse logistics, to a great extent. Implementing an information system that is compatible with supply chain partners was perceived to be the primary contributor, with a mean value of 4.3 and a median value of 4.5.

In this part of the questionnaire, the respondents were also afforded an opportunity to make comments. According to one respondent, the simplest would be to use an existing warehouse management system and transport management system together with the automated analysis. Another respondent commented that in most instances, the organisation does not require a very advanced system, but a reverse logistics supplier needs an effective system in place. The same respondent also stated that if the systems are too complex, the staff may not always understand how the system works. The respondent therefore suggested that simplicity is the best – keep it simple, documented and streamlined.

6.2.3.2 Best practices relating to reverse logistics processes

Section 3.2 was about best practices and solutions relating to reverse logistics processes. Table 6.10 indicates the means and median values for each of the potential best practices and solutions relating to reverse logistics processes.

Table 6.10: Mean and median values for best practices relating to reverse logistics processes

	Mean	Median
Streamline the reverse logistics process	4.1	4.5
Set structured procedures	4.2	5
Automate the entire reverse logistics process	3.8	3.5
Standardise the reverse logistics procedures	4.3	5
Establish a reverse logistics procedure that is uncomplicated	4.3	4
Establish a reverse logistics procedure that is quick	4.1	5
Establish a gatekeeper at the start of the reverse logistics process	4.1	4.5
Implement a robust gatekeeping function	3.9	4
Separate reverse logistics facilities from forward facilities by establishing central returns centres	3.6	4

Graph 6.8 indicates the mean values for each of the potential best practices and solutions relating to the reverse logistics process.

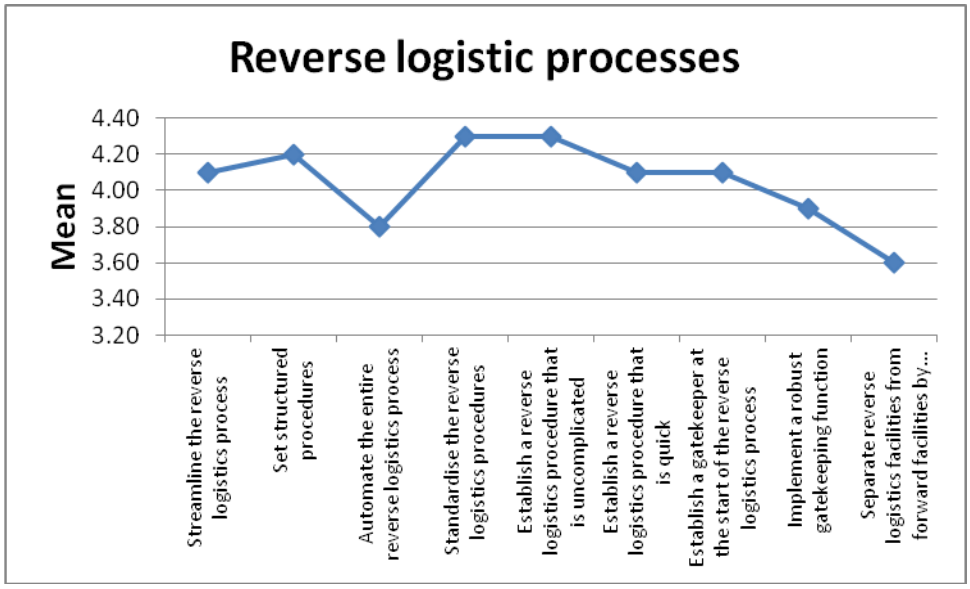

Figure 6.8: Mean values for best practices relating to reverse logistics processes

The range of the mean and median values (3.6–4.3 and 3.5–5) respectively indicated that all the best practices relating to the reverse logistics process tended to be perceived as a potential best practice/solution, which could contribute to the efficient management of reverse logistics, to a great or very great extent. However, separating reverse logistics from forward facilities had the lowest mean, with a value of 3.6. It was therefore perceived to be a best practice/solution, which contributes to the efficient management of reverse logistics, to a lesser extent than the other practices. However, standardising reverse logistics procedures, with a mean value of 4.3 and median value of 5, and establishing a reverse logistics procedure that is quick, with a mean value of 4.3 and a median value of 4, were both perceived to be the best practice/solution with the most significant contribution to the efficient management of reverse logistics.

In terms of the comments in this section, one participant suggested that it is best to keep forward and reverse logistics running hand in hand, because this reduces costs. This mirrors the results which indicated that separating the reverse logistics and forward facilities are perceived to be a best practice that contributes to the management of reverse logistics, to a lesser extent than the other practices.

6.2.3.3 Organisational and management-related best practices

Section 3.3 focused on organisational and management-related best practices and solutions. Table 6.11 indicates the means and median values for each of the potential organisational and management-related best practices.

Table 6.11: Mean and median values for organisational and management-related best practices

	Mean	**Median**
Create a comprehensive strategic plan for reverse logistics	4.2	4
Implement a customer-focused policy and strategy for reverse logistics	4	4
Implement multiple disposition strategies for reverse logistics	3.44	3
Establish clear policies for reverse logistics	4.5	5
Establish uniform policies for reverse logistics	3.8	4
Review current customer service practices	3.33	4
Simplify return policies	4.33	5
Implement return avoidance strategies or zero-return policies	3.5	4
Develop an innovative reverse logistics programme	4.33	5
Develop a formalised reverse logistics programme	4.2	4

Employ a dedicated manager for reverse logistics	3.11	3
Guidance of top management and an executive team to implement a successful reverse logistics programme	3.9	4
Top management that demonstrate commitment to reverse logistics	4.1	4
Conduct formal training of employees involved in the reverse logistics process	4.22	5
Establish cross-functional teams for reverse logistics	4.1	4

Graph 6.9 indicates the mean values for each of the potential organisational or management-related best practice/solution

Figure 6.9: Mean values for organisational and management-related best practices

The wide range of the mean and median values (3.11–4.5 and 4–5) respectively indicated that all the organisational and management-related best practices tended to be perceived as a potential best practice/solution, which could contribute to the efficient management of reverse logistics, from a moderate to a great extent. However, employing a dedicated manager for reverse logistics had the lowest mean, with a value of 3.11. It was therefore perceived to be a best practice/solution that contributed to the efficient management of reverse logistics, to a moderate extent. However, establishing clear policies for reverse logistics was perceived to be the best practice/solution with the most significant contribution to the efficient management of reverse logistics, with a mean value of 4.5 and median value of 5.

Regarding the comments, one of the respondents stated that implementing dedicated staff is easy and that management should easily adapt their commitment to reverse logistics if they see the benefits of cost savings and operational efficiency. Another respondent commented that cross-functional teams reduce costs and retain the staff dynamics. However, this respondent commented that top management involvement is not always a positive thing. The reason for this is that top management often do not understand the procedure at ground level. According to this respondent, top management should take some interest in reverse logistics in order to provide the necessary resources.

The above-mention comments mirror the results, in that both “top management that demonstrate commitment to reverse logistics” and “establish cross-functional teams for reverse logistics” had high mean values.

6.2.3.4 Best practices relating to outsourcing and partnerships

Section 3.4 was about best practices relating to outsourcing and partnerships. Table 6.12 indicates the means and median values for each of the potential outsourcing and partnerships relating to best practices.

Table 6.12: Mean and median values for best practices relating to outsourcing and partnerships

	Mean	Median
Outsource reverse logistics to third party logistics (3PL) providers	3.56	4
Leverage a partnership network for reverse logistics	3.3	3
Create alliances with supply partners for reverse logistics	3.7	4
Engage with supply chain partners through contractual processes	3.7	4
Build and develop long-term partnerships with supply chain partners based on mutual trust and commitment	3.4	3.5
Share information with supply chain partners	4.2	4

Graph 6.10 indicates the mean values for each of the potential best practice/solution relating to outsourcing and partnerships.

Figure 6.10: Mean values for best practices relating to outsourcing and partnerships

The range of the mean and median values (3.33–4.2 and 3–4) respectively indicated that all the best practices relating to outsourcing and partnerships tended to be perceived as a potential best practice/solution, which could contribute to the efficient management of reverse logistics, from a moderate to a great extent. However, leveraging a partnership network for reverse logistics had the lowest mean, with a value of 3.33 and median with a value of 3. It was therefore perceived to be a best practice/solution, which contributes to the efficient management of reverse logistics, to a moderate extent. By contrast, sharing information with supply chain partners was perceived to be the best practice/solution with the most significant contribution to the efficient management of reverse logistics, with a mean value of 4.2 and median value of 4.

In terms of the comments in this section, one respondent stated that reverse logistics on a corporate scale is almost certainly best outsourced. This respondent also commented as follows: "[Y]ou focus what you are good on and the reverse logistics partner focus on what they are good at". The same respondent suggested that outsourcing should not be done when the organisation applies forward logistics.

In this section, implementing an information system that is compatible with supply chain partners, standardising reverse logistics procedures, establishing a reverse logistics procedure that is quick, establishing clear policies for reverse logistics and sharing information with supply chain partners were all perceived to be the best practices with the most significant contribution to the efficient management of reverse logistics. The next section deals with the results of the inferential statistics.

6.3 INFERENTIAL ANALYSIS

This section focuses on the impact of turnover on problems/challenges experienced and the extent of contribution of the best practices in reverse logistics. The aim was to test whether or not organisations with a turnover of less than R100 million per annum differ statistically significantly from those organisations with a turnover of more than R100 million per annum with regard to the problems/challenges and the extent of contribution of best practices. A Mann-Whitney nonparametric test was used because of the small sample size and ordinal scaled data.

6.3.1 The impact of turnover on problems and challenges experienced in reverse logistics

In order to determine whether the turnover of organisations had an impact on the problems/challenges experienced, the following hypotheses were tested:

H_0: Organisations with a turnover of less than R100 million per annum do not differ from those organisations with a turnover of more than R100 million with regard to the challenges/problems experienced.

H_1: Organisations with a turnover of less than R100 million per annum differ from those organisations with a turnover of more than R100 million with regard to the challenges/problems experienced.

Table 6.13 shows the problems/challenges for which there is a statistically significant difference at the 10% level of significance (exact significance used) between organisations with a turnover of less than R100 million per annum and those with a turnover of more than R100 million per annum.

Table 6.13: Testing for statistical differences: problems and challenges

	Lack of information visibility	Uncertainties relating to product returns	A lack of knowledge about the time and costs involved in the disposition of product returns	Lack of top management awareness of the importance of reverse logistics	Lack of top management commitment to reverse logistics
Mann-Whitney U	4.500	3.000	4.000	.000	.000
Wilcoxon W	19.500	18.000	19.000	3.000	3.000
Z	-1.741	-2.132	-1.844	-2.160	-2.049
Asymp. sig. (2-tailed)	.082	.033	.065	.031	.040
Exact sig. [2*(1-tailed sig.)]	.095[a]	.056[a]	.095[a]	.095[a]	.095[a]

Furthermore, the mean ranks shown below in table 6.14 indicate that the organisations with a turnover of less than R100 million tended to experience these problems to a greater extent (higher mean ranks) than those with a turnover of more than R100 million per annum.

Table 6.14: Mean ranks: significant differences in reverse logistics problems/challenges

Problem/challenge	Turnover	Mean rank
Lack of information visibility	Less than 100 million	7.10
	More than 100 million	3.90
Uncertainties relating to product returns	Less than 100 million	7.40
	More than 100 million	3.60
A lack of knowledge about time and costs involved in the disposition of product returns	Less than 100 million	7.20
	More than 100 million	3.80
Lack of top management awareness of the importance of reverse logistics	Less than 100 million	5.00
	More than 100 million	1.50
Lack of top management commitment to reverse logistics	Less than 100 million	5.00
	More than 100 million	1.50

Based on the above findings, organisations with a turnover of less than R100 million tended to experience problems relating to a lack of information visibility, uncertainties relating to product

returns, a lack of knowledge about the time and costs involved in the disposition of product returns, a lack of top management awareness of the importance of reverse logistics and a lack of top management commitment, to a greater extent than those with a turnover of more than a R100 million per annum. The reason for this could be the fact that larger organisations are more organised in terms of information and management's attitude towards reverse logistics.

6.3.2 The impact of turnover on the extent of the contribution of particular best practices perceived in reverse logistics

In order to determine whether the turnover of organisations had an impact on the extent of the contribution of particular best practices perceived in reverse logistics, the following hypotheses were tested:

H_0: Organisations with a turnover of less than R100 million per annum do not differ from those organisations with a turnover of more than R100 million per annum with regard to their perception of the extent of the contribution of best practices.

H_1: Organisations with a turnover of less than R100 million per annum do differ from those organisations with a turnover of more than R100 million per annum with regard to their perception of the extent of the contribution of best practices.

Table 6.15 shows the contribution of best practices for which there is a statistically significant difference at the 10% level of significance (exact significance used) between organisations with a turnover of less than R100 million per annum and those with a turnover of more than R100 million per annum.

Table 6.15: Testing statistical difference: best practices

	Develop an innovative, sophisticated and formalised reverse logistics programme	Outsource reverse logistics to third party logistics (3PL) providers	Leverage a partnership network and create alliances with supply chain partners for reverse logistics
Mann-Whitney U	1.000	2.000	4.500
Wilcoxon W	11.000	12.000	19.500
Z	-2.084	-2.066	-1.735
Asymp. sig. (2-tailed)	.037	.039	.083
Exact sig. [2*(1-tailed sig.)]	.057[a]	.063[a]	.095[a]

Table 6.16 below indicates the mean ranks regarding the extent of the contribution of best practices between organisations with a turnover of less than R100 million per annum and those with a turnover of more than R100 million per annum.

Table 6.16: Mean ranks: significant difference of best practices in reverse logistics

Best practice	Turnover	Mean rank
Develop an innovative, sophisticated and formalised reverse logistics programme	Less than 100 million	2.75
	More than 100 million	6.25
Outsource reverse logistics to third party logistics (3PL) providers	Less than 100 million	6.60
	More than 100 million	3.00
Leverage a partnership network and create alliances with supply chain partners for reverse logistics	Less than 100 million	7.20
	More than 100 million	3.90

From table 6.17 it is clear that those organisations with a turnover of less than R100 million per annum (mean rank = 2.75) tended to perceive the contribution of developing an innovative, sophisticated and formalised reverse logistics programme to a lesser extent than those organisations with a turnover of more than R100 million per annum (mean rank = 6.25). This

could be the result of a lack of resources and limited scope of reverse logistics in smaller organisations.

However, those organisations with a turnover of less than R100 million per annum tended to perceive the contribution of outsourcing reverse logistics to a 3PL as well as leveraging a partnership network and creating alliances with supply chain partners for reverse logistics to a greater extent (mean ranks of 6.6 and 7.2 respectively) than those organisations with a turnover of more than R100 million per annum (mean ranks of 3 and 3.9 respectively). The statistically significant difference regarding these two best practices is to be expected. If the extent or scope of an activity such as reverse logistics is limited, it does not justify an organisation's attention or resources. Hence it is a best practice to outsource the activity or create an alliance with a larger supply chain partner to assist with the activity. In the next section, a gap and opportunity analysis, based on the results of the extent of the contribution of best practices in reverse logistics in relation to the difficulty in implementing it, will be discussed.

6.4 GAP AND OPPORTUNITY ANALYSES

In this section, the analysis of section 3 (instruction 2) in terms of the extent of the contribution of the best practices in relation to the difficulty of implementing the best practices are discussed. This will be done by a means of a gap analysis and an opportunity analysis. The gap analysis for each best practice category will be discussed first, followed by a discussion of the opportunity analysis for each best practice category.

6.4.1 Gap analysis

In this section, the extent of the contribution of best practices in relation to the difficulty to implement these best practices is discussed by means of a gap analysis. This analysis involves a comparison between two factors in order to determine the difference exist between them.

6.4.1.1 Information-related best practices

In this section, the extent of the contribution of information-related best practices in relation to the difficulty in implementing these information-related best practices, are discussed by means

of a gap analysis. Table 6.17 indicates the mean values of the contribution of information-related best practices and the difficulty implementing it.

Table 6.17: Mean values of contribution and difficulty implementing information-related best practices

	Information-related best practice	Contribution	Difficulty implementing
3.1.1a	Invest in state-of-the-art technology for reverse logistics	3.90	2.90
3.1.2a	Apply an integrated information management approach	4.00	3.60
3.1.3a	Analyse returns data to optimise decision making	3.60	2.00
3.1.4a	Establish effective data collection	4.00	2.33
3.1.5a	Use data management to track the flow of information	3.90	2.50
3.1.6a	Implement an accurate information system	4.10	2.80
3.1.7a	Implement a flexible information system	3.60	3.20
3.1.8a	Automate information	3.50	2.50
3.1.9a	Implement an information system that is compatible with supply chain partners (customers and suppliers)	4.30	4.40
3.1.10a	Utilise the internet or establish a web-based approach	4.00	3.10
3.1.11a	Utilise a reverse logistics information management system	4.00	3.10
3.1.12a	Utilise special return software	3.11	3.44
3.1.13a	Make us of a return merchandise authorisation (RMA) system	3.50	2.80
3.1.14a	Utilise a knowledge management system (KMS)	3.44	2.78
3.1.15a	Utilise a warehouse management system (WMS)	3.78	2.89
3.1.16a	Utilise a transportation management system (TMS)	3.67	2.78

The radar graph (figure 6.11) shows the mean level of (1) the extent of the contribution of each of the best practices, and (2) the difficulty implementing each of these information-related best practices.

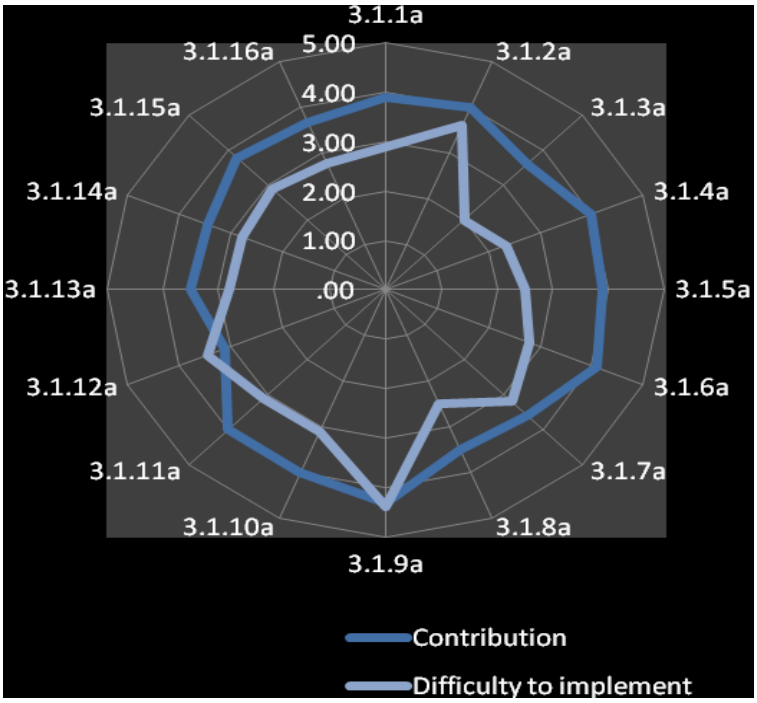

Figure 6.11: Contribution/difficulty implementing information-related best practices

From the graph, the following observations can be made about the best practices:

- The practice "implement an information system that is compatible with supply chain partners (customers and suppliers)" has the highest mean level in terms of its contribution (4.3), but the effort to implement it is between somewhat and very difficult (4.4), thus indicating that it is an extremely important best practice, but implementation is cost intensive.
- The practice "implement an accurate information system" has a high contribution mean level (4.1) and the difficulty implementing it is moderate (2.8). This best practice is thus one of the "low hanging fruits" that will contribute to a great extent and is not that cost intensive/difficult to implement.
- The practice of establishing "effective data collection" has a high contribution mean level (4.0), but the difficulty implementing it is fairly low with a mean value of 2.33. This best practice is thus important and not that difficult to implement.

- The practice "utilise special return software" has a moderate contribution level (3.11), but the difficulty implementing it is even higher (3.44), indicating that decisions taken about this practice should be carefully considered in terms of value delivered to the organisation.

6.4.1.2 Best practices relating to reverse logistics processes

In this section, the extent of the contribution of best practices relating to reverse logistics processes in relation to the difficulty in implementing these best practices is discussed by means of a gap analysis. Table 6.18 below indicates the mean values of the contribution of best practices relating to reverse logistics processes and the difficulty implementing it.

Table 6.18: Mean values for contribution and difficulty implementing best practices relating to reverse logistics processes

	Best practices relating to reverse logistics processes	Contribution	Difficulty implementing
3.2.1a	Streamline the reverse logistics process	4.1	3.00
3.2.2a	Set structured procedures	4.2	2.50
3.2.3a	Automate the entire reverse logistics process	3.8	4.00
3.2.4a	Standardise the reverse logistics procedures	4.3	2.10
3.2.5a	Establish a reverse logistics procedure that is uncomplicated	4.3	2.30
3.2.6a	Establish a reverse logistics procedure that is quick	4.1	2.60
3.2.7a	Establish a gatekeeper at the start of the reverse logistics process	4.1	2.00
3.2.8a	Implement a robust gatekeeping function	3.9	2.67
3.2.9a	Separate reverse logistics facilities from forward facilities by establishing central returns centres	3.6	3.70

The radar graph (figure 6.12) shows the mean level of (1) the extent of the contribution of each of the best practices, and (2) the difficulty implementing each of these best practices relating to reverse logistics processes.

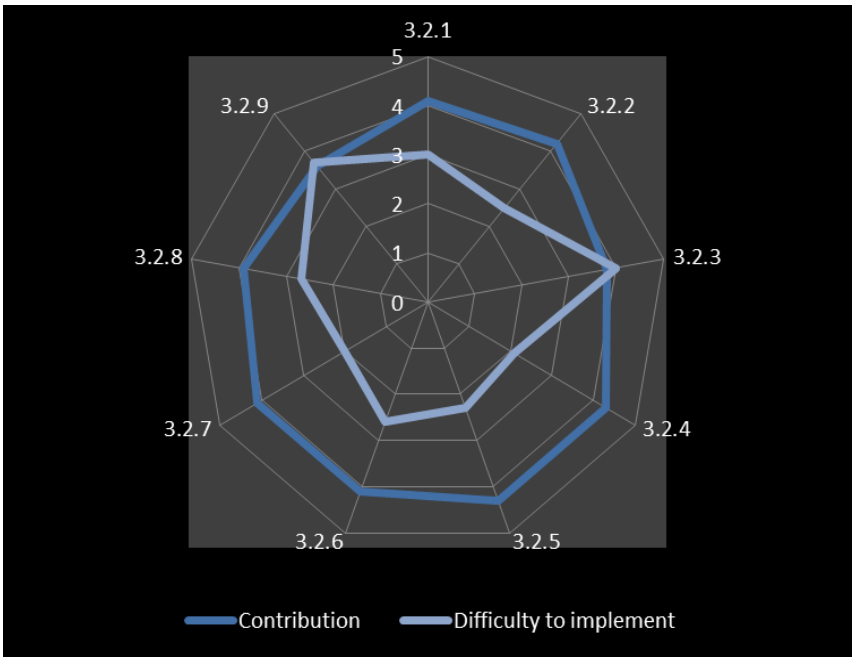

Figure 6.12: Contribution/difficulty implementing best practices relating to reverse logistics processes

From the graph, the following observations can be made about the best practices:

- The practice, "setting structured processes for reverse logistics", has a high mean in terms of its contribution (4.2), but the effort implementing is moderately low (2.5). Hence this best practice will contribute to a great extent and it is not too difficult to implement.
- The practice, "automate the entire reverse logistics process", has a relatively high mean level of 3.8 in terms of its contribution, but the difficulty implementing this practice has a higher mean level of 4. Hence it would be deemed an important best practice, but implementing it could be too difficult, and a decision about this practice should be carefully considered in terms of value delivered to the organisation.
- The practice, "standardise the reverse logistics process", has a high mean level (4.3) in terms of its contribution, but a low mean level (2.1) in terms of the difficulty implementing it. This practice is thus extremely important and not too cost intensive to implement.
- Similar to the above, the practice, "establish a reverse logistics procedure that is uncomplicated", has a high mean level (4.3) in terms of its contribution, and a relatively low

mean level (2.3) for implementing it. Thus this is also a vital best practice and not too difficult to implement.

- The practice, "establish a gatekeeper at the start of the reverse logistics process", also has a relatively high mean level (4.1) with a low mean level (2) in terms of the difficulty implementing it. This best practice is therefore important and not difficult to implement.

6.4.1.3 Organisational and management-related best practices

In this section, the extent of the contribution of organisational and management-related best practices in relation to the difficulty of implementing these best practices, is discussed by means of a gap analysis. Table 6.19 indicates the mean values of the contribution of organisational and management-related best practices and the difficulty implementing it.

Table 6.19: Mean values for contribution and difficulty implementing organisational and management-related best practices

	Organisational and management-related best practice	Contribution	Difficulty implementing
3.3.1a	Create a comprehensive strategic plan for reverse logistics	4.2	2.5
3.3.2a	Implement a customer-focused policy and strategy for reverse logistics	4	2.78
3.3.3a	Implement multiple disposition strategies for reverse logistics	3.44	3.44
3.3.4a	Establish clear policies for reverse logistics	4.5	2.4
3.3.5a	Establish uniform policies for reverse logistics	3.8	2.8
3.3.6a	Review current customer service practices	3.33	2.33
3.3.7a	Simplify return policies	4.33	2.78
3.3.8a	Implement return avoidance strategies or zero-return policies	3.5	3.13
3.3.9a	Develop an innovative reverse logistics programme	4.33	3.22

3.3.10a	Develop a formalised reverse logistics programme	4.2	3.3
3.3.11a	Employ a dedicated manager for reverse logistics	3.11	2.11
3.3.12a	Guidance of top management and an executive team to implement a successful reverse logistics programme	3.9	2.9
3.3.13a	Top management that demonstrate commitment to reverse logistics	4.1	2.8
3.3.14a	Conduct formal training of employees involved in the reverse logistics process	4.22	2.44
3.3.15a	Establish cross-functional teams for reverse logistics	4.1	2.5

The radar graph below (figure 6.13) shows the mean level of (1) the extent of the contribution of each of the best practices, and (2) the difficulty implementing each of these best practices.

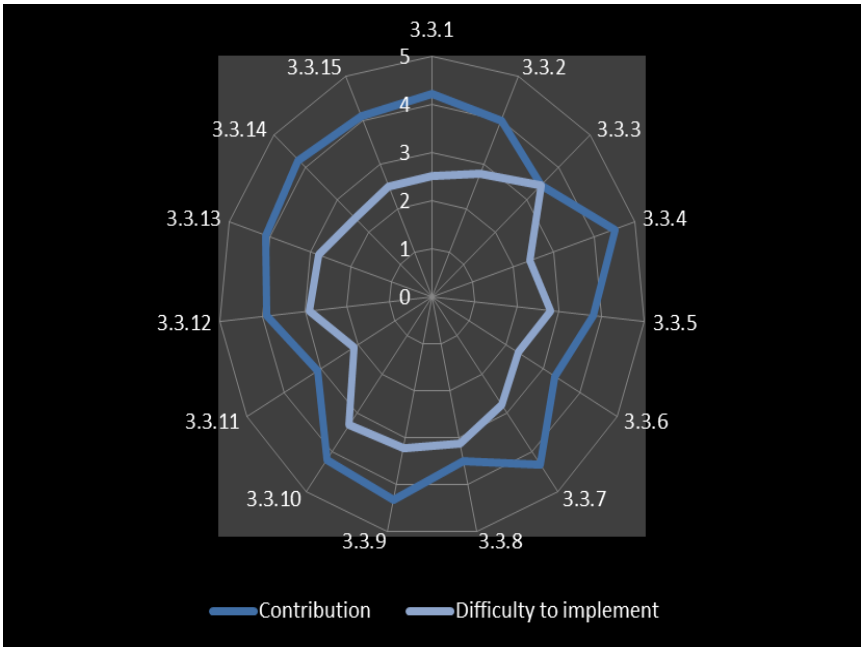

Figure 6.13: Contribution/difficulty implementing organisational and management-related best practices

From the graph, the following observations can be made about the best practices:

- The practice, "create a comprehensive strategic plan for reverse logistics", has a high mean level (4.2) in terms of its contribution, and a relatively low mean level (2.5) in terms of the difficulty implementing it. Hence it is an important best practice and relatively easy to implement.
- The practice, "establish clear policies for reverse logistics", has the highest mean level in terms of its contribution (4.5), and also has a low mean level in terms of the difficulty implementing it (2.4). This best practice is thus very important and not difficult to implement.
- Similar to the above, the practice, "conduct formal training of employees involved in the reverse logistics process", has a high mean level of 4.22 in terms of its contribution and a low mean level of 2.44 in terms of the difficulty implementing it. This best practice is thus also relatively important and not difficult to implement.

6.4.1.4 Best practices relating to outsourcing and partnerships

In this section, the extent of the contribution of best practices relating to outsourcing and partnerships in relation to the difficulty implementing these best practices is discussed by means of a gap analysis. Table 6.20 indicates the mean values of the contribution of best practices relating to outsourcing and partnerships and the difficulty implementing it.

Table 6.20: Mean values for contribution and difficulty implementing best practices relating to outsourcing and partnerships

	Best practices relating to outsourcing and partnerships	Contribution	Difficulty implementing
3.4.1a	Outsource reverse logistics to third party logistics (3PL) providers	3.56	3.22
3.4.2a	Leverage a partnership network for reverse logistics	3.3	2.2
3.4.3a	Create alliances with supply partners for reverse logistics	3.7	2.8
3.4.4a	Engage with supply chain partners through contractual processes	3.7	3.1

3.4.5a	Build and develop long-term partnerships with supply chain partners based on mutual trust and commitment	3.4	2.7
3.4.6a	Share information with supply chain partners	4.2	2.7

The radar graph below (figure 6.14) shows the mean level of (1) the extent of the contribution of each of the best practices, and (2) the difficulty of implementing each of these best practices.

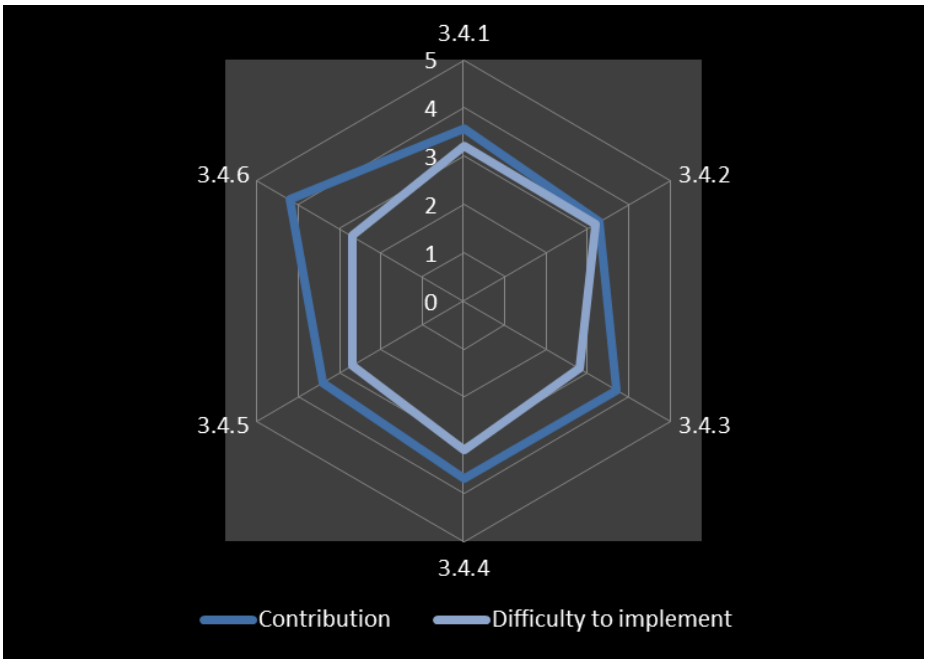

Figure 6.14: Contribution/difficulty implementing best practices relating to outsourcing and partnerships

From the graph, the following observations can be made about the best practices:

- The practice, "create alliances with supply chain partners for reverse logistics", has a moderately high mean in terms of its contribution (3.7), and the effort to implement it was moderately low (2.8) in comparison. Hence this best practice was relatively important and not that difficult to implement.
- The practice, "share information with supply chain partners", had the highest mean level in terms of its contribution (4.2) and a moderately low mean level (2.7) for implementing it. This best practice was therefore deemed important and not too difficult to implement.

6.4.2 Opportunity analysis

In this section, an opportunity analysis will be used to determine the extent of the contribution of best practices in relation to the difficulty implementing these best practices. This will be discussed by means of portfolio matrixes. Each portfolio matrix has the following four quadrants:

- *White elephant*. This quadrant signifies those best practices with a low level of contribution (low mean values – less than 3) and difficult to implement (high mean values – more than 3)
- *Bread and butter*. This quadrant signifies those best practices with a low level of contribution but easy to implement (low mean values – less than 3)
- *Oysters*. This quadrant signifies those best practices that are important, but difficult to implement (high mean values – more than 3)
- *Pearls*. This quadrant signifies those best practices that are important (high mean values – more than 3) and are relatively easy to implement (low mean values – less than 3)

The opportunity analysis for each of the best practice categories will now be discussed.

6.4.2.1 Information-related best practices

In this section, the extent of the contribution of information-related best practices in relation to the difficulty implementing them is discussed by means of an opportunity analysis. Graph 6.15 illustrates the portfolio matrix for these best practices.

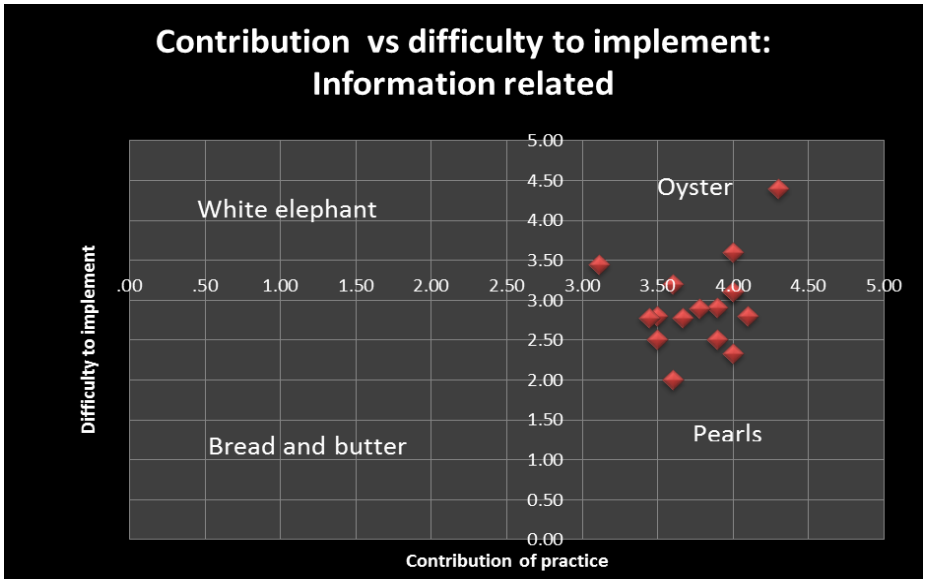

Figure 6.15: Portfolio matrix: contribution versus difficulty implementing information-related best practice

The portfolio matrix indicates that all the best practices relating to information in reverse logistics identified are indeed perceived to contribute to at least to a moderate extent to the efficient management of reverse logistics (mean values above 3). Furthermore, practices in the pearl quadrant (10 of the 16 listed) are considered to be those that can potentially add value and are not that difficult to implement. These best practices should be included in the refined framework of reverse logistics best practices (main objective of the study). The remaining four practices are all in the oyster quadrant, indicating that they can be potentially cost intensive to implement and the benefit-cost trade-off should be carefully considered for these practices. The best practices in the oyster quadrant that merit careful consideration include the following:

- applying an integrated information management approach
- utilising the internet or adopting a web-based approach
- utilising a reverse logistics information management system
- implementing a flexible information system
- implementing an information system that is compatible with supply chain partners
- utilising special return software

6.4.2.2 Best practices relating to reverse logistics processes

In this section, the extent of the contribution of best practices relating to reverse logistics processes in relation to the difficulty implementing them are discussed by means of an opportunity analysis. Graph 6.16 illustrates the portfolio matrix for these best practices.

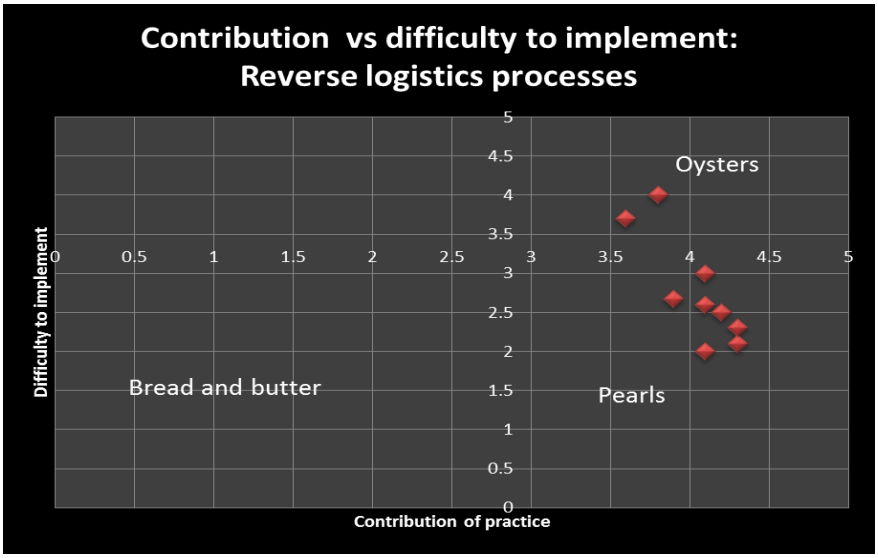

Figure 6.16: Portfolio matrix: contribution versus difficulty implementing best practices relating to reverse logistics processes

The portfolio matrix indicates that all the best practices relating to the reverse logistics process are indeed perceived to contribute, to a relatively high extent, to the efficient management of reverse logistics (mean values above 3.5). Furthermore, practices in the pearl quadrant (7 of the 9 listed) are considered to be those that can potentially add value and are not that difficult to implement These best practices should be included in the refined framework of reverse logistics best practices (main objective of the study). Thus the remaining two best practices in the oyster quadrant indicate that they may be potentially cost intensive to implement and the benefit-cost trade-off should be carefully considered for these practices. The two best practices in the oyster quadrant include, automating the entire reverse logistics process and separating reverse logistics facilities from forward facilities by establishing central returns centres.

6.4.2.3 Organisational and management-related best practices

In this section, the extent of the contribution of organisational and management-related best practices in relation to the difficulty implementing them is discussed by means of an opportunity analysis. Graph 6.17 illustrates the portfolio matrix for these best practices.

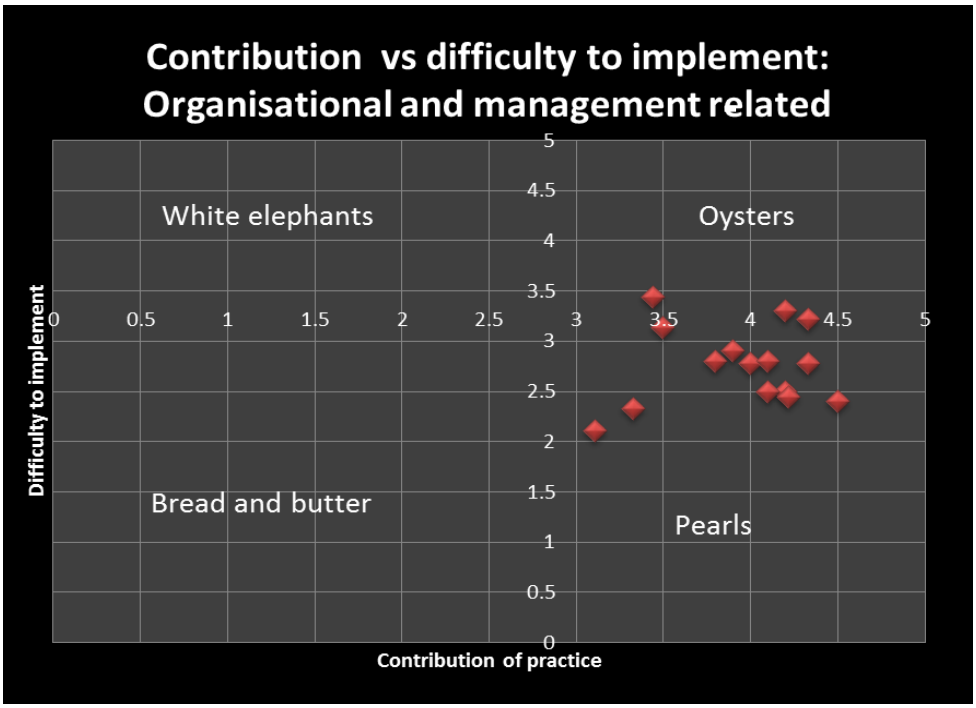

Figure 6.17: Portfolio matrix: contribution versus difficulty implementing organisational and management-related best practices

The portfolio matrix indicates that all the organisational and management-related best practices are indeed perceived to contribute, to a relatively high extent, to the efficient management of reverse logistics (mean values above 3.3). Furthermore, practices in the pearl quadrant (11 of the 15 listed) are considered to be those that can potentially add value and are not that difficult to implement. These best practices should be included in the refined framework of reverse logistics best practices (main objective of the study). Hence the remaining four best practices in the oyster quadrant indicate that they may be potentially cost intensive to implement and the benefit-cost trade-off should be carefully considered for these practices. The four organisational and management best practices that require careful consideration in the oyster quadrant include the following:

- implementing multiple disposition strategies for reverse logistics.
- implementing return avoidance strategies or zero-return policies.
- developing an innovative reverse logistics programme.
- developing a formalised reverse logistics programme.

6.4.2.4 Best practices relating to outsourcing and partnerships

In this section, the extent of the contribution of best practices relating to outsourcing and partnerships in relation to the difficulty to implement them is discussed by means of an opportunity analysis. Graph 6.18 illustrates the portfolio matrix for these best practices.

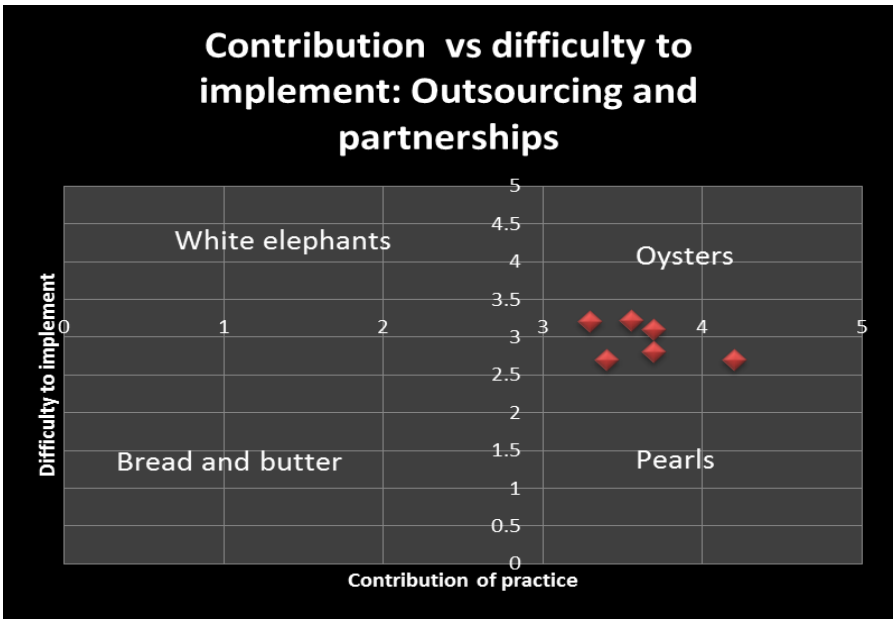

Figure 6.18: Portfolio matrix: contribution versus difficulty implementing best practices relating to outsourcing and partnerships

The portfolio matrix indicates that all the best practices relating to outsourcing and partnerships are indeed perceived to contribute, to a moderately high extent, to the efficient management of reverse logistics (mean values above 3). Furthermore, practices in the pearl quadrant (3 of the 6 listed) are considered to be those that can potentially add value and are not that difficult to implement. These best practices should be included in the refined framework of reverse logistics best practices (main objective of the study). Thus the remaining three best practices in the oyster quadrant indicate that they may be potentially cost intensive to implement and the benefit-cost trade-off should be carefully considered for these practices. The three best practices in the oyster quadrant include outsourcing reverse logistics to a 3PL provider, leveraging a partnership network for reverse logistics and engaging with supply chain partners through contractual processes.

In essence, all the best practices are indeed perceived to contribute to, at least a moderate extent, to the efficient management of reverse logistics. The majority of the best practices appear in the pearl quadrant, while the rest appear in the oyster quadrant. Hence only a limited number of best practices may be too cost intensive to implement. In the next section, the refined best practice framework will be provided, based on the results of the gap and opportunity analyses.

6.5 REFINED BEST PRACTICE FRAMEWORK FOR REVERSE LOGISTICS

In this section, the refined best practice framework will be provided, based on the results of the empirical study. The best practices will be placed in a series of tables, according to the best practice categories from the literature study. These categories include information relating to best practices, best practices relating to the reverse logistics process, organisational and management-related best practices and best practices relating to outsourcing and partnerships, which will be discussed in separate sections.

In each of these sections two tables will be presented. The first table will contain those best practices that are considered to be important and not that difficult to implement. These best practices thus appear in the pearl quadrant of the opportunity analysis (best practices with a contribution mean value of more than 3 and a difficulty mean value of less than 3).

The second table will contain those best practices that are important, but may be cost intensive to implement. These are the best practices that appear in the oyster quadrant of the opportunity

analysis (best practices with a contribution mean value of more than 3 and a difficulty mean value of more than 3).

Each of these tables will contain the following:

- the best practice
- the best practice results in mean values
- the justification based on the gap and opportunity analysis

Each of these frameworks will now be presented.

6.5.1 Refined framework for information-related best practices

In this section, the information-related best practices will be provided, based on the findings of the gap analysis and opportunity analysis. Table 6.21 contains the information-related best practices that appear in the pearl quadrant of the opportunity analysis. Organisations should consider implementing these best practices because they are important and not that difficult to implement. These best practices are therefore included in the refined framework and should be prioritised by organisations in terms of implementing best practices in reverse logistics.

Table 6.21: Information-related best practices included in the refined framework: first priority

BEST PRACTICE	BEST PRACTICE IN MEAN VALUES	JUSTIFICATION BASED ON RESULTS OF THE GAP AND OPPORTUNITY ANALYSES
Establish effective data collection	• Contribution – mean value 4 • Difficulty implementing – mean value 2.33	Based on the gap analysis, this best practice has the largest gap value of 1.67. It therefore has a high contribution level and is not that difficult to implement. Hence organisations should consider implementing this best practice first.
Analyse returns data to optimise decision making	• Contribution – mean value 3.6 • Difficulty implementing – mean value 2	Based on the gap analysis, this best practice has a large gap value of 1.66. Although this best practice does not have the highest level of contribution, it is the least difficult to implement. Hence, based on its results, organisations can also consider implementing this best practice.
Use effective data management to track the flow of information	• Contribution – mean value 3.9 • Difficulty implementing – mean value 2.5	Based on the gap analysis, this best practice has a fairly large gap value of 1.4. It therefore has a relatively high contribution level and is not that difficult to implement. Hence, based on its results, organisations should also consider implementing this best practice.

Implement an accurate information system	• Contribution – mean value 4.1 • Difficulty implementing – mean value 2.8	Based on the gap analysis, this best practice also has a fairly large gap value of 1.3.This best practice also has the highest level of contribution in comparison with the other best practices in this category, and is not it is not that difficult to implement. Therefore, based on its results, organisations should consider implementing this best practice.
Invest in state-of-the-art technology	• Contribution – mean value 3.9 • Difficulty implementing – 2.9	Based on the gap analysis, this best practice has a gap value of 1. It thus has a relatively high level of contribution and is not too difficult to implement. Therefore, based on the results, organisations should also consider implementing this best practice.
Automate information	• Contribution – mean value 3.5 • Difficulty implementing – mean value 2.5	Based on the gap analysis, this best practice also has a gap value of 1. Although this best practice has a lower level of contribution in comparison with the above-mentioned best practices, it is also not that difficult to implement. Hence, based on the results, this best practice should also be considered.
Utilise a WMS	• Contribution – mean value 3.78 • Difficulty implementing – mean value 2.89	Based on the results of the gap analysis, this best practice has a gap value of 0.89. This best practice has a relatively high mean value in comparison with the difficulty implementing it. Therefore, based on the results, this best practice should also be considered.
Utilise a TMS	• Contribution – mean value 3.67 • Difficulty implementing – mean value 2.78	Similar to the above-mentioned best practice, the result of the gap analysis for this best practice is a gap value of 0.89. However, this best practice has a slightly lower level of contribution in comparison with the above-mentioned best practice, but is not that difficult to implement it. Hence, based on the results, this best practice should also be considered.
Make use of an RMA system	• Contribution – mean value 3.5 • Difficulty implementing – mean value 2.8	Based on the results of the gap analysis, this best practice has a gap value of 0.7. This best practice therefore has a moderately high level of contribution and is not too difficult to implement. Hence organisations can also consider implementing this best practice.
Utilise a KMS	• Contribution – mean 3.44 • Difficulty implementing – 2.89	Based on the results of the gap analysis, this best practice has the lowest gap level of 0.66 in comparison with the above-mentioned best practices. It therefore has the lowest level of contribution but is not too difficult to implement. Based on this result, organisations can also consider implementing this best practice.

Table 6.22 contains those information-related best practices that appear in the oyster quadrant of the opportunity analysis. These best practices are important and should be included in the framework. However, they may be cost intensive and difficult to implement and are less of a priority for organisations. Organisations should thus carefully consider the benefit-cost trade-off before implementing these best practices.

Table 6.22: Information-related best practices included in the refined framework: second priority

BEST PRACTICE	BEST PRACTICE IN MEAN VALUES	JUSTIFICATION BASED ON RESULTS OF THE GAP AND OPPORTUNITY ANALYSES
Utilise the internet or establish a web-based approach	• Contribution – mean value 4 • Difficulty of implementing – mean value 3.10	Based on the results of the gap analysis, this best practice has a gap value of 0.9. This best practice has a high level of contribution in comparison with the difficulty implementing it. However, based on the results, it may be difficult to implement.
Utilise an RLMS	• Contribution – mean value 4 • Difficulty implementing – mean value 3.10	This best practice shows the same results as the above-mentioned best practice. Hence based on the results of the gap analysis, this best practice has a gap value of 0.9. It has a high level of contribution in comparison with the difficulty implementing it. However, based on the results, it may be difficult to implement.
Apply an integrated information management approach	• Contribution – mean value 4 • Difficulty of implementing – mean value 3.6	Based on the gap analysis, this best practice has a gap value of 0.4. This best practice has a high contribution level, but may be too difficult and cost intensive to implement. Hence organisations should carefully consider the benefit-cost trade-off before implementing it.
Implement a flexible information system	• Contribution – mean value 3.6 • Difficulty to implement – mean value 3.2	Similar to the above-mentioned best practice, this best practice has a gap value of 0.4. However, it has a moderately high contribution, but may also be too cost intensive to implement. Therefore organisations should carefully consider the benefit-cost trade-off before implementing it
Implement an information system that is compatible with supply chain partners	• Contribution – mean value 4.30 • Difficulty of implementing – mean value 4.40	Based on the results of the gap analysis, this best practice has a negative gap value of -0.1. Although this best practice has the highest level of contribution in comparison with all the information-related best practices, it is also the most difficult to implement. Organisations should thus carefully consider the benefit-cost trade-off before they implement it.
Utilise special return software	• Contribution – mean value 3.11 • Difficulty implementing – mean value 3.44	Based on the gap analysis, this best practice has a negative gap value of -0.44. This best practice also has the lowest level of contribution in comparison with all the other best practices in this category. Hence the difficulty implementing it far exceeds its contribution. This best practice should thus be organisation's last priority.

From the tables, it is clear that the majority of the information-related best practices have a high contribution levels in comparison with the difficulty implementing them. The best practice that was considered the most significant, based on the results, is to establish effective data collection. However, the best practice that has the lowest level of contribution and is also too cost intensive and difficult to implement is to utilise special return software. In the next section, the refined framework for best practices relating to reverse logistics practices will be presented.

6.5.2 Refined framework for best practices relating to reverse logistics processes

In this section, the best practices relating to reverse logistics processes will be discussed, based on the findings of the gap and opportunity analyses. Table 6.23 contains the best practices relating to reverse logistics processes that appear in the pearl quadrant of the opportunity analysis. Organisations should consider implementing these best practices because they are important and not that difficult to implement. These best practices are thus included in the refined framework and should be prioritised by organisations in terms of implementing best practices in reverse logistics.

Table 6.23: Best practices relating to reverse logistics processes included in the refined framework: first priority

BEST PRACTICE	BEST PRACTICE IN MEAN VALUES	JUSTIFICATION BASED ON RESULTS OF THE GAP AND OPPORTUNITY ANALYSES
Standardise the reverse logistics procedures	• Contribution – mean value 4.3 • Difficulty implementing – mean value 2.1	Based on the gap analysis, this best practice has the largest gap value of 2.2. It has one of the highest contribution levels in comparison with the other best practices in this category. This best practice is also not difficult to implement, and for that reason, organisations should consider implementing it first.
Establish a gate-keeper at the start of the reverse logistics process	• Contribution – mean value 4.1 • Difficulty implementing – mean value 2	Based on the gap analysis, this best practice has a large gap value of 2.1. This best practice has a high contribution level and is not difficult to implement. Based on its results, organisations should therefore also consider implementing this best practice.
Establish a reverse logistics procedure that is uncomplicated	• Contribution – mean value 4.3 • Difficulty implementing – mean value 2.3	Based on the gap analysis, this best practice has a fairly large gap value of 2. Similar to the best practice that was mentioned first, this best practice also has the highest contribution level, but the difficulty implementing it is slightly higher. However, regardless of this, it also has a high contribution level in comparison with its difficulty of implementation. Based on its results, organisations should thus also consider implementing this best practice.
Set structured procedures	• Contribution – mean value 4.2 • Difficulty implementing – mean value 2.5	Based on the gap analysis, this best practice also has a fairly large gap value of 1.7. This best practice has a high level of contribution and is not difficult to implement. Based on its results, organisations should thus consider implementing this best practice.
Establish a reverse logistics procedure that is quick	• Contribution – mean value 4.1 • Difficulty implementing – 2.6	Based on the gap analysis, this best practice has a gap value of 1.5. It also has a high level of contribution and is not too difficult to implement. Based on its results, organisations should thus also consider implementing this best practice.

Implement a robust gate-keeping function	• Contribution – mean value 3.9 • Difficulty implementing – mean value 2.67	Based on the gap analysis, this best practice has a gap value of 1.23. This best practice has a moderately high level of contribution in comparison with the difficulty implementing it. Based on the results, this best practice should thus also be considered.
Streamline the reverse logistics process	• Contribution – mean value 4.1 • Difficulty implementing – mean value 3.1	Based on the results of the gap analysis, this best practice has a gap value of 1. This best practice has a high level of contribution, but a higher difficulty level in comparison with the other best practices in this category. It is therefore the final best practice included in the refined framework for best practices relating to reverse logistics processes. Regardless of this, it should also be implemented on the basis of its results.

Table 6.24 contains those best practices relating to reverse logistics processes that appear in the oyster quadrant of the opportunity analysis. These best practices are important and should be included in the framework. However, they may be cost intensive and difficult to implement and are less of a priority for organisations. Hence organisations should carefully consider the benefit-cost trade-off before implementing these best practices.

Table 6.24: Best practices relating to reverse logistics processes included in the refined framework: second priority

BEST PRACTICE	BEST PRACTICE IN MEAN VALUES	JUSTIFICATION BASED ON RESULTS OF THE GAP AND OPPORTUNITY ANALYSES
Automate the entire reverse logistics process	• Contribution – mean value 3.8 • Difficulty implementing –- mean value 4	Based on the gap analysis, this best practice has a negative gap value of -0.2. This best practice has a moderately high contribution level, but in comparison, the difficulty of implementation is higher. For this reason it should be a second priority.
Separate reverse logistics facilities from forward facilities by establishing central returns centres	• Contribution – mean value 3.6 • Difficulty implementing – mean value 3.7	Based on the results of the gap analysis, this best practice has also a negative gap value of -0.1. This best practice has the lowest level of contribution in comparison with the other best practices relating to reverse logistics processes. It may also be cost intensive to implement, and for this reason organisations should carefully consider the cost-benefit trade-off.

From the tables, it is clear that most of the best practices relating to reverse logistics processes have a high contribution level in comparison with the difficulty implementing them. The best practice that was considered the most significant, based on the results, is standardising the reverse logistics procedure. By contrast, the best practice that has the lowest level of contribution and is also cost intensive and difficult to implement is to separate reverse logistics

facilities from forward facilities by establishing central returns centres. In the next section, the refined framework for organisational and management-related best practices will be presented.

6.5.3 Refined framework for organisational and management-related best practices

This section focuses on the organisational and management-related best practices, based on the findings of the gap and opportunity analyses. Table 2.25 contains the organisational and management-related best practices that appear in the pearl quadrant of the opportunity analysis. Organisations should consider implementing these best practices, since they are important and not that difficult to implement. Hence these best practices are included in the refined framework and should be prioritised by organisations in terms of implementing best practices in reverse logistics.

Table 6.25: Organisational and management-related best practices included in the refined framework: first priority

BEST PRACTICE	BEST PRACTICE IN MEAN VALUES	JUSTIFICATION BASED ON RESULTS OF THE GAP AND OPPORTUNITY ANALYSES
Establish clear policies for reverse logistics	• Contribution – mean value 4.5 • Difficulty implementing – mean value 2.4	Based on the gap analysis, this best practice has the largest gap value of 2.1. It has the highest contribution level in comparison with the other best practices in this category. This best practice is also not difficult to implement and organisations should thus consider implementing it first.
Conduct formal training of employees involved in the reverse logistics process	• Contribution – mean value 4.22 • Difficulty implementing – mean value 2.44	Based on the gap analysis, this best practice has a large gap value of 1.78. This best practice has a high contribution level and is not difficult to implement. Based on its results, organisations should thus also consider implementing this best practice.
Create a comprehensive strategic plan for reverse logistics	• Contribution – mean value 4.2 • Difficulty implementing – mean value 2.5	Based on the gap analysis, this best practice has a fairly large gap value of 1.7. This best practice has a high contribution level and is not too difficult to implement. Based on its results, organisations should thus also consider implementing this best practice.
Establish cross-functional teams for reverse logistics	• Contribution – mean value 4.1 • Difficulty implementing – mean value 2.5	Based on the gap analysis, this best practice has a gap value of 1.6. This best practice has a high level of contribution and is not difficult to implement. Organisations should consider implementing this best practice.

Simplify return policies	• Contribution – mean value 4.33 • Difficulty implementing – 2.78	Based on the gap analysis, this best practice has a gap value of 1.55. It has a high level of contribution and is not too difficult to implement. Based on its results, organisations should also consider implementing this best practice.
Top management that demonstrate commitment to reverse logistics	• Contribution – mean value 4.1 • Difficulty implementing – 2.8	Based on the gap analysis, this best practice has a gap value of 1.3. It has a high level of contribution and is not too difficult to implement. Based on its results, organisations should therefore consider implementing this best practice.
Implement a customer-focused policy and strategy for reverse logistics	• Contribution – mean value 4 • Difficulty implementing – 2.78	Based on the gap analysis, this best practice has a gap value of 1.22. It also has a high level of contribution and is not too difficult to implement. Based on its results, organisations should thus also consider implementing this best practice.
Guidance of top management and an executive team to implement a successful reverse logistics programme	• Contribution – mean value 3.9 • Difficulty implementing – mean value 2.9	Based on the gap analysis, this best practice has a gap value of 1. This best practice has a moderately high level of contribution in comparison with the difficulty of implementing it. Based on its results, this best practice should thus also be considered.
Establish uniform policies for reverse logistics	• Contribution – mean value 3.8 • Difficulty implementing – mean value 2.8	Based on the results of the gap analysis, this best practice has a gap value of 1. This best practice has a high level of contribution and is not difficult to implement. Based on its results, organisations should also consider implementing it.
Review current customer service practices	• Contribution – mean value 3.33 • Difficulty implementing – mean value 2.33	Based on the results of the gap analysis, this best practice also has a gap value of 1. This best practice has a relatively high level of contribution and is not difficult to implement. Based on its results, organisations should also consider implementing this best practice.
Employ a dedicated manager for reverse logistics	• Contribution – mean value 3.11 • Difficulty implementing – mean value 2.11	Similar to the above, based on the results of the gap analysis, this best practice has a gap value of 1. This best practice has a moderate level of contribution and is not difficult to implement. Based on its results, organisations should thus also consider implementing it.

Table 2.26 contains those organisational best practices that appear in the oyster quadrant of the opportunity analysis. These best practices are important and should be included in the framework. However, they may be cost intensive and difficult to implement and are less of a priority for organisations. Hence organisations should carefully consider the benefit-cost trade-off before implementing these best practices.

Table 6.26: Organisational and management-related best practices included in the framework: second priority

BEST PRACTICE	BEST PRACTICE IN MEAN VALUES	JUSTIFICATION BASED ON RESULTS OF THE GAP AND OPPORTUNITY ANALYSES
Develop an innovative reverse logistics programme	• Contribution – mean value 4.33 • Difficulty implementing – mean value 3.22	Based on the gap analysis, this best practice has a gap value of 1. This best practice has a high contribution level, but may be too cost intensive to implement. Hence organisations should carefully consider the benefit-cost trade-off before implementing it
Develop a formalised reverse logistics programme	• Contribution – mean value 4.2 • Difficulty implementing – mean value 3.33	Based on the results of the gap analysis, this best practice has gap value of 0.9. Like the above- mentioned best practice, this one also has a high level of contribution, but may be too cost intensive to implement. Organisations should thus carefully consider the benefit-cost trade-off before implementing it.
Implement return avoidance strategies or zero-return policies	• Contribution – mean value 3.5 • Difficulty implementing – mean value 3.15	Based on the gap analysis, this best practice has a gap value of 0.42. It has a moderately high contribution level, but may be too cost intensive or difficult to implement. This best practice should thus be one of the second priorities.
Implement multiple disposition strategies for reverse logistics	• Contribution – mean value 3.44 • Difficulty implementing – mean value 3.44	Based on the results of the gap analysis, this best practice has gap value of 0. It has a moderately high contribution level, but may be also too difficult to implement it. This best practice should therefore be the final priority in this category.

From the tables, it is clear that the majority of the organisational and management-related best practices have a high contribution level in comparison to the difficulty implementing it. The best practice that was considered the most significant, based on the results, would be to establish clear policies for reverse logistics. However, implementing multiple disposition strategies for reverse logistics was viewed as being the least significant since it had a moderately high level of contribution, but also a moderately high level of difficulty implementing it. In the next section, the refined framework for best practices relating to outsourcing and partnerships will be presented.

6.5.4 Refined framework for best practices relating to outsourcing and partnerships

In this section, the best practices relating to outsourcing and partnerships will be presented, based on the findings of the gap and opportunity analyses. Table 6.27 contains the best practices relating to outsourcing and partnerships that appear in the pearl quadrant of the opportunity analysis. Organisations should consider implementing these best practices because they are important and not that difficult to implement. Hence these best practices have been included in

the refined framework and should be prioritised by organisations in terms of implementing best practices in reverse logistics.

Table 6.27: Best practices relating to outsourcing and partnerships included in the refined framework: first priority

BEST PRACTICE	BEST PRACTICE IN MEAN VALUES	JUSTIFICATION BASED ON RESULTS OF THE GAP AND OPPORTUNITY ANALYSES
Share information with supply chain partners	• Contribution mean value – 4.2 • Difficulty implementing – mean value 2.7	Based on the gap analysis, this best practice has the largest gap value of 1.5. It also has the highest contribution level in comparison with the other best practices in this category and is not that difficult to implement. Hence organisations should consider implementing this best practice first.
Create alliances with supply chain partners for reverse logistics	• Contribution – mean value 3.7 • Difficulty implementing – mean value 2.8	Based on the gap analysis, this best practice has a gap value of 0.9. It has a high contribution level and is not difficult to implement. Based on its results, organisations should also consider implementing this best practice.
Build and develop long-term partnerships with supply chain partners based on mutual trust and commitment	• Contribution – mean value 3.4 • Difficulty implementing – mean value 2.7	Based on the gap analysis, this best practice has a gap value of 0.7. It has a moderately high contribution level and is not too difficult to implement. Based on its results, organisations should also consider implementing this best practice.

Table 6.28 contains those best practices relating to outsourcing and partnerships in the oyster quadrant of the opportunity analysis. These best practices are important and should be included in the framework. However, they may be cost intensive and difficult to implement and are less of a priority for organisations. Organisations should therefore carefully consider the benefit-cost trade-off before implementing these best practices.

Table 6.28: Best practices relating to outsourcing and partnerships included in the refined framework: second priority

BEST PRACTICE	BEST PRACTICE IN MEAN VALUES	JUSTIFICATION BASED ON RESULTS OF THE GAP AND OPPORTUNITY ANALYSES
Engage with supply chain partnerships through contractual processes	• Contribution – mean value 3.7 • Difficulty implementing – mean value 3.1	Based on the gap analysis, this best practice has a gap value of 0.6. It has a fairly high contribution level, but may be slightly too cost intensive to implement. Hence organisations should carefully consider the benefit-cost trade-off before implementing it

Outsource reverse logistics to 3PL providers	• Contribution – mean value 3.56 • Difficulty implementing – mean value 3.22	Based on the results of the gap analysis, this best practice has a gap value of 0.34. It also has a fairly high level of contribution, but may be too cost intensive to implement. Hence organisations should carefully consider the benefit-cost trade-off before implementing it
Leverage a partnership network for reverse logistics	• Contribution – mean value 3.3 • Difficulty implementing – mean value 3.2	Based on the gap analysis, this best practice has a gap value of 0.1. It has a moderately high contribution level, but may be too cost intensive or difficult to implement. This best practice should thus be the last priority.

From the tables, it is clear that half of the best practices relating to outsourcing in partnerships are included in the refined framework. Sharing information with supply chain partners was considered the most significant, since it had the highest level of contribution and is not too difficult to implement. By contrast, the best practice that has a moderately high contribution level but may be too cost intensive to implement is leveraging a partnership network for reverse logistics.

In essence, the majority of best practices were in the pearl quadrant, and based on the results, the best practices that were considered to be the most significant were to

- establish effective data collection
- standardise the reverse logistics procedure
- establish clear policies for reverse logistics
- share information with supply chain partnerships

6.6 CONCLUSION

In this section, the results and findings of the empirical study were discussed. *Firstly,* the descriptive analysis was explained and the descriptive statistics of the organisational information, the level of problems experienced in reverse logistics and the level of best practices in reverse logistics were discussed.

Secondly, the inferential analysis was explained by means of a Mann-Whitney nonparametric test. The purpose was to test whether or not organisations with a turnover of less than R100 million per annum differ statistically from those with a turnover of more than R100 million per annum. The impact of turnover on problems and challenges experienced in reverse logistics and the impact of turnover on the extent of particular best practices were therefore tested.

Thirdly, the extent of the contribution of best practices in relation to the difficulty implementing them was discussed by means of gap and opportunity analyses. The gap analysis was illustrated by means of tables and radar graphs, while the opportunity analysis was illustrated by means of portfolio matrixes. The most significant findings were highlighted and discussed.

Finally, the refined best practice framework in reverse logistics was presented. This refined framework was given in separate sections, based on the categories from the literature study. The results of the gap and opportunity analyses were used to compile the refined best practice framework in reverse logistics. Those best practices that appeared in the pearl quadrant of the opportunity analysis (those with contribution mean values of more than 3, and the difficulty level mean values of less than 3) were included as the first priority in the refined framework. However, those best practices that appeared in the oyster quadrant (those with a contribution mean value of more than 3 and a difficulty mean value of more 3) were included in the framework as a second priority because they may be cost intensive and difficult to implement and should be only implemented after a thorough cost-benefit analysis. The refined frameworks were illustrated by means of tables.

The next chapter discusses the conclusions and recommendations of the study.

CHAPTER 7
CONCLUSIONS AND RECOMMENDATIONS

7.1 INTRODUCTION

This chapter presents the conclusions and recommendations for the study. The conclusions in the chapter are organised according to the phases and objectives of the study.

As previously stated, *phase 1* involved a literature study to meet the first seven secondary objectives of the study, namely to

(1) investigate the concept of reverse logistics
(2) determine the importance of reverse logistics
(3) explore the drivers and benefits of reverse logistics
(4) explore all the dimensions and elements of reverse logistics
(5) identify the problems and challenges in reverse logistics
(6) find solutions to the problems and challenges in reverse logistics
(7) compile a conceptual best practice framework based on the literature study

Phase 2 involved empirical research in which a survey method was used. The purpose of this was to refine the conceptual framework for best practices in reverse logistics. The aim of phase 2 was to meet the final secondary objective of the study to refine the framework.

Both the literature study and empirical study contributed to the primary objective of the study which was to determine the best practices in reverse logistics and compile a framework for organisations that would enable them to manage their reverse logistics processes more efficiently.

The outline of this chapter is as follows:

- Summary of findings – literature study
- Summary of findings – empirical study
- Recommendations
- Future research
- Conclusion

7.2 SUMMARY OF FINDINGS: LITERATURE STUDY

In this section, conclusions will be drawn from the findings in the literature study. This section will summarise the findings on the

- conceptualisation of reverse logistics (chapter 2),
- problems and challenges in reverse logistics (chapter 3)
- solutions to overcome the problems and challenges in reverse logistics (chapter 3)
- development of a conceptual framework for best practices in reverse logistics (chapter4)

7.2.1 A summary of the findings on the conceptualisation of reverse logistics

Chapter 2 of the study provided an extensive overview of the concept of reverse logistics and numerous elements that were discussed on the basis of the findings derived from the literature. This section summarises the findings in chapter 2.

- There are numerous definitions of reverse logistics as well as a number of concepts closely related to it. These concepts are often confused with reverse logistics and include the closed-loop supply chain, closed-loop supply chain management (CSCM), reverse supply chain management (RSCM), green logistics and green supply chain management (GSCM) and returns management. It was found that the closed-loop supply chain and CSCM involve both forward and reverse logistics. RSCM includes business processes to manage the reverse path of products from the customer to its final disposition. Green logistics is a part of reverse logistics, but the focus is on the environment. The focus of GSCM is on an environmentally conscious supply chain. Finally, returns management is broad in scope, and includes reverse logistics, gatekeeping and avoidance.

- Based on numerous literature sources, it was found that reverse logistics has become increasingly important to organisations in their drive to lower costs. In order to emphasise the significance of reverse logistics, a number of drivers in reverse logistics and benefits of reverse logistics were identified. In most instances, it was found that organisations engage in reverse logistics for financial reasons, corporate citizenship and customer expectations as well as environmental and legislative pressures. In terms of the benefits of reverse logistics, it was found that organisations can reduce costs if they effectively manage their reverse logistics. Organisations become “green” if they engage in reverse logistics because this leads

to reduced waste and environmental cost. Finally, reverse logistics can be used as a tool to increase customer satisfaction and gain a competitive advantage. Hence organisations can become cost-effective and deliver added value to customers if they manage their reverse logistics efficiently and for these reasons reverse logistics is important.

- Product returns is a vital part of reverse logistics. There are different types of and reasons for product returns, that can be placed in three categories, namely manufacturer returns, distribution returns and consumer/user returns:
    - manufacturer returns include raw material surplus, quality control returns, production leftovers and by-products,
    - distribution returns include product recalls, commercial returns, stock returns, reusable products and functional returns,
    - customer/user returns include reimbursement guarantees, warranty and service returns, end-of-use returns and end-of-life returns.

- There are a number of parties involved in a reverse logistics process, which may include forward supply chain actors, specialised reverse chain players and governmental institutions and opportunistic players. It was also found that reverse logistics involves product collection, inspection, separation and sorting and recovery and disposition. Organisations also have a number of disposition options which include, returns to seller, reuse, remanufacturing, recycling, donation and disposal.

From the above summary it is clear that the following first four secondary objectives of the study were achieved:

- to investigate the concept of reverse logistics
- to determine the importance of reverse logistics
- to explore drivers and benefits of reverse logistics
- to explore all the dimensions and elements of reverse logistics

The findings of this were used as a foundation to develop the conceptual best practice framework in reverse logistics. The next section provides a summary of the findings in chapter 3, in terms of the problems, challenges and possible solutions in reverse logistics.

7.2.2 A summary of the findings on the problems and challenges and solutions in reverse logistics

In chapter 3 the problems, challenges and solutions in reverse logistics were discussed. This section will also provide a brief overview of the framework that was developed in chapter 3

7.2.2.1 Summary of the findings on the problems and challenges in reverse logistics

In the literature it was found that organisations can experience numerous problems and challenges in reverse logistics, as highlighted below.

- *Cost associated with reverse logistics.* It was found that the high cost associated with reverse logistics is a major challenge for organisations. In addition, many organisations are not aware of the cost associated with reverse logistics. There are thus hidden costs in reverse logistics.

- *Lack of appropriate information systems for reverse logistics.* It was found that the most significant problems are insufficient investment in IT solutions, the low reliability of IT solutions, lack of information visibility and misinformation with regard to reverse logistics.

- *Problems with product returns and reverse logistics processes.* It was found that the uncertainty of product returns was a challenge since the majority of product returns are unplanned and unpredictable. Organisations can also experience problems in determining the best disposition option to follow, which can be both time-consuming and costly.

- *Organisational and management-related problems.* Numerous organisational and management-related problems were identified in the literature. The most significant problems included a lack of strategic planning to include reverse logistics, a shortage of high level managers for reverse logistics, a lack of top management awareness and commitment towards reverse logistics, a lack of departmental collaboration and communication and resistance to change and the need for new approaches.

- *Problems between upstream reverse supply chain partners.* It was found that there are a number of problems with supply chain partners in the reverse supply chain. The most

significant problems included a lack of collaboration, a lack of communication and a lack of support between reverse supply chain partners.

- *Reverse logistics relating to customers.* Based on the literature findings, the most significant problems relating to customers included a lack of communication with customers and rule enforcement, as well as customers' expectations and dissatisfaction. It was found that poorly defined return policies can create either lenient or highly complex returns processes. Also, if the organisation does not have proper return merchandise authorisation (RMA) system in place, customers can return products in any case and still receive credit for it.

Based on the literature findings, it is clear from the above that there are numerous problems and challenges in reverse logistics. The aim of this section was to achieve the fifth secondary objective of the study, namely to identify problems and challenges in reverse logistics. The next section contains a summary of the findings in terms of the solutions to overcome these problems and challenges in reverse logistics.

7.2.2.2 Summary of the findings on the solutions to overcome problems and challenges in reverse logistics

Although there are numerous problems and challenges in reverse logistics, a number of solutions were also identified in the literature, which will enable organisations to overcome these problems and challenges. This section summarises the findings.

- *Solutions relating to information system.* It was found that with appropriate information technology, information management and data collection and systems in place, organisations can overcome a variety of problems in reverse logistics. Numerous systems were identified that will enable organisations to overcome reverse logistics problems. These included the following: standard information systems that are accurate, flexible and automated; internet and web-based systems; specific systems for reverse logistics such as a reverse logistics management system (RLS); special returns software and return systems; RMA systems; and other systems such as a knowledge management system (KMS); warehouse management system (WMS); and transportation management system (TMS).

- *Solutions relating to reverse logistics flows and processes.* It was found that organisations can streamline, structure, automate, standardise and formalise their reverse logistics processes to resolve various problems in reverse logistics. Organisations can also make use of a gatekeeper or a central return centre in order to improve the efficiency of reverse logistics.

- *Human and management-related solutions.* Based on the literature, a number of human and management-related solutions were identified to overcome certain problems and challenges in reverse logistics. These solutions involved strategies and planning for reverse logistics, policies, guidelines and programmes for reverse logistics, top management support for reverse logistics, staff training for reverse logistics and coordination of functional departments.

- *Outsourcing as a solution.* It was found that by outsourcing reverse logistics to a third party logistics (3PL) provider or third party reverse logistics (3PRL) provider can solve a number of problems, since these parties have the necessary expertise, knowledge and experience in reverse logistics.

- *Reverse supply chain partnerships as a solution.* It was found that collaboration, communication, trust and commitment in order to share and integrate information with supply chain partners can solve many problems and challenges in reverse logistics.

From the above it is clear that numerous solutions are known to exist that can help organisation to overcome problems and challenges in reverse logistics. The aim of this section was to realise the sixth secondary objective of the study, namely to find the solutions to overcome problems and challenges in reverse logistics. In order to match the problems and solutions, a framework was developed in chapter 3. A brief summary of this framework will be provided in the next section.

7.2.2.3 Summary of the framework indicating problems and challenges and solutions in reverse logistics

In order to indicate the possible solutions for each problem and challenge in reverse logistics, a framework was compiled. The following conclusions can be drawn from this framework:

- To overcome cost-related problems in reverse logistics, organisations could invest in IT; make use of data collection and appropriate information systems developed for reverse logistics; implement solutions applicable to the reverse logistics process; establish a gatekeeper; centralise return centres; establish clear policies, guidelines and programmes for reverse logistics; outsource; and finally, form reverse supply chain partnerships.

- To overcome problems relating to a lack of appropriate information systems for reverse logistics, organisations could invest in information technology, make use of information management and data collection, information systems, centralisation or outsource their reverse logistics function.

- To overcome organisational and management problems, organisations could make use of appropriate systems for reverse logistics; conduct strategic planning; enlist top management support; coordinate functional departments; and outsource reverse logistics to 3PL providers.

- In terms of resolving problems with reverse supply chain partnerships, organisations could do the following: invest in information technology; make use of information management; apply appropriate systems for reverse logistics; establish policies for reverse logistics; outsource their reverse logistics function' and communicate and collaborate with their reverse logistics partners.

- To overcome customer-related problems in reverse logistics, organisations could invest in information technology; make use of information management and data collection, systems and solutions for reverse logistics; implement solutions applicable to the reverse logistics process; appoint a gatekeeper; establish appropriate strategies, policies, guidelines and programmes for reverse logistics; train staff for reverse logistics; and collaborate and communicate with partners in the supply chain.

From the above it is clear that some solutions can sort out a number of the problems and challenges in reverse logistics. The findings stemming from chapter 3 were also used as a

foundation to develop the conceptual best practice framework in reverse logistics. In the next section, the development of the conceptual best practice framework will be summarised.

7.2.3 Summary of the development of the conceptual best practice framework in reverse logistics

In order to achieve the seventh secondary objective, a conceptual best practice framework in reverse logistics was developed in order to assist organisations. In chapter 5,a series of conceptual frameworks was also develop for best practices in reverse logistics. This framework can either be used as a consultancy instrument or organisations can use this framework without any help from consultants. These frameworks are based on the findings in the literature. This framework consisted of the following steps:

- Step 1: Determine the maturity level of organisations in terms of reverse logistics.
- Step 2: Identify reverse logistics problems and challenges.
- Step 3: Suggest possible solutions to overcome the problems and challenges in reverse logistics.
- Step 4: Consult and implement best practices based on solutions in reverse logistics

Each of these steps was presented in the framework. However, because the framework was so comprehensive, a series of more detailed frameworks was also developed.

- *Step 1: Determine the maturity level of organisations in terms of reverse logistics*

In chapter 1 the maturity levels in reverse logistics were discussed. Some organisations are in the:

  - *innocence stage* with no understanding of reverse logistics
  - *understanding stage* with a growing understanding of reverse logistics in terms of the need from an environmental, control and warranty reclaim perspective
  - *competence stage* with solid reverse logistics capabilities
  - *development stage* with increasing scope of reverse logistics
  - *excellence stage* with world class optimised reverse logistics

The purpose of this step is to determine the maturity level of the organisation. If the organisation has a lower level of maturity, the concept of reverse logistics needs to be explored by the

organisation or explained by the consultant. Therefore the following need to be explored and determined for the organisation:

- the concept of reverse logistics
- the importance of reverse logistics in terms of the drivers and benefits in reverse logistics
- the types and reasons for returns
- the parties involved in reverse logistics processes
- the reverse logistics process, activities and options

The aim was therefore to clarify the scope, processes and activities of reverse logistics in the organisation.

- *Step 2: Identify problems and challenges in reverse logistics*

As previously stated, the findings in literature on the problems and challenges in reverse logistics were used in the conceptual framework. In this step, organisations are presented with the different types of problems and challenges that could exist in reverse logistics. The idea of step 2 is that organisations should identify the specific problems they are experiencing in reverse logistics.

- *Step 3: Suggest possible solutions to overcome problems and challenges in reverse logistics*

Once organisations have identified their problems and challenges in reverse logistics, possible solutions to resolve these problems could be explored. The solutions offered in the framework are based on the findings of the literature study.

- *Step 4: Consult and implement best practices in reverse logistics*

All the best practices in reverse logistics were derived from the solutions in the literature. A series of best practice tables was developed on the basis of the findings. Hence organisations could refer to these tables in order to identify the best practices in reverse logistics that would be applicable to their particular situation.

To simplify the conceptual framework, a series of more detailed frameworks was developed, which was based on each problem or challenges in reverse logistics. Each of these frameworks contains the specific problem in reverse logistics, possible solutions to resolve the problem and

best practices to implement. In these frameworks, reference is made to the best practice tables which can be consulted to obtain more detail prior to implementing these best practices.

Figure 7.1 provides an overview of the conceptual best practice framework in reverse logistics.

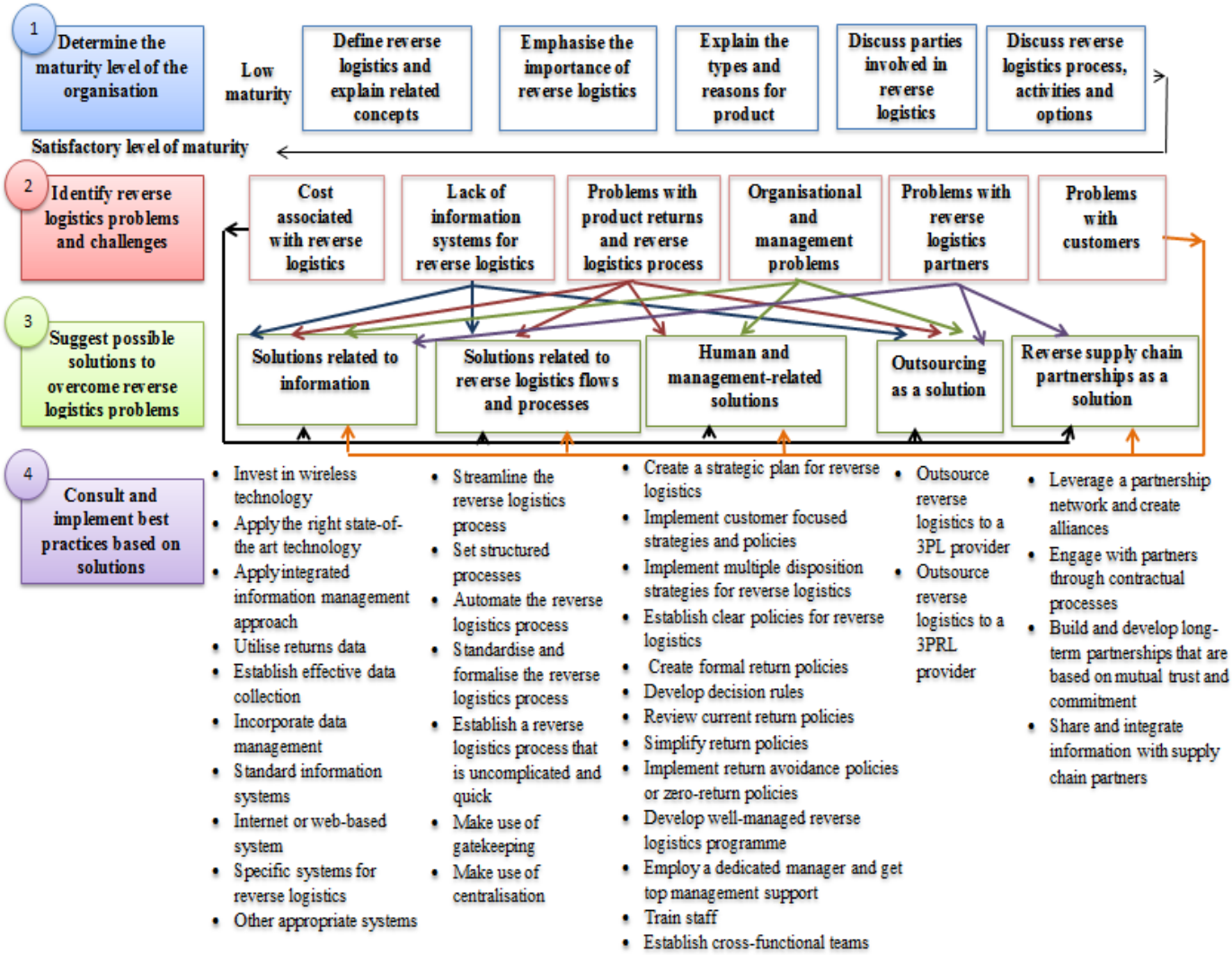

Figure 7.1 Overview of the conceptual best practice framework in reverse logistics

The next section contains the summary and findings of the empirical study.

7.3 SUMMARY OF FINDINGS: EMPIRICAL STUDY

In order to achieve the final secondary objective of the study, it was decided to conduct a survey. The aim was to refine the framework that was developed in the literature study. In order to refine the framework, a questionnaire was developed on the basis of the findings in the literature study.

It was decided to identify and include in the survey, organisations that perform and manage activities in reverse logistics or provide it as a specialised service to other organisations in South Africa. However, it was found that only a limited number of organisations fit this requirement. Purposive or judgemental sampling techniques were thus used. Twenty-one organisations were identified and requested to participate, and a total of ten organisations completed the questionnaire.

The data analysis for the study included both descriptive and inferential statistics. It was also decided to conduct gap and opportunity analyses to enable the researcher to refine the conceptual best practice framework. In this section, the results of the empirical study will be summarised in terms of the descriptive analysis, inferential analysis, gap analysis and opportunity analysis.

7.3.1 Summary and findings of descriptive analysis

In the descriptive analysis, the results of each section in the questionnaire were discussed. The sections include the respondents' organisational information, the levels of problems experienced in reverse logistics and their reverse logistics practices. This section provides a summary of the results and findings of each section.

7.3.1.1 Summary of the results of organisational information

The purpose of part 2, question 1, in the questionnaire was to obtain the respondents' organisational information. The findings for question 1 are summarised below.

- In terms of the results of the participants' positions and roles in their organisation, it was found that the majority of the participants were the managing directors of their organisation (30%), while the rest (70%) were either business development directors, commercial directors, commercial managers, general managers, logistics managers, supply chain consultants or warehouse managers.

- In terms of the size, it was found that 50% of the organisations had a turnover of more than a R100 million per annum, and the other half a turnover of less than a R100 million per annum. It was also found that 30% of the organisations had less than 50 employees, 10%

between 51 and 200, 20% between 501 and 1 000 and 20% between 1 001 and 5000 and 20% more than 5 000 employees.

- In terms of the status of the organisations, it was found that the majority of the participants (70%) were located in the head office of their organisations. The rest ranged from a holding company (10%), subsidiary (10%) to an independent unit (10%).

7.3.1.2 Summary of the results of the problems experienced in reverse logistics

In part 2, the respondents were asked to indicate the extent to which organisations could experience problems relating to cost, information systems, product returns and the reverse logistics process, organisational and management-related problems, problems with supply chain partners and customers.

- Regarding the cost associated with reverse logistics, it was found that the high cost associated with reverse logistics was the main problem experienced. The lack of awareness of the hidden cost in reverse logistics was also perceived to be a major problem. The respondents indicated that the inability to reduce cost was also a problem, but to a moderate extent. From the results it is clear that the cost associated with reverse logistics was indeed perceived to be a problem.

- In terms of problems relating to information systems, it was found that insufficient investment in IT was perceived to be the primary problem. The second main problem was a lack of information visibility, which was also perceived to be a major problem. Low reliability of IT solutions and insufficient, abundant, ambiguous and conflicting data were perceived to be problems to a moderate extent. The results indicated that information-related problems in reverse logistics were indeed problems that organisations experience.

- In terms of problems relating to product returns and reverse logistics processes, uncertainties about product returns were perceived to be the main problem. The lack of knowledge about the time and cost involved in the disposition process was also perceived to be a major problem. However, it was indicated that the uncertainty about the appropriate disposition option to follow was a problem to a moderate extent. Hence the results indicated that the

most significant problems were perceived to be uncertainties relating to product returns and the time and cost involved in the disposition process.

- The greatest obstacles relating to organisational and management problems were perceived to be a lack of top management commitment to reverse logistics, a lack of top management awareness of the importance of reverse logistics and a lack of departmental collaboration/communication/cooperation in reverse logistics. Not including reverse logistics in strategic planning was also perceived to be a major problem, but to a moderate extent. Resistance to change to include reverse logistics was perceived to be the least significant problem. The results indicated that organisational and management-related problems were indeed perceived to be a problem in reverse logistics.

- In terms of problems with supply chain partners, it was found that both a lack of collaboration and a lack of communication with supply chain partners in reverse logistics were perceived to be problems, but only to a moderate extent.

- In terms of customer-related problems, it was found that customers' abuse of return policies was perceived to be the main problem. The results also indicated that unauthorised return allowance tended to be a serious problem. However, customers' negative perceptions of returning the products and lack of clear policies on product returns were perceived to be problems only to a moderate extent.

In conclusion, the above results indicate that the principal problems were perceived to be the high cost associated with reverse logistics, insufficient investment in IT, uncertainties relating to product returns, lack of top management commitment to reverse logistics and customers' abuse of return policies. However, the results indicated that uncertainties about the appropriate disposition option to follow, lack of collaboration and communication with supply chain partners in reverse logistics, a lack of clear policies on product returns and customers' negative perception of returning products tended to be perceived as problems to a lesser extent.

The next section summarises the results on the level of best practices in reverse logistics.

7.3.1.3 Summary of the results in terms of the level of importance of best practices in reverse logistics

In part 2, question 3, in the questionnaire, the respondents were asked to indicate to what extent best practices relating to information, reverse logistics processes, organisational and management, outsourcing and partnerships, can contribute to the efficient management of reverse logistics. These best practices were identified in the literature study. A summary of the results of question 3 is provided below.

- Based on the results, all the information-related best practices tended to be perceived as a potential best practice that could contribute to the efficient management of reverse logistics. The best practices with the main contribution included the following: applying an integrated information management approach; establishing effective data collection; implementing an accurate information system; implementing an information system that is compatible with supply chain partners (customers and suppliers); utilising the internet or establishing a web-based approach; and utilising a reverse logistics information management system. The best practice with the greatest contribution was the implementation of an information system that is compatible with supply chain partners. The results also indicated that investing in state-of-the-art technology for reverse logistics and using data management to track the flow of information both tended to make a significant contribution to the efficient management of reverse logistics. Those best practices that were perceived to contribute to the efficient management of reverse logistics, but to a lower extent, in comparison to the above-mentioned best practices, included the following: analysing returns data to optimise decision making; implementing a flexible information system; automating information; making use of an RMA system; utilising a KMS; utilising a WMS; and utilising a TMS. The best practice that was perceived to be the least likely to contribute to the efficient management of reverse logistics was the utilisation of special return software. Regardless of this, all the information-related best practices were perceived to contribute to the efficient management of reverse logistics.

- The results also indicated that all the best practices relating to reverse logistics processes were perceived to contribute to the efficient management of reverse logistics. Standardising the reverse logistics procedures and establishing a reverse logistics procedure that is uncomplicated were perceived to be the primary contributors to the efficient management of

reverse logistics. Streamlining the reverse logistics process, setting structured procedures, establishing a reverse logistics procedure that is quick, establishing a gatekeeper at the start of the reverse logistics process and implementing a robust gatekeeping function, were all perceived to be great contributors to the efficient management of reverse logistics. However, the best practices that were perceived to have a lower level of contribution, compared with the above-mentioned best practices, included automating the entire reverse logistics process and having separate reverse logistics facilities from forward facilities by establishing central return centres.

- Based on the results, all the organisational and management-related best practices appear to contribute to the efficient management of reverse logistics. Those best practices with the highest contribution to the efficient management in reverse logistics included the following: create a comprehensive strategic plan for reverse logistics; implement a customer-focused policy and strategy for reverse logistics; establish clear policies for reverse logistics; simplify return policies; develop an innovative reverse logistics programme; develop a formalised reverse logistics programme; top management demonstrating their commitment to reverse logistics; conducting formal training for those employees involved in the reverse logistics process; and establishing cross-functional teams for reverse logistics. However, establishing clear policies for reverse logistics was perceived to be the main contributor to the effective management of reverse logistics.

- In terms of best practices relating to outsourcing and partnerships, the results indicated that all these best practices tended to contribute to the efficient management of reverse logistics to at least a moderate extent. Sharing information with supply chain partners was perceived to be the main contributor to the efficient management of reverse logistics. Creating alliances for reverse logistics and engaging with partners through contractual processes were perceived to be fairly significant contributors to the efficient management of reverse logistics. Those best practices with a lower contribution level in comparison with the above-mentioned best practices included outsourcing reverse logistics to 3PL providers, leveraging a partnership network for reverse logistics and building and developing long-term partnerships with supply chain partners based on mutual trust and commitment.

In conclusion, the best practices that were perceived to be the principal contributors to the efficient management of reverse logistics included the following: implementing an information

system that is compatible with supply chain partners; standardising reverse logistics procedures; establishing a reverse logistics procedure that is quick; establishing clear policies for reverse logistics; and sharing information with supply chain partners. However, the results indicated that the best practices with the lowest level of contribution to the efficient management of reverse logistics included utilising special return software and employing a dedicated manager for reverse logistics. In essence, all the best practices identified in the literature were perceived to be important to the efficient management of reverse logistics to at least a moderate extent.

The results of the inferential statistical analysis are summarised in the next section.

7.3.2 Summary and findings of inferential analysis

As explained in chapter 4, a Mann-Whitney nonparametric test was performed because of the small sample size. The results indicated that 50% of the organisations had a turnover of less than R100 million per annum, and the other half a turnover of more than R100 million per annum. It was therefore decided to test whether or not organisations with a turnover of less than R100 million per annum differed statistically significantly from those with a turnover of more than R100 million per annum regarding the problems/challenges and the extent of the contribution of best practices. A summary of the test results is provided below.

7.3.2.1 Summary of the results of the impact of turnover on problems and challenges experienced in reverse logistics

In this section the following hypotheses were tested:

H_0: Organisations with a turnover of less than R100 million per annum do not differ from those organisations with a turnover of more than R100 million with regard to the challenges/problems experienced

H_1: Organisations with a turnover of less than R100 million per annum differ from those organisations with a turnover of more than R100 million with regard to the challenges/problems experienced

The aim was to test whether there was a statistically significant difference, at the 10% level of significance (exact significance used), between organisations with a turnover of less than R100 million per annum and organisations with a turnover of more than R100 million per annum

It was found that there were statistical differences between those organisations with a turnover of less than R100 million per annum and those with a turnover of more than R100 million. Those organisations with a turnover of less than R100 million per annum experienced problems relating to the following: a lack of information visibility; the uncertainties relating to product returns; a lack of knowledge about the time and cost involved in the disposition of product returns; a lack of top management awareness of the importance of reverse logistics; and a lack of top management commitment, to a significant extent than those with a turnover of more than a R100 million per annum.

One reason for this could be the fact that organisations with a lower turnover do not have sophisticated systems in place to improve information visibility. Also, these organisations may lack the necessary resources to handle the uncertainties relating to product returns. This may also be the reason why these organisations struggle with a lack of knowledge about the time and costs involved in the disposition process. Finally, the lack of resources may also be the result of management being unaware of the importance of reverse logistics, which basically means a lack of commitment. One could therefore conclude that smaller organisations lack the necessary financial and human resources for reverse logistics, compared with larger organisations. This clearly indicates that sufficient resources are necessary for the efficient management of reverse logistic.

7.3.2.2 Summary of the results on the impact of turnover on the extent of contribution of best practices perceived in reverse logistics

In this section the following hypotheses were tested:

H_0: Organisations with a turnover of less than R100 million per annum do not differ from those organisations with a turnover of more than R100 million per annum regarding their perception of the extent of the contribution of best practices

H_1: Organisations with a turnover of less than R100 million per annum do differ from those organisations with a turnover of more than R100 million per annum regarding their perception of the extent of the contribution of best practices

Regarding the contribution of best practices, it was found that statistical differences do exist between those organisations with a turnover of less than R100 million per annum and those with

a turnover of more than R100 million. Those organisations with a turnover of less than R100 million per annum perceived the contribution of an innovative, sophisticated and formalised reverse logistics programme to be significantly less than those organisations with a turnover of more than R100 million per annum. However, those organisations with a turnover of more than R100 million per annum perceived the contribution of outsourcing reverse logistics to a 3PL, leveraging a partnership network and creating alliances with supply chain partners for reverse logistics to be significantly greater than those organisations with a turnover of less than R100 million per annum.

It could be argued that organisations with a lower turnover do not find it necessary to develop innovative, sophisticated and formalised reverse logistics programmes. It could be that these organisations feel that the scope of their reverse logistics activities does not justify such programmes and/or they cannot afford them. However, the scope and available resources in larger organisations could make the use of such programmes a viable option.

It is also clear that larger organisations perceive outsourcing and alliance with supply chain partners to be a contributor to the efficient management of reverse logistics to a greater extent than the smaller organisations. Outsourcing in particular is an option for activities with limited scope. Larger organisations often outsource activities to enable them to focus on their core activities and functions. They therefore realise what benefits outsourcing offers. The larger organisations may be in the position to create alliances with supply chain partners (owing to a position of power) and see the benefit of this for the efficient management of reverse logistics. The smaller organisations may lack the power or capabilities that will enable them to create alliances and it may not be viable for them to outsource or create alliances for reverse logistics.

7.3.3 Summary of the results and findings of the gap analysis and opportunity analysis

In part 2, question 3, the respondents were asked to indicate the extent of the contribution of the best practices in relation to the difficulty of implementing the best practices. Gap and opportunity analyses were performed for this purpose.

Similar to the descriptive analysis, gap and opportunity analyses were also performed for each best practice category. However, in this instance, the mean values for both the level of

contribution and the difficulty implementing the best practice were used. Radar graphs were used to illustrate the gap analysis and portfolio matrixes to illustrate the opportunity analysis.

In chapter 6, it was mentioned that the portfolio matrixes consisted of the following four quadrants:

- white elephant – best practices with a low level of contribution (low mean values – less than 3) and difficult to implement (high mean values – more than 3)
- bread and butter – best practices with a low level of contribution, but easy to implement (low mean values – less than 3)
- oysters – best practices that are important, but difficult to implement (high mean values – more than 3)
- pearls – those best practices that are important (high mean values – more than 3) and relatively easy to implement (low mean values – less than 3)

It was found that none of the best practices were in the white elephant or bread and butter quadrants. All the best practices were therefore important, but some were difficult to implement (oysters) and others easy to implement (pearls).

A refined framework was developed on the basis of the gap analysis and the opportunity analysis for each best practice category. Table 7.1 contains those best practices in the pearl quadrant. In other words, these best practices had a contribution mean value of more than 3 and a difficulty mean value of less than 3. Organisations should thus consider implementing these best practices first because they make a vital contribution and are not that difficult to implement.

Table 7.1: Best practices in the pearl quadrant

Best practices in pearl quadrant	
Best practice category	**Best practices**
Information-related best practices	• Establish effective data collection • Analyse returns data to optimise decision-making • Use effective data management to track the flow of information • Implement an accurate information system • Invest in state-of-the-art technology • Automate information • Utilise a WMS • Utilise a TMS • Make use of an RMA system • Utilise a KMS

Best practices relating to reverse logistics processes	• Standardise the reverse logistics procedures • Establish a gate-keeper at the start of the reverse logistics process • Establish a reverse logistics procedure that is uncomplicated • Set structured procedures • Establish a reverse logistics procedure that is quick • Implement a robust gate-keeping function • Streamline the reverse logistics process
Organisational and management-related best practices	• Establish clear policies for reverse logistics • Conduct formal training of employees involved in the reverse logistics process • Create a comprehensive strategic plan for reverse logistics • Establish cross-functional teams for reverse logistics • Simplify return policies • Top management that demonstrate commitment to reverse logistics • Implement a customer-focused policy and strategy for reverse logistics • Guidance of top management and an executive team to implement a successful reverse logistics programme • Establish uniform policies for reverse logistics • Review current customer service practices • Employ a dedicated manager for reverse logistics
Best practices relating to outsourcing and partnerships	• Share information with supply chain partners • Create alliances with supply chain partners for reverse logistics • Build and develop long-term partnerships with supply chain partners based on mutual trust and commitment

Table 7.2 indicates those best practices in the oyster quadrant. These best practices thus have a contribution mean value of more than 3 and a difficulty mean value of more than 3. Hence these best practices are important but may be difficult to implement. Organisations should therefore carefully consider the cost-benefit trade-off before implementing it.

Table 7.2 Best practices in the oyster quadrant

Best practices in oyster quadrant	
Best practice category	**Best practices**
Information-related best practices	• Utilise the internet or establish a web-based approach • Utilise a reverse logistics information management system • Apply an integrated information management approach • Implement a flexible information system • Implement an information system that is compatible with supply chain partners • Utilise special return software
Best practices relating to reverse logistics processes	• Automate the entire reverse logistics process • Separate reverse logistics facilities from forward facilities by establishing central return centres
Organisational and management-related best practices	• Develop an innovative reverse logistics programme • Develop a formalised reverse logistics programme • Implement return avoidance strategies or zero-return policies • Implement multiple-disposition strategies for reverse logistics
Best practices relating to outsourcing and partnerships	• Engage with supply chain partnerships through contractual processes • Outsource reverse logistics to 3PL providers • Leverage a partnership network for reverse logistics

7.4 RECOMMENDATIONS

In terms of the findings of an extensive literature study and empirical study onto reverse logistics, the following recommendations can be made:

- Organisations should familiarise themselves with the concept of reverse logistics and the scope of reverse logistics activities in organisations.
- Organisations should pay more attention to reverse logistics and realise the importance and benefits of it.
- Organisations should identify the problems/challenges they experience in reverse logistics and consider possible solutions and best practices to implement in order to resolve these problems. As a starting point, organisations could make use of the best practice framework developed in this study.
- Organisations should include reverse logistics in their strategic planning and create clear policies for it.

- Organisations should invest in appropriate information technology and establish effective data collection to improve the effectiveness of their reverse logistics processes
- Organisations should consider outsourcing their reverse logistics function, if they lack the necessary expertise or knowledge.
- Organisations should communicate and share information with their supply chain partners regarding reverse logistics.

7.5 FUTURE RESEARCH

Future research possibilities include the following:

- Since there are closely related concepts to reverse logistics, the approach in this study can also be applied to these concepts. For instance, a conceptual best practice framework could be developed for effective returns management.

- In this study, the conceptual best practice framework was only refined. Researchers could consider testing this framework in different industries with representative samples.

- The focus of the study was not specific to any industry. Hence the approach in this study could be more industry specific. For instance, future research could focus on the best practices of reverse logistics in, say, the fast-moving consumer goods (FMCG) industry or the manufacturing industry. It could even be more specific such as best practices in reverse logistics for the automotive manufacturing industry.

This study has thus opened up avenues for numerous future research opportunities in the field of reverse logistics.

7.6 CONCLUSION

This study clearly indicated that reverse logistics is a vital function that should not be ignored. Organisations are beginning to realise this, but more development is still needed. Organisations should realise that if they improve the management of their reverse logistics processes, provide more resources for reverse logistics and pay more attention to it, the benefits are endless. Such

practices will lead to cost and waste reductions. In addition, organisations could improve their customer service and gain a competitive advantage.

The primary objective of the study was to determine the best practices in reverse logistics and to compile a framework for organisations that would enable them to manage their reverse logistics processes more efficiently. This objective was achieved by

- identifying the best practices in reverse logistics from the literature
- compiling a conceptual framework of best practices in reverse logistics, based on the literature findings
- conducting a survey in order to determine whether these best practices are indeed regarded as important and make a contribution in practice
- refining the best practice framework into a practical workable instrument

Based on the findings, all the best practices identified in the literature proved to be important in practice. Applying the best practices proposed in the study will enable organisations to manage their reverse logistics processes more efficiently.

Since there is still a paucity of academic research in South Africa in the field of reverse logistics, the aim of this study was to contribute to this field and increase awareness of the significance of reverse logistics. Hopefully this will open up opportunities for future research and practices in reverse logistics for both academics and businesses in South Africa.

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APPENDICES
APPENDIX A
Questionnaire

GENERAL INFORMATION

Dear Respondent

I am a lecturer in the Department of Transport Economics, Logistics and Tourism at the University of South Africa. I am currently conducting research for my MCom in Logistics. The aim of my study is to determine best practices in reverse logistics in order to compile and provide a framework for organisations that will enable them to manage their reverse logistics processes more efficiently.

The purpose of this questionnaire is to

- determine the most significant problems and challenges that can be experienced by organisations in reverse logistics
- determine best practices or solutions that can be implemented to overcome challenges in reverse logistics and improve the management of reverse logistics

Instructions on the completion of this questionnaire will follow before each section. The questionnaire is designed to make completion as easy and quick as possible. Most of the questions can be answered by simply making a tick in a box.

Note the following important points:

- This is an independent research study and participation is voluntary. Your responses will be treated as **strictly confidential** and the **anonymity** of companies and respondents is assured.
- No person or firm will have access to your completed questionnaire.

If any part of the questionnaire is not clear, or if you have any queries, please contact me, Amanda Badenhorst, at 084 581 4285 or email me at badena@unisa.ac.za .

Once you have completed your questionnaire, please return it to me via email at badena@unisa.ac.za. It would be appreciated if you could return the completed questionnaire to me by no later than 5 November 2012.

Should you require a copy of the abbreviated report of the findings, please write your name, email address or telephone number in the box below.
I look forward to your response.
Yours sincerely
Amanda Badenhorst

THANK YOU FOR YOUR COOPERATION

SECTION 1 –GENERAL INFORMATION

1.1 Name of company

_____

1.2 Position/title of person who completed the questionnaire

1.3 Please indicate the size of your company in terms of annual turnover and number of employees.

No. of employees / Level of turnover (Rm)	Less than 50	51 – 200	201 – 500	501 – 1 000	1 001 – 5 000	More than 5 000
Less than R10 million p.a.	1	2	3	4	5	6
R10 – 100 million p.a.	1	2	3	4	5	6
R101 – 500 million p.a.	1	2	3	4	5	6
More than R500 million p.a.	1	2	3	4	5	6

1.4 Which option best describes the status of the company you work for?

STATUS	**CIRCLE (0) CHOICES**
Head office	01
Holding company	02
Branch	03
Subsidiary	04
Independent unit	05

SECTION 2 – PROBLEMS AND CHALLENGES IN REVERSE LOGISTICS

2.1 Cost associated with reverse logistics

In your opinion, to what extent do organisations experience the following problems with reverse logistics? Please provide more information in the comments block if you wish to expand on or clarify specific issues.

		TICK IF NOT A PROBLEM	**IF A PROBLEM AREA, PLEASE CIRCLE (0) TO WHAT EXTENT**				
	Cost-related problems in reverse logistics		**Lesser extent**				**Greater extent**
1	The inability to reduce cost		**1**	**2**	**3**	**4**	**5**
2	High cost associated with reverse logistics		**1**	**2**	**3**	**4**	**5**
3	The lack of awareness of the hidden cost of reverse logistics		**1**	**2**	**3**	**4**	**5**
Comments:							

2.2 Information systems

In your opinion, to what extent do organisations experience the following problems with reverse logistics? Please provide more information in the comments block if you wish to expand on or clarify specific issues.

		TICK IF NOT A PROBLEM	**IF A PROBLEM AREA, PLEASE CIRCLE (0) TO WHAT EXTENT**				
	Information-related problems		**Lesser extent**				**Greater extent**
1	Insufficient investment in information technology		**1**	**2**	**3**	**4**	**5**
2	Low reliability of IT solutions		**1**	**2**	**3**	**4**	**5**
3	Lack of information visibility		**1**	**2**	**3**	**4**	**5**
4	Insufficient, abundant, ambiguous or conflicting data		**1**	**2**	**3**	**4**	**5**

Comments:

2.3 Product returns and reverse logistics processes

In your opinion, to what extent do organisations experience the following problems with reverse logistics? Please provide more information in the comments block if you wish to expand on or clarify specific issues.

		TICK IF NOT A PROBLEM	**IF A PROBLEM AREA, PLEASE CIRCLE (0) TO WHAT EXTENT**				
	Problems relating to product returns and reverse logistics processes		**Lesser extent**				**Greater extent**
1	Uncertainties relating to product returns (e.g. irregular material flows and infrequent and erratic timing patterns of returns or condition or quality of product returns)		**1**	**2**	**3**	**4**	**5**
2	Uncertainty about appropriate disposition option to follow		**1**	**2**	**3**	**4**	**5**
3	A lack of knowledge about time and costs involved in the disposition of product returns		**1**	**2**	**3**	**4**	**5**
Comments:							

2.4 Organisational and management-related problems

In your opinion, to what extent do organisations experience the following problems with reverse logistics? Please provide more information in the comments block if you wish to expand on or clarify specific issues.

		TICK IF NOT A PROBLEM	IF A PROBLEM AREA, PLEASE CIRCLE (0) TO WHAT EXTENT				
	Organisational and management-related problems		**Lesser extent**				**Greater extent**
1	Not including reverse logistics in strategic planning		**1**	**2**	**3**	**4**	**5**
2	The lack of top management awareness of the importance of reverse logistics		**1**	**2**	**3**	**4**	**5**
3	The lack of top management commitment to reverse logistics		**1**	**2**	**3**	**4**	**5**
4	The lack of departmental collaboration/communication/cooperation in reverse logistics		**1**	**2**	**3**	**4**	**5**
5	The resistance to change in order to include reverse logistics		**1**	**2**	**3**	**4**	**5**
Comments:							

2.5 Problems with supply chain partners

In your opinion, to what extent do organisations experience the following problems with reverse logistics? Please provide more information in the comments block if you wish to expand on or clarify specific issues.

		TICK IF NOT A PROBLEM	IF A PROBLEM AREA, PLEASE CIRCLE (0) TO WHAT EXTENT				
	Problems with supply chain partners in reverse logistics		**Lesser extent**				**Greater extent**
1	Lack of collaboration with supply chain partners in reverse logistics		**1**	**2**	**3**	**4**	**5**
2	Lack of communication with supply chain partners in reverse logistics		**1**	**2**	**3**	**4**	**5**

Comments:

2.6 Customer-related problems

In your opinion, to what extent do organisations experience the following problems with reverse logistics? Please provide more information in the comments block if you wish to expand on or clarify specific issues.

		TICK IF NOT A PROBLEM	IF A PROBLEM AREA, PLEASE CIRCLE (0) TO WHAT EXTENT				
	Customer-related problems		**Lesser extent**				**Greater extent**
1	The lack of clear policies on return of products		**1**	**2**	**3**	**4**	**5**
2	Customers' abuse of return policies		**1**	**2**	**3**	**4**	**5**
3	Unauthorised return allowance		**1**	**2**	**3**	**4**	**5**
4	Customers' negative perception of returning the products		**1**	**2**	**3**	**4**	**5**
Comments:							

SECTION 3 – BEST PRACTICES AND SOLUTIONS IN REVERSE LOGISTICS

3.1 Information-related best practices

(1) In your opinion, to what **extent** can the following **practices or solutions** be attributed to the efficient management of reverse logistics?

(2) Also please indicate how **difficult** it would be to **implement** these practices or solutions. Use the guide indicated below to decide how difficult it would be to implement the practice.

Guide for 5-point scale

1. Very easy to implement, few resources needed, little time or complexity
2. Somewhat easy to implement, some resources and time needed, but not taxing to the organisation
3. Moderately difficult to implement, can be remediated with moderate resources and time, moderate complexity
4. Somewhat difficult to implement, requires resources, time and probably complex
5. Extremely difficult to implement, high impact on resources and time, very complex

(3) Please provide more information in the comments block if you wish to expand on or clarify specific issues.

		EXTENT TO WHICH PRACTICE CAN CONTRIBUTE TO EFFICIENT MANAGEMENT OF REVERSE LOGISTICS					**DON'T KNOW**	**DIFFICULT IMPLEMENTING THE PRACTICE**				
Information-related best practices		**Lesser extent**				**Greater extent**		**Very easy**				**Very difficult**
1	Invest in state-of-the-art technology for reverse logistics	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
2	Apply an integrated information management approach	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
3	Analyse returns data to optimise decision making	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
4	Establish effective data collection	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
5	Use data management	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**

	to track the flow of information											
6	Implement an accurate information system	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
7	Implement a flexible information system	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
8	Automate information	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
9	Implement an information system that is compatible with supply chain partners (customers and suppliers)	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
10	Utilise the internet or establish a web-based approach	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
11	Utilise a reverse logistics information management system	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
12	Utilise special return software	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
13	Make us of a return merchandise authorisation (RMA) system	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
14	Utilise a knowledge management system (KMS)	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
15	Utilise a warehouse management system (WMS)	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
16	Utilise a transportation management system (TMS)	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
COMMENTS:												

3.2 Best practices relating to reverse logistics processes

(1) In your opinion, to what **extent** can the following **practices or solutions** be attributed to the efficient management of reverse logistics?

(2) Also please indicate how **difficult** it would be to **implement** these practices or solutions. Use the guide indicated below to decide how difficult it would be to implement the practice.

Guide for 5-point scale

1. Very easy to implement, few resources needed, little time or complexity
2. Somewhat easy to implement, some resources and time needed, but not taxing to the organisation
3. Moderately difficult to implement, can be remediated with moderate resources and time, moderate complexity
4. Somewhat difficult to implement, requires resources, time and probably complex
5. Extremely difficult to implement, high impact on resources and time, very complex

(3) Please provide more information in the comments block if you wish to expand on or clarify specific issues.

		EXTENT TO WHICH PRACTICE CAN CONTRIBUTE TO EFFICIENT MANAGEMENT OF REVERSE LOGISTICS					**DON'T KNOW**	**DIFFICULTY IMPLEMENTING THE PRACTICE**				
Best practices relating to reverse logistics processes		**Lesser extent**				**Greater extent**		**Very easy**				**Very difficult**
1	Streamline the reverse logistics process	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
2	Set structured procedures	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
3	Automate the entire	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**

	reverse logistics process											
4	Standardise the reverse logistics procedures	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
5	Establish a reverse logistics procedure that is uncomplicated	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
6	Establish a reverse logistics procedure that is quick	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
7	Establish a gatekeeper at the start of the reverse logistics process	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
8	Implement a robust gatekeeping function	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
9	Separate reverse logistics facilities from forward facilities by establishing central return centres	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
COMMENTS:												

3.3 Organisational and management-related best practices

(1) In your opinion to what **extent** can the following **practices or solutions** be attributed to the efficient management of reverse logistics?

(2) Also please indicate how **difficult** it would be to **implement** these practices or solutions. Use the guide indicated below to decide how difficult it would be to implement the practice.

Guide for 5-point scale

1. Very easy to implement, few resources needed, little time or complexity
2. Somewhat easy to implement, some resources and time needed, but not taxing to the organisation
3. Moderately difficult to implement, can be remediated with moderate resources and time, moderate complexity
4. Somewhat difficult to implement, requires resources, time and probably complex
5. Extremely difficult to implement, high impact on resources and time, very complex

(3) Please provide more information in the comments block if you wish to expand on or clarify specific issues.

		EXTENT TO WHICH PRACTICE CAN CONTRIBUTE TO EFFICIENT MANAGEMENT OF REVERSE LOGISTICS					**DON'T KNOW**	**DIFFICULTY IMPLEMENTING THE PRACTICE**				
Organisational and management-related best practices		**Lesser extent**				**Greater extent**		**Very easy**				**Very difficult**
1	Create a comprehensive strategic plan for reverse logistics	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
2	Implement a customer-focused policy and strategy for reverse logistics	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
3	Implement multiple disposition strategies for reverse logistics	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
4	Establish clear policies	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**

	for reverse logistics											
5	Establish uniform policies for reverse logistics	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
6	Review current customer service practices	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
7	Simplify return policies	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
8	Implement return avoidance strategies or zero-return policies	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
	Develop an innovative reverse logistics programme	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
9	Develop a formalised reverse logistics programme	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
10	Employ a dedicated manager for reverse logistics	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
11	Guidance of top management and an executive team to implement a successful reverse logistics programme	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
12	Top management that demonstrate commitment to reverse logistics	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
13	Conduct formal training of employees involved in the reverse logistics process	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
14	Establish cross-functional teams for	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**

	reverse logistics											
COMMENTS:												

3.4 Best practices relating to outsourcing and partnerships

(1) In your opinion, to what **extent** can the following **practices or solutions** be attributed to the efficient management of reverse logistics?

(2) Also please indicate how **difficult** it would be to **implement** these practices or solutions. Use the guide indicated below to decide how difficult it would be to implement the practice.

Guide for 5-point scale

1. Very easy to implement, few resources needed, little time or complexity
2. Somewhat easy to implement, some resources and time needed, but not taxing to the organisation
3. Moderately difficult to implement, can be remediated with moderate resources and time, moderate complexity
4. Somewhat difficult to implement, requires resources, time and probably complex
5. Extremely difficult to implement, high impact on resources and time, very complex

(3) Please provide more information in the comments block if you wish to expand on or clarify specific issues.

		EXTENT TO WHICH PRACTICE CAN CONTRIBUTE TO EFFICIENT MANAGEMENT OF REVERSE LOGISTICS					DON'T KNOW	DIFFICULTY IMPLEMENTING THE PRACTICE				
Best practices relating to outsourcing and partnerships		**Lesser extent**				**Greater extent**		**Very easy**				**Very difficult**
1	Outsource reverse logistics to third party logistics (3PL) providers	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
2	Leverage a partnership network for reverse logistics	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
3	Create alliances with supply partners for reverse logistics	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
4	Engage with supply chain partners through contractual processes	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
5	Build and develop long-term partnerships with supply chain partners based on mutual trust and commitment	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
6	Share information with supply chain partners	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
COMMENTS:												

Once again, thank you for your time and assistance in completing this questionnaire. It is greatly appreciated.

APPENDIX B

LIST OF COMPANIES CONTACTED

Company name	Company webpage address
Device	www.device.co.za
Logistics Africa International Ltd	www.logisticsafrica.com
Technogistics (Pty)Ltd	www.technogistics.co.za
TDF Network Africa	www.tdf.co.za
Revlogs (Pty)Ltd	www.revlogs.co.za
Logtrix (Pty)Ltd	www.logtrix.com
Rowlands Pearse Management Services (Pty)Ltd	www.rowlandspearse.co.za
Value Logistics	www.value.co.za
Bayete Reverse Logistics	www.ibcsolutions.co.za
Dataserv SA	www.dataserv.co.za
WMservices	www.rlwmservices.co.za
Service Parts Logistics (SPL)	www.spl.co.za
DB Shenker South Africa	http://www.schenker.co.za/pages/contact.php
Bidvest Panalpina Logistics Ltd	www.bpl.za.com
Imperial Distribution	http://www.imperialdistribution.co.za/
Westcon SA (Pty)Ltd	www.westcon.co.za
DHL International (Pty)Ltd	http://www.dhl.co.za/en.html
UPS Solutions South Africa	www.ups.com/content/za/en/contact/index.html
The Cold Chain Distribution South Africa	www.thecoldchain.co.za
Chartered Institute of Logistics and Transport South Africa	www.ciltsa.org.za/