

A framework for successful logistics outsourcing arrangements in South Africa

by

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Abstract

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Outsourcing of logistics activities is a popularly employed logistics strategy by many industries within the South African context. However, it is not fully understood what is required to ensure the sustainability of such a strategy. More specifically, the alignment of the logistics service provider and the customer is not fully understood. Customers adhere to strict procurement policies, which often result in short contractual periods, while logistics service providers aim to generate proper returns during these short contractual periods. Customers and logistics service providers require assistance in structuring the approach to a logistics outsourcing arrangement to ensure the success of the transaction.

This study aims to develop a framework or roadmap to be used by customers and logistics service providers either considering to enter a logistics outsourcing arrangement or already committed to such an arrangement. The framework will provide guidance to both parties to ensure that the arrangement achieves the objectives of a modern-day logistics outsourcing arrangement. The objectives of a successful logistics outsourcing arrangement include: ensuring the sustainability of the arrangement; meeting the expectations of both parties; achieving joint and own objectives; ensuring a fair price; extending the duration of the contract; and ensuring that on termination the arrangement ends amicably.

The framework is developed by means of an in-depth analysis of the life cycle of a logistics outsourcing arrangement within the South African context. Each phase within the life cycle is investigated by means of industry interviews, questionnaires, case studies and equity research. Factors affecting the success of logistics outsourcing arrangements are identified. Subsequently, possible solutions are recalled from existing research, or developed and tested to aid both parties in identifying and managing these factors throughout the life cycle. These solutions include methods for dealing with the insource versus outsource and supplier selection decisions and a method of managing detrimental behaviour of the customer and logistics service provider within the arrangement.

Keywords: decision trees, gain sharing, key performance indicators, linear programming, logistics outsourcing, insource versus outsource decision, multi-objective decision making, service provider selection

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Contents

1	Introduction.....	1
1.1	Successful logistics outsourcing arrangements in a South African context	1
1.2	Problem statement.....	2
1.3	Research objectives.....	2
1.4	Research approach	2
1.5	Limitations and assumptions.....	3
1.6	Ethical considerations	4
1.7	Research contributions.....	4
1.8	Document structure	5
2	Literature Review	6
2.1	Setting the scene	6
2.2	Achieving logistics excellence.....	6
2.2.1	Product to customer	7
2.2.2	Inventory to information	7
2.2.3	Cost centre to profit centre.....	8
2.2.4	Transaction to relationship.....	8
2.3	Outsourcing as logistics strategy – the initiation phase	8
2.3.1	The insource versus outsource decision.....	8
2.3.2	Proven decision-making methods	9
2.3.3	Customer fit	12
2.3.4	Partner-specific investment.....	12
2.3.5	Legal agreements	13
2.4	A sustainable relationship – the growth and maturity phase	13
2.4.1	Establishing a relationship	13
2.4.2	Partnerships.....	14
2.4.3	Creating value for the customer	14
2.5	A failed relationship – the decline	15
2.5.1	Relationship risk	15
2.5.2	Asset risk.....	15
2.5.3	Competence risk.....	16
2.5.4	Factors that initiate the decline	16
2.6	Concluding remarks	17
3	Research Method	18
3.1	Introduction.....	18
3.2	Research approach and design	18
3.3	Research methodology.....	20
3.3.1	Identifying the characteristics of typical logistics outsourcing arrangements in South Africa.....	20
3.3.2	The LSP perspective of the logistics outsourcing life cycle	23
3.3.3	The customer perspective of the logistics outsourcing arrangement	25

3.3.4	Getting insight into the factors that contribute to the sustainability of a logistics outsourcing arrangement.....	26
3.3.5	Develop a framework which will guide customers and LSPs to establish a successful arrangement	27
3.4	Concluding remarks	28
4	Current logistics outsourcing practices in South Africa	29
4.1	Introduction to logistics in South Africa.....	29
4.2	Analysis.....	29
4.3	Results.....	29
4.3.1	The customer’s perspective.....	29
4.3.2	The LSP’s perspective	30
4.3.3	Types of LSPs	31
4.3.4	South African logistics practices during the initiation phase.....	33
4.3.5	South African logistics practices during the growth and maturity phase	39
4.3.6	South African logistics practices during the decline phase	49
4.4	Concluding remarks	50
5	The insource versus outsource decision	52
5.1	The initiation phase.....	52
5.2	The method developed by Platts et al	54
5.3	Decision trees.....	59
5.3.1	Method	59
5.3.2	The decision tree model	59
5.3.3	Linear programming	64
5.4	Research Results	65
5.4.1	Platts et al.’s method.....	65
5.4.2	Decision trees.....	65
5.4.3	Linear programming results	67
5.5	Evaluation of results	67
5.5.1	Logistics cost	67
5.5.2	The associated risk.....	67
5.5.3	Long-term strategy.....	68
5.5.4	Service provider fit	68
5.5.5	The degree of market growth achieved.....	68
5.5.6	Service levels	68
5.6	Conclusion and recommendations	69
6	The growth and maturity phase	70
6.1	Extending the growth and maturity phase	70
6.2	Analysis.....	70
6.2.1	Conflicting and joint objectives	70
6.2.2	The resulting behaviour	71
6.3	Results.....	75

6.3.1	KPIs aligning the LSP with the customer	75
6.3.2	KPIs opposing customer behaviour	75
6.3.3	KPIs opposing LSP behaviour	76
6.3.4	Mutual KPIs	76
6.3.5	Value-adding KPIs.....	76
6.4	Concluding remarks	76
7	A roadmap to a sustainable logistics outsourcing arrangement.....	77
7.1	Introduction.....	77
7.2	Achieving a sustainable arrangement	78
7.2.1	The initiation phase.....	78
7.2.2	Growth and maturity	79
7.2.3	The decline.....	79
7.3	Meeting expectations and objectives	80
7.3.1	The initiation phase.....	80
7.3.2	The growth and maturity phase.....	81
7.4	Ensuring a fair price.....	82
7.5	Extended duration	82
7.6	Amicable termination.....	83
7.7	Concluding remarks	84
	References	86
	A Ethics approval.....	89
	B Customer and LSP questionnaires	91
	C Detail of the eight case studies	106
	D KPI matrix	109

List of Tables

Table 1: Data used in addressing the research objectives of the study	19
Table 2: KPIs that manage LSP behaviour	43
Table 3: KPIs which manage the customer.....	47
Table 4: Weightings of importance per area	54
Table 5: Criteria weightings per area	55
Table 6: Scoring of in-house and LSP capabilities for comparison.....	56
Table 7: Overall results of the comparison between in-house and LSP capabilities	56
Table 8: Cost driving dimensions identified in the data	60
Table 9: Confidence intervals for the expected value of each variable	60
Table 10: Comparison of options.....	66
Table 11: Variable weightings per strategy	66
Table 12: Decision tree option results.....	66
Table 13: Identifying complementing and opposing KPIs	72
Table 14: KPI coverage	74
Table 15: Logistics outsourcing roadmap: Achieving a sustainable outsourcing arrangement	78
Table 16: Logistics outsourcing roadmap: Meeting expectations and objections	80
Table 17: Logistics outsourcing roadmap: Ensuring a fair price	82
Table 18: Logistics outsourcing roadmap: Extending duration	82
Table 19: Logistics outsourcing roadmap: Ensuring an amicable termination of the arrangement.....	84
Table 20 Case study detail of KPIs.....	107
Table 21 KPI Matrix	110

List of Figures

Figure 1: The outsourcing arrangement life cycle	1
Figure 2: The contribution to national transport cost compared to the questionnaire response rate.....	23
Figure 3: Reasons for outsourcing	34
Figure 4: LSP capability analysis.....	35
Figure 5: Internal customer capabilities	36
Figure 6: Relevant factors when taking on a new customer	37
Figure 7: Adaptions to accommodate the other party	38
Figure 8: Joint efforts.....	41
Figure 9: The contents of a formal legal agreement	49
Figure 10: Termination causes.....	50
Figure 11: The initiation phase	53
Figure 12: Cost sensitivity	57
Figure 13: Service sensitivity.....	57
Figure 14: Technology and process sensitivity.....	58
Figure 15: Auxiliary function sensitivity	58
Figure 16: First uncertainty fork	61
Figure 17: Service level uncertainty	62
Figure 18: Decision tree.....	63
Figure 19: KPI coverage versus complexity	75

List of Abbreviations

3PL	Third Party Logistics Provider
CDC	Central Distribution Centre
CSCMP	Council of Supply Chain Management Professionals
DTI	Department of Trade and Industry
ECSA	Engineering Council of South Africa
ERP	Enterprise Resource Planning System
FMCG	Fast Moving Consumer Goods
GDP	Gross Domestic Product
IT	Information Technology
JIT	Just-In-Time
JSE	Johannesburg Stock Exchange
KPI	Key Performance Indicator
LP	Linear Programming
LSP	Logistics Service Provider
MCDM	Multiple Criteria Decision Making
MHE	Material Handling Equipment
NDD	Nominated Day of Delivery
POD	Proof of Delivery
RFP	Request For Proposal
ROIC	Return On Invested Capital
RTM	Route To Market
SAIIE	South African Institute for Industrial Engineers
SASC	South African Shippers Council
SKU	Stock Keeping Units
SL	Service Level
TMS	Transport Management System
TVP	Total Value Purchasing
WACC	Weighted Average Cost of Capital
WMS	Warehouse Management System
XML	Extensible Mark-up Language

Chapter 1

Introduction

1.1 Successful logistics outsourcing arrangements in a South African context

‘In order to enhance the development of logistics, not only in South Africa but also internationally, it is important to identify the latest trends and do benchmarking against the best practices’[1]. The outsourcing of logistics activities within South African has enjoyed increased popularity [2], but little is known about the management of the relationship between the parties within such an arrangement.

Singh [3] reports that, ‘Factors such as the misalignment between customers and logistics service providers (LSPs) in South Africa have proved an increasing strain on the customer-LSP relationship’. Mountford [4] adds, ‘In most cases the consequence is an unsustainable outsourcing arrangement that could ultimately lead to the termination of a logistics outsourcing contract without renewal’. Before the parties enter the agreement, customers and LSPs in a logistics outsourcing arrangement often do not recognise the factors that threaten the future sustainability of these arrangements [5]. Nor the possibility that these factors might even present themselves on the onset of the arrangement.

It is important that LSPs and customers be given guidance throughout the progression of the arrangement to keep it sustainable and ultimately successful. Johnston [2] compares the customer supply chain to a system of living organisms. Expanding this metaphor, one could compare the logistics outsourcing arrangement to the life cycle of an organism. Figure 1 shows such a life cycle consisting of three main stages: initiation, growth and maturity, and the decline.

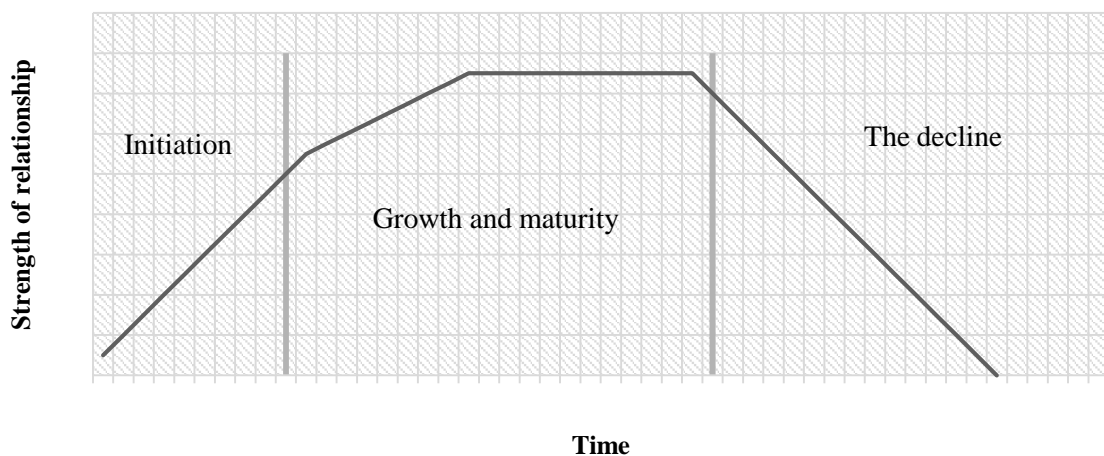


Figure 1: The outsourcing arrangement life cycle

The initiation of the life cycle consists of the decision of the customer to outsource any logistics activities and the initial interaction between the customer and LSP. The growth and maturity phase constitutes the period wherein a relationship between the LSP and customer is cultivated, logistics services are provided by the LSP, and customer expectations have to be managed. The decline phase signifies the period wherein the agreement approaches termination. As time progresses and

the arrangement moves through the different phases of the life cycle, the strength of the arrangement changes. It is not fully understood what affects the length of each phase, the rate at which the strength of the relationship grows, when the strength of the relationship will start to reduce, or at what level of strength the arrangement will end.

Mountford [4] uses the example of large multinational companies operating within South Africa. These companies have stringent procurement policies that apply very short contractual periods. They therefore do not promote long-term relationships with the LSP. He adds that during the request for proposal (RFP) process, LSPs are often made to take part in an online bidding process. This process frequently results in the LSP being pressurised to reduce costs to unsustainable levels. Once the LSP has been awarded the contract, the juggling act of managing costs and customer expectations during the growth and maturity phase commences. This often comes to an abrupt end during the decline phase; the customer sends out RFPs towards the end of the short contractual period, and the LSP disengages. The arrangement comes to a less than amicable end.

The life cycle duration of the arrangement was very short, due to customer procurement policies. The strength of the arrangement did not reach an optimal level, since the LSP was operating under immense pressure and this resulted in a weak relationship at the end of the decline phase. The arrangement therefore did not end amicably.

1.2 Problem statement

The aim of the logistics outsourcing arrangement is to ensure that the transaction is successful for both parties. LSPs and their customers require assistance in approaching a logistics outsourcing arrangement to avoid the classic pitfalls and detrimental behaviour that might lead to the unsustainability of such an arrangement and, ultimately, the unamicable termination. It is not fully understood what constitutes a successful logistics outsourcing arrangement in the South African context. Therefore, a need exists to understand what constitutes a successful logistics outsourcing arrangement in the South African context, and the steps required to achieve this.

1.3 Research objectives

The research objective of this study aimed to determine the characteristics of a successful logistics outsourcing arrangement and the approach to keep it successful within a South African context. To do this, the following secondary objectives had to be achieved:

- Identify the characteristics of typical logistics arrangements in South Africa within the context of the logistics outsourcing life cycle;
- Understand both the customer and LSP perspectives of the life cycle and draw a comparison between them;
- Identify opportunities where a logistics outsourcing arrangement will be mutually beneficial;
- Gain insight into the factors that contribute to the sustainability of such an arrangement;
- Develop a framework that will guide customers and LSPs to establish a successful arrangement.

1.4 Research approach

The approach followed in this research study included a thorough literature review which studies the logistics outsourcing strategy from the life cycle perspective to logically organise the existing research. The initiation phase of the life cycle focuses on existing research regarding the customer decision to either outsource or perform the logistics function in-house. This will be referred to as

the insource versus outsource decision. The initiation phase includes the methods used to make this decision; selecting the most appropriate service provider; and the associated evaluation criteria. The growth and maturity phase of the life cycle investigates the use of mechanisms put in place to keep such an arrangement sustainable and the behaviour promoted by such mechanisms. The decline phase reviews existing research, which relates to the fatal factors that contribute to the termination of the arrangement.

The literature study forms the basis from which the research study is performed. Key milestones and processes within the life cycle, as identified in the literature review, are used to develop two industry questionnaires – one for customers and one for LSPs. The industry questionnaires were developed and distributed to determine which practices identified within the literature are prevalent in a South African context and whether any gaps exist.

To analyse the industry questionnaire results, interviews with top executives representing both parties – LSPs and customer – were held. These interviews provided the necessary perspective from which to analyse and interpret the results of the industry questionnaires. The interviews added to the understanding of logistics outsourcing arrangements within South Africa from the customer and LSP perspectives.

Three case studies – one customer case study and two LSP case studies – could be developed from the industry interviews, and provided the opportunity to study the life cycle of a logistics outsourcing arrangement in more detail. The customer case study was used to dissect the initiation phase and determine the opportunities where a logistics outsourcing arrangement would be mutually beneficial for both parties. Additional information, such as RFP results and historical performance and sales data, was provided by the customer case study company. Proven insource versus outsource decision-making methods and supplier selection evaluation criteria were applied to the customer's logistics outsourcing decision problem. Recommendations were made regarding the most appropriate method to apply in different circumstances.

The two LSP case studies combined with the industry questionnaire results provided the opportunity to understand the factors that affect the sustainability of the arrangement during the growth and maturity phase. A method of managing customer and LSP behaviour within different permutations of the logistics outsourcing arrangement was developed to ensure the sustainability of the arrangement. Eight additional case studies were provided by questionnaire participants and were used to evaluate this method.

No additional research was performed to study the decline phase in further detail. The onset of the decline phase indicates that the arrangement will be terminated and that any energy applied during this phase would be to ensure that the arrangement ends amicably. Any actions taken to save an arrangement should be taken during the preceding two phases to delay the onset of the decline phase.

To conclude the research and achieve the secondary research objectives a framework or roadmap for successful logistics outsourcing was developed. The purpose of the roadmap was to collate the findings from the preceding chapters into a guide that customers and LSPs could use to align efforts. This guide assists in achieving the results desired by both parties, and to ensure that the arrangement is successful.

1.5 Limitations and assumptions

This study looked at improving logistics outsourcing arrangements within a South African context. The case studies used included representatives from the construction, mining, manufacturing and

trade industries. These studies represent various permutations of the logistics outsourcing arrangement with an assortment of logistics services, such as warehousing, secondary distribution and primary transport on offer within the borders of South Africa.

1.6 Ethical considerations

Ethics approval to complete this study was obtained from the University of Pretoria before any interviews were held or questionnaires were sent out. The formal communication from the University ethics committee has been included in Appendix A.

All participants to the questionnaire and interviews were briefed on the objective of the study and anonymity and confidentiality was ensured. All participants were ensured that the study forms part of research completed at the University of Pretoria and would not be distributed to any competitor or customer. Interviews were not recorded, the author relied on notes taken during the interview and follow-up emails.

To ensure the anonymity and confidentiality of the participants in this study, no names were recorded in the survey tool. Company names and job titles were requested to determine the representativeness of the sample of the market and the credibility of the response. This information was not shared with any party involved. Participants could exit the questionnaire at any time and questions could be skipped at own will.

All participants had the opportunity to request that the results of the study be shared. All data shared were aggregated to such an extent that no individual responses could be observed.

1.7 Research contributions

A framework was developed which aims to guide both the LSP and the customer in South Africa in managing the logistics outsourcing life cycle. Along with the life cycle, the framework acts as a roadmap that both parties can reference to ensure that the appropriate actions are taken at the appropriate time to achieve the objectives of such an outsourcing arrangement.

LSP and customer actions are listed and categorised in the roadmap based on the objectives they promote and the life cycle phase to which they apply. This roadmap will assist both parties in the arrangement in identifying and addressing factors that threaten the future sustainability of the arrangement and improve the success rate of these arrangements. The framework details physical steps that both parties should follow in the life cycle of the logistics outsourcing arrangement. The framework, which is easily implementable and combines many proven methods and processes, was developed for the practical use by LSPs and customers. To the best of the author's knowledge, no other framework exists that takes both the LSP and customer perspectives of the arrangement into account and aligns the proposed steps to the objectives of such an arrangement. Existing research covers the individual steps outlined in the framework, but no research was found that takes a high-level view of the entire arrangement.

In developing the conceptual framework, a key performance indicator (KPI) matrix was developed. The matrix can be used in different permutations of the logistics outsourcing arrangement to determine which KPIs should be measured. In addition it provides the frequency in which the KPIs should be reported on and to propose a method of calculation. The KPI matrix aims to align the efforts of both parties, promote value-adding behaviour and oppose detrimental behaviour.

Three proven insource versus outsource and supplier selection methods typically used in the manufacturing industry were applied to a logistics outsourcing decision problem within the fast

moving consumer goods (FMCG) industry. A method developed by Platts, Probert & Canez [6], linear programming (LP) and decision trees were successfully applied to a local logistics insource versus outsource decision. This provides the customer with proposed methods to use in different circumstances. The study showed that proven outsourcing decision-making methods traditionally applied to a manufacturing outsourcing decision problem could be adapted and applied to a logistics outsourcing decision problem of a South African FMCG company. The methods successfully made use of the information that was available to the company in practice, and depended on scientific and statistical inference. It was not reliant on a repository of LSP performance history built up over years of experience in dealing with LSPs, as this would have been a costly process. All methods could incorporate the required evaluation criteria and decision-making objectives. This study offers middle management three different methods to assess the logistics outsourcing decision problem and make tactical decisions regarding outsourcing to execute a company's long-term logistics strategy.

The results obtained from the industry questionnaire provided interesting insights into the current South African logistics outsourcing practices as perceived by the customer and the LSP.

1.8 Document structure

Chapter 1 serves as an introduction to the study. In Chapter 2, a thorough literature review is completed for all phases in the logistics outsourcing life cycle to establish a basis from which each phase will be investigated. The literature review is followed by Chapter 3, which outlines the research methodology followed to achieve the research objectives outlined.

Chapter 4 investigates the current logistics outsourcing life cycle practices in South Africa. Chapter 5 studies the initiation phase by applying proven decision-making methods to the insource versus outsource decision and supplier selection process in a logistics outsourcing context. Chapter 6 investigates the growth and maturity phase, which constitutes the actual logistics activities provided by the LSP and the customer's periodic evaluation of the value of the logistics services procured during the initiation phase.

Chapter 7 combines all the findings from the literature reviewed, South African logistics outsourcing trends, the decision-making methods and the proposed performance measures into a framework for customers and LSPs to use in practise.. In addition, the research contribution is highlighted and recommendations for future research are made.

Chapter 2

Literature Review

2.1 Setting the scene

Cilliers & Nagel [1] predicted that logistics would play a critical role in the recovery of the economy from political instability in South Africa caused by the first democratic election. Their article was published shortly after South Africa's first democratic election in 1994. It describes the economic landscape as a country with negative economic growth, a fast growing population, increasing levels of unemployment, labour force unrest, and imports that exceed exports. They argue that South Africa's trading partners are all developed nations and therefore international competitiveness should be the highest priority. This economic landscape described by Cilliers & Nagel [1] translates to a very tough environment for managing a business.

Twenty-one years after the publication of the article by Cilliers & Nagel [1], an assessment of the economic landscape is required. Statistics published by the World Trade Organization [7] provide a snapshot of South Africa's international competitiveness. According to these statistics, South Africa mainly exports merchandised goods to the European Union, China, the United States of America, Japan and India. The annual value of exported merchandised goods equates to \$87 256 million. Merchandised goods imports originate from the European Union, China, the Kingdom of Saudi Arabia, the United States of America and Japan to the annual value of \$124 245 million.

The commercial services trade, although smaller than merchandised goods trade, gives a good indication of South Africa's international competitiveness in terms of logistics services. It indicates that South Africa imports more services, such as transport and travel, than it exports. Exported commercial services, such as transportation, travel and other services, account for \$14 711 million annually, of which transport accounts for 11.8% thereof. Conversely, imported commercial services account for \$17 195 million, of which transport accounts for 46.5% thereof [7].

Increased exports can stimulate economic growth by the inflow of foreign currency, which positively affects job creation and local development through investment in infrastructure. Logistics is the common denominator. South Africa's local logistics capabilities ultimately translate to its international capabilities. High logistics costs are seen as a barrier to trade and foreign investment and thus economic growth [8].

Havenga [9] states that South Africa's logistics costs exceed that of the global average. Logistics costs as a percentage of the gross domestic product (GDP) for South Africa is estimated at 14.7%. The logistics costs as a percentage of the GDP for other industrialised nations is estimated at 11.7%. Japan is estimated at 10% and the United States of America at 10.1% [9]. Higher logistics costs reduce already thin margins caused by relatively high labour and production costs, which ultimately reduces South Africa's competitiveness in the global market despite the abundance of natural resources.

2.2 Achieving logistics excellence

Mentzer & Williams [10] define the term 'logistics leverage' as the achievement of excellent and superior infrastructure-based logistics performance. Which, when implemented through a successful marketing strategy, creates recognisable value for customers. They also emphasise that logistics can add value to the customer's experience only if it is far superior to the norm and the

customer is made aware of it. To achieve logistics excellence, Cilliers & Nagel [1] propose a paradigm shift: from product to customer; function to process; inventory to information; profit to profitability; and transaction to relationships.

2.2.1 Product to customer

In a market where product parity is fast becoming a reality, companies are pressurised to find other means of differentiating themselves in the market. Mentzer & Williams [10] postulate that the competitive advantage may lie in ancillary services such as logistics. The paradigm shift from product to customer recognises that the competitive advantage lies not only in the product but also in the experience or measure of value coupled with the product perceived by the customer. However, the competitive advantage created by logistics has to be sustainable. This is achieved through substantial investment in the required assets and the capability that brings the assets together, which creates an advantage not easily imitated by the competition [10].

Function to process

The theory of systems engineering defines a system as a collective set of resources performing functions, using the components of which these resources consist to achieve a common objective [11]. Thus, the grouping of logistics activities can be viewed as another resource within a supply chain or system with the common goal to profitably deliver a value-adding product to the end-customer. Liu, Xu, Wang & Wu [12] capture the dynamic interaction of logistics outsourcing systems. They apply system dynamics as a method to analyse the impact on risk policy decisions over a long-term horizon. Cilliers & Nagel [1] suggest a holistic approach to supply chain management, viewing the level of integration between components as an indication of the level of advancement the supply chain has reached. This suggests that logistics cannot be viewed as an isolated function to the supply chain, and an integrated approach or process should be followed to avoid supply chain fragmentation.

2.2.2 Inventory to information

Information technology (IT) plays an important role in the integration of the supply chain. Rao & Young [13] identify three types of complexities in supply chains: network, product and process complexities. Network complexities include complexities associated with multiple trading partners, countries and continents. Product complexities refer to complications that arise from product characteristics that affect the handling of the product, such as size, density and environmental requirements (storing temperatures etc.). Process complexities relate to time sensitivity, manufacturing cycle times and order cycle times of the product within the supply cycle. Vaidyanathan [14] states that IT lowers transaction costs and deals with the increasing supply chain complexity. The broad scope of IT services and its specialised nature are strong drivers for the outsourcing of logistics activities [15]. Therefore, IT can establish the flow of information essential for the integration of four categories of logistics activities most often outsourced. These include warehousing, transportation, customer service, and inventory and logistics management [14]. Vaidyanathan [14] postulates that an integrated supply chain offers the customer a means to better position and manage inventory throughout the supply chain. IT serves as tool to facilitate this integration, provides stock level visibility to the customer and enables scenario modelling to better position inventory and reduce working capital.

2.2.3 Cost centre to profit centre

Skjoett Larsen [15] notes that traditionally logistics activities were outsourced to cut costs and free up capital for other investments. In addition, Cilliers & Nagel [1] as well as Mentzer & Williams [10] note that logistics is traditionally seen as a cost centre and that value created by logistics should benefit both the company and its customers. Razzaque & Sheng [16] view logistics as a profit centre, not a cost centre. They maintain that logistics should be a strategic tool for penetrating new markets and expanding existing markets with the objective of growing revenue.

2.2.4 Transaction to relationship

Skjoett Larsen [15] views the transition of outsourced logistics from a cost centre to a value-adding activity from two perspectives: the transactional perspective and the network perspective. The transactional perspective refers to the more traditional view of logistics, such as the logistics function performed by long haul carriers. These transactions were frequent, making use of non-specific assets (assets used to serve many customers) and performance was easy to measure. Business was awarded based on the cheapest rates and the market governed the cost due to a surplus of service providers available. This archaic arrangement between service provider and customer has developed into the third party logistics (3PL) arrangement.

Today, the transactional perspective constitutes 3PL arrangements that are characterised by long-standing relationships; the use of specific assets (assets dedicated to serve a single customer); complex performance measurement due to the large basket of services included; and the arrangement being controlled by the party that is in the bargaining position [15].

The network or relationship perspective views 3PL arrangements as a combination of links or bonds created by dependencies on technical expertise, social bonds, administrative control and legal commitments. The cumulative effect of these bonds creates a relationship between the company and the LSP [15].

2.3 Outsourcing as logistics strategy – the initiation phase

A variety of opinions exist around implementing outsourcing as a logistics strategy. Razzaque & Sheng [16] describe logistics as a traditionally low-priority supporting function that has developed into a means of ensuring good customer service levels. However, Diehl & Spinler [17] state that outsourcing, together with factors such as global sourcing and relocation, creates longer, more complex supply chains. These supply chains require increased service, higher product handling, more frequent information exchange and transparency, which results in increased vulnerability. Gadde & Hulthen [18] note that the outsourcing of logistics activities implies that businesses are creating a single point of contact for managing company-wide logistics. Rao & Young [13] add that outsourcing also allows businesses to transfer some of the complexity and risk related to the distribution of goods to an external service provider. Gadde & Hulthen [18] maintain that outsourcing also allows businesses to transform a fixed cost into a variable cost. It is important that the customer be cognisant of the positive as well as negative attributes of outsourcing when making the insource versus outsource decision.

2.3.1 The insource versus outsource decision

The decision to outsource logistics activities is driven by a wide variety of factors. Rao & Young [13] list four factors that influence the decision to outsource logistics functions as: the degree to which these functions form part of the core competency of the organisation; liability and control of risk; service level or cost trade-offs; and access to information and communications systems.

The degree to which logistics functions form part of the core competency of the organisation determines whether logistics gives the company a competitive advantage in the market when controlled internally. Conversely, the liability and control of risk refer to the level of risk exposure the company perceives when either outsourcing the logistics function or keeping it in-house. In addition, higher service levels are associated with high levels of logistics activity, which can be very costly. Therefore Gadde & Hulthen [18] state that the natural output of a strategically focussed, well-designed and well-run logistics system is a good cost or service trade-off.

Gadde & Hulthen [18] and Thomkins [19] identify additional factors, such as improved market relationships, reduced management, access to global networks, improved inventory accuracy and increased customer satisfaction. Rahman [20] suggests flexibility, reduced capital investment and lean capabilities as reasons for considering outsourcing as logistics strategy.

Outsourcing logistics functions can potentially improve market relationships, as LSPs often have established relationships with major wholesale and retail outlets closest to consumers. In addition, a service provider can leverage economies of scale to reduce the effect of high management and overhead costs. Global logistics require high levels of effort, large investments and key relationships with suppliers outside the country. Therefore, managing risks associated with dealing across borders calls for a level of expertise that is often provided by external service providers. In striving for improved inventory accuracy, service providers can often be invaluable, as demand and replenishment planning is frequently one of their core competencies [16].

Companies often make the decision to insource and therefore perform logistics operations in-house for a variety of reasons. Hsiao, Van der Vorst, Kemp & Omta [21] suggest high switching costs as a reason to implement outsourcing. Rahman [20] and Gadde & Hulthen [18] suggest loss of management control. In addition, Gadde & Hulthen [18] also identify the lack of advanced IT to integrate the supply chain on the part of the LSP; information loss; proper in-house service provider management; misalignment between service provider and buyer; and management distrust of third-party logistics providers (3PLs) as reasons for the decision to insource.

2.3.2 Proven decision-making methods

McIvor & Humphreys [22] state that one of the key problems encountered by companies during the insource versus outsource decision is a lack of formal methods for evaluating the decision. Companies tend to focus on short-term overhead costs and not on the long-term growth view [22]. In addition, they mention that many companies find themselves outsourcing due to the need of short-term savings or an inherited position. Companies make short-term focused decisions to an extent that these decisions become part of a long-term strategy that is fully integrated and not flexible. Another problem encountered is that companies outsource activities without assessing the strategic importance of the activity [13]. Consequently, too many companies have stopped internal investment in what they thought were cost centres in favour of outside suppliers [22].

Existing research covering proven decision-making methods in the case of outsourcing logistics include case-based reasoning and transaction cost analysis [22]; the Von Neumann Morgenstein concept of utility applied to decision trees [23]; a method developed by Platts et al. [6] and linear programming [23, 24]. The successful application of these methods in a logistics outsourcing decision-making context is still to be decided. The insource versus outsource and supplier selection processes will be combined in this study since these processes are not mutually exclusive. Moreover, the lack of proper service providers will force a company to insource even though the evaluation criteria for outsourcing have been met.

It is important that customers make use of proven decision-making methods during the insource versus outsource and supplier selection processes. McIvor & Humphreys [22] state that companies making the decision often do not understand the in-house capabilities compared to what is available on the market. In addition inaccurate cost or saving estimation techniques lead to false expectations and wrong decisions.

2.3.2.1 Case-based reasoning

McIvor & Humphreys [22] investigate the possibility of using case-based reasoning to make a decision regarding outsourcing in a manufacturing context. Case-based reasoning compares historical results obtained from dealing with suppliers with the case in question. The case refers to an opportunity to outsource. Historical results are kept in a data repository which includes cost, quality and service provider characteristics and any historical issues with the supplier. This method proves to be very effective in the manufacturing industry where the manufacturing of certain parts can be outsourced to multiple suppliers. Products are easily manufactured, requirements generally stay constant and can be provided by a range of suppliers on the market [22]. The duration of these contracts can be limited to a few batches or last for years. In contrast, outsourcing a logistics function is less simple, because the expertise needed is driven by product, network and process complexities [13]. In addition customer requirements are ever-changing and driven by the end-customer's high expectations. Logistics contract periods tend to be longer than that of manufacturing contracts, and the switching costs associated with changing LSPs are much higher than when changing manufacturing suppliers. As a result, it would be very challenging to build a database for the purpose of service provider comparison. An important advantage of using this method is that historic performance achievements are taken into account when making the supplier selection or even the insource versus outsource decision. Suppliers are rated based on previous experience with the supplier or by verification of a supplier reference.

McIvor & Humphreys [22] propose a model whereby the supplier's capabilities are not only measured but also compared to that of the company. This method is an extension of their work on the case-based reasoning method, adding an evaluation of the company's in-house capability to perform the function.

2.3.2.2 Multiple criteria decision making

Apart from the case-based reasoning method and the extension thereof, McIvor & Humphreys [22] add the multiple criteria decision-making (MCDM) method. MCDM considers multiple attributes in respect of multiple client objectives. These attributes include cost, service levels, lead times, service provider stability and quality of service. Each attribute is assigned a weighting that is obtained from polling industry experts on the importance of the attribute. Suppliers are rated and ranked based on their perceived performance [22]. The use of multiple objectives in a decision-making process is very important for decisions in the logistics outsourcing context, due to the complexity of the logistics solutions, the uncertainty and multiple business objectives associated with the decision.

2.3.2.3 Decision trees

Winston [23] describes the Von Neumann-Morgenstern concept of decision making under uncertainty. This concept describes events such as lotteries, each having an expected outcome or utility, and takes the probability of multiple outcomes into account. These events can be illustrated in decision trees, which consist of multiple branches that correspond to different alternative events each with a certain outcome. Based on the decision maker's preference for each expected outcome of an event, their aversion to risk can be established. As a result recommendation can be made as

to how much value the decision maker places on each outcome. This method can be applied to the logistics outsourcing decision problem to determine what each party – the customer as well as the service provider – considers a fair price for the services on offer. This process can ensure that expectations are managed and a mutual understanding of the value associated with the decision exists.

Decision trees can be used to decompose a large complex decision problem into several smaller problems [23]. Each smaller problem consists of multiple objectives to be reached and the decision maker is shown the risk (level of uncertainty) and utility associated with reaching these objectives in each case. Winston [23] proposes the use of multi-attribute utility functions in decision trees.

Ruiz-Torres & Mahmoodi [25] use the decision tree method in a manufacturing context to determine the number of suppliers, while considering supplier failure risk and procurement and operational cost savings. This can easily be translated into a logistics context by considering LSP service levels (in-full and on-time delivery) rather than supplier failure; and logistics costs rather than procurement savings.

The decision tree method offers a decision maker the opportunity to look at multiple alternatives, taking into account multiple decision variables and uncertainty, and producing an expected utility.

2.3.2.4 A method developed by Platts et al. (2000)

Platts et al. [6] propose an encompassing model that considers technology, cost and a strategic framework. They acknowledge that the insource versus outsource decision is not a static issue and should be re-assessed periodically by measuring in-house and supplier performance. The method views the outsourcing problem as a collection of areas that affect the performance of the function in consideration. Each area consists of a group of functions which can be quantified.

Areas and factors are rated to determine supplier and in-house capabilities, which are assigned weightings based on importance within the process. The results give a definitive answer to the insource versus outsource question. A robustness test is performed by testing the sensitivity of each area to a change in weighting. Once the process is determined to be robust, a final decision can be made.

This method has been practically tested and has a periodic review component that the other methods lack. Logistics change at the same pace that consumer demand changes and a decision made today might not be feasible tomorrow. The method therefore reduces the risk of biased decision-making in that it requires a large project team to assign weightings and ratings to various decision variables. It is a multi-attribute decision-making method, which is key to successful logistics outsourcing decisions and comparable to case-based reasoning and the decision tree method.

Analytical hierarchy process (AHP) is very similar to the method developed by Platts et al. (2002). It is applied in group decision making problems and helps the decision maker structure the decision problem [26]. The method structures the evaluation criteria into hierarchies and offers the decision makers the opportunity to compare evaluation criteria two at a time, assigning weightings and ratings to each evaluation criteria. Peng [26] applies this method to a logistics service provider selection problem. He applies the evaluation criteria such as logistics cost, operational efficiency, service quality and technology. Peng [26] finds that the method incorporating these evaluation criteria is more targeted and practical than other methods considered.

2.3.2.5 *Linear programming (LP)*

Winston [23] reports that linear programming (LP) is a tool used to solve optimisation problems. Such a model consists of single- or multiple-objective functions that are optimised (maximised or minimised) subject to certain constraints placed on the model. Guneri et al. [24] propose an integrated method consisting of fuzzy logic and an LP model. The model is designed to consider qualitative and quantitative attributes to make a supplier selection decision in the manufacturing context. The model produces the optimum quantities to assign to each supplier, while maximising the total value of purchasing (TVP). TVP consists of relationship closeness, reputation and position in the industry, performance history, conflict resolution, and delivery capability. TVP is maximised subject to the constraints imposed by demand, product quality and budget.

This LP method offers the decision maker the option of not only selecting a single supplier but multiple suppliers, without over complicating or increasing the duration of the decision-making process. Multiple attributes and objectives can be incorporated in this method and it provides a definitive answer based on scientific inference.

2.3.3 Customer fit

Rajesh, Pugazhendhi, Ganesh, Yves, Lenny Kol & Muralidharae [27] suggest that LSPs need to ensure the fit of the customer and the required logistics services to the LSP core competency when tendering for new business. In addition, they mention that the level of maturity of the LSP and the customer should be gauged to determine the feasibility of investing in a long-term relationship.

Huemer [28] proposes a shift between viewing the traditional supply chain to rather viewing the supply network. In the traditional supply chain customers compete on the basis of economies of scale in manufacturing whereas the supply network view, whole supply chains compete on the basis of economies of scale on the demand side. This shift requires customers which traditionally compete in the market to align on the logistics playing field in order to reap the benefits of more efficient and cost effective logistics functions [28]. Huemer proposes that ‘the customer considers what is the right supplier for your supply chain versus what is the right product for your supply network?’

Traditionally the customer focus is on physical product, chain relationships, and sequential dependencies whereas Huemer [28] proposes viewing supply chain management from the LSP perspective. He acknowledges LSP strategies, structures and resource perceptions which in turn leads to better understanding of how the LSP can create value and interacts with customer strategies and structures.

2.3.4 Partner-specific investment

O’Large [29] studied the impact of partner specific adaptations or investment in a 3PL relationship. He states that should an LSP make adaptations to accommodate a customer, the customer’s perceived quality of performance is increased, and therefore the customer’s loyalty towards the LSP increases as well. In comparison, when a customer has to make adaptations to accommodate an LSP, it is regarded as an effort and the perceived quality of performance is lower. Loyalty is reduced and the service provider is perceived as inadequate.

Rese [30] states that the level of specific investments on the buyer or service provider’s side is the most important driver for the choice of governance mechanism. Arino, Reyer, Mayer & Jane [31] state that during the negotiation process, both parties have the opportunity to engage in a process of sense-making and mutual understanding. They should engage in deliberations to assess the

quality and intentions of their counterpart. The investment requirement can be assessed and the customer or LSP can form an understanding of reasoning behind the high level of investment and thereby preserve customer loyalty.

2.3.5 Legal agreements

O'Large [29] discusses the content of 3PL contracts. He remarks that these contracts are often biased, containing detailed stipulations concerning the LSP's responsibilities, adaption procedures and performance measures, but excluding that of the customer. It is often accepted that the LSP will never be in the bargaining position but Rese [30] and McIvor & Humphreys [22] mention the strategic positioning of the LSP in the market contributes to the governance of the relationship. Wong, Lai, Lun & Cheng [32] postulate that supplier commitment can be fostered by making use of explicit and implicit contracts.

An explicit contract governs an outsourcing arrangement by means of specifying rules and agreements, reducing uncertainty in behaviours and stipulating performance expectations [32]. This allows parties to handle disputes amicably and equitably, reduces risk of non-conformance and builds trust. It is costly and unfeasible to try and account for all eventualities in an explicit contract.

An implicit contract exists when the buyer has to conform to an institutional arrangement, for example, the ISO standards for quality assurance [32]. This compels the service provider to conform to certain standards to deliver the service to the buyer. Through this process, trust is developed and cooperation is strengthened.

2.4 A sustainable relationship – the growth and maturity phase

To ensure a sustainable relationship, the parties involved should decide on the appropriate level of integration, cooperation and the method of governance [32]. Rese [30] classifies relationships based on the level of investment specificity and the availability of the service in the market. Berglund, Van Laarhoven, Sharman & Wandel [33] maintain that the level of customisation involved in the services offered influences method of governance. Rese [28] further adds the role that economies of scale play in the service offered by the service provider and the degree to which the service affects the end-customer. In support of Rese, McIvor & Humphreys [22] add that the strategic importance of the service plays a role in revenue distribution.

2.4.1 Establishing a relationship

Rajesh & Sheng [27] identify factors that influence the service provider and customer relationship. They describe the gradual development of a partnership by the increase in the number of outsourced activities. The buyer looks for a specific solution to initially test the 3PL's capabilities. A relationship is subsequently established and has to be maintained.

Hartmann and De Grahl [34] define three dimensions of customer loyalty: retention, extension and referrals. They find that all three dimensions are positively affected by LSP's flexibility. Should the LSP achieve these dimensions it stabilizes the relationship. It further extends the LSP's business with the respective customer and potential new customers. Customers take flexibility into account when renewing or expanding contracts [34].

Wallenburg [35] states that proactive cost improvement and proactive performance improvement are both strong drivers of the dimensions of customer loyalty. He maintains that proactive cost improvement is the main driver of customer loyalty when standard outsourced services and short

contractual periods are involved. Whereas proactive performance improvement is the main driver of customer loyalty where more complex services and longer contractual periods are observed [35].

Rajesh & Sheng [27] list cultural synergy or alignment; constant dialogue and communication; control retention; and detailed roles and expectations as important factors for a sustainable relationship. Wong et al. [32] suggest that uncertainty has the biggest detrimental effect on the sustainability of a relationship. By improving transparency and information related to variability stemming from sales volumes, demand requirements, order sizes and order cycles, the uncertainty experienced by the service provider can be reduced. IT can be used as a mechanism to establish improved transparency and information.

Ryssel, Ritler & Gemunden [36] identify trust, commitment and value creation as the most important factors in sustainable business relationships, and they postulate that IT supports all these factors. They describe today's world of business as a market place where companies come together to exchange information, goods and services, and they maintain that no company stands in isolation. Shared use of IT is therefore important, as it supports these interactions.

Ryssel et al. [36] define trust as the extent to which a customer perceives the supplier's level of competency, benevolence and honesty. IT improves customer process reliability by supporting decision-making, planning and quality management. This, in turn, is perceived by the customer as a high level of supplier competence and a willingness to serve. Consequently, communication is improved, which in turn leads to information being processed quicker, more accurately and more reliably. Information sharing requires a high level of trust, since a partner who shares information is more vulnerable due to the high levels of risk involved [36].

2.4.2 Partnerships

Rese [30] proposes a model to determine whether a partnership is an advisable method of coordination and governance between an LSP and customer. Factors taken into account include the level of product specificity or customisation of the logistics solution. The quality of service compared to what is available in the market. Whether the logistics solution is dedicated to the customer or shared among many customers; and the degree to which the service provider adds value to the end-customer are also factors considered

Rese [30] also states that a partnership is inadvisable when there is little or no investment, quality parity in the market, an abundance of service providers or multiple customers served by the same supplier. The supplier will not be able to leverage from the economies of scale presented in the aforementioned case, should he dedicate his resources to only providing to the partnership. In the opposite scenario, a partnership is advised but the stability is measured in terms of the degree to which both sides can manipulate the partnership. An example includes opportunism of the service provider to inflate overheads and maximise profits.

2.4.3 Creating value for the customer

To many enterprises, it is unclear how to nurture LSP commitment in support of logistics operations [32]. Berglund et al. [33] investigate the strategies of 3PLs in creating value for the customer. Their study covers the methods that keep 3PLs competitive. The main challenge reported is ensuring that the 3PL add more value than the customer can create in-house when performing the same activities. They list operational and IT skills as paramount for achieving this objective.

Lambert & Burdurogh [37] suggest that 3PL customers and top management must regularly be shown the value that is created by logistics. As a failure to translate it into financial benefits may result in the logistics function not being rewarded. Opposing objectives between LSPs and customers often leave one side of the arrangement better off than the other. To this end, Lambert & Burdurogh [37] illustrate that high service levels translate to higher logistics costs. It is therefore necessary to convert high service levels into a financial benefit. For Example the value added by improving inventory turns which, reduces inventory carrying cost and increases sales.

It is important to ensure that the value measured is not myopic and illustrates the trade-off between customer service and cost [37]. LSPs should focus on customer service, since satisfied customers are loyal and make repeat purchases. In addition, it is more costly to attract new customers than retaining existing customers. Dissatisfied customers are very likely to share their dissatisfaction and it is more profitable to sell to existing customers [37].

The method of coordination and governance, the development of trust, communication, information technology and reporting on value added are all factors that affect the sustainability of the relationship between an LSP and the customer. It is important to be cognisant of the factors that contribute to an unsustainable relationship to implement preventative measures and keep the arrangement as sustainable as possible.

2.5 A failed relationship – the decline

Tsai, Lai, Lloyd & Lin [38] investigate the factors that cause the failure of logistics arrangements in the context of distribution of expensive apparel from major wholesalers to retail stores. They identify risks experienced in logistics arrangements, which are classified as: relationship, asset and competence risk.

2.5.1 Relationship risk

Relationship risk includes vendor opportunism, poor communication, lack of shared goals and asymmetric power [38]. These risks influence the level of sustainability of the arrangement and can be addressed during the preceding phases of the logistics outsourcing arrangement lifecycle. A vendor displays opportunistic behaviour in instances when the LSP misinterprets the delivery contract to increase revenue by adding sub-charges, by detrimental behaviour due to the cost model employed, or when an LSP reduces business risk by transferring it to sub-contractors [38]. Poor communication includes the failure to provide correct delivery information on time [38] and can be addressed by implementing IT solutions, as mentioned by Lambert & Burdurogh [37].

A customer risks cooperation with an LSP when the LSP's organisational culture and goals do not align with that of the customer [38]. This forms part of the customer and LSP fit discussed in Section 2.3.3. Conflict caused by cultural differences between companies strains relationships because the will to compromise is affected by each party's refusal to relinquish power.

Asymmetry of power is illustrated when the customer loses the balance of power. The LSP finds itself in the bargaining position, having leverage over the customer owing to the loss of internal capabilities due to outsourcing and a lack of alternative suppliers [38].

2.5.2 Asset risk

Asset risk pertains to risk associated with assets such as employees, resources and information, and includes poor employee utilisation, information risk, and internal government cost and dependence risk. The level of customisation of the service provided to the customer plays a major

role in asset risk. A very high level of asset specificity places both the LSP and the customer in the risk position. High levels of investment on the part of the LSP to accommodate the customer places the LSP under pressure. The LSP has to retain the customer for at least the payback period to cover the investment made and show returns. The LSP is therefore dependent on the customer, since it might not be able to sell the customised solution to anyone else on the market. Similarly, the customer is also dependent on the LSP, since it has foregone the internal ability to perform the function in favour of outsourcing [38].

The level of customisation means that economies of scale cannot be leveraged by spreading the cost of resources over multiple customers, thus employees are underutilised [38]. Rese [30] states that the greater the economies of scale on the LSP side, the less attractive an exclusive value-creating partnership for both sides. Thus, the service level and cost trade-off becomes relevant, both sides of the arrangement need to acknowledge the trade-offs associated with the level of investment made.

The importance of excellent LSP IT capabilities is illustrated by information risk, which constitutes the loss due to unavailable, incomplete, inconsistent and unsecured customer information. Asset risk also includes internal governing costs, whereby the LSP has to be managed by means of consistent periodical monitoring of contractual obligations. Asset risk also includes bargaining with the service provider and negotiating for needed contractual changes [38].

2.5.3 Competence risk

Competence risk consists of the deterioration of the service performance, loss of control, poor strategic development and poor competence protection. LSPs are focused on driving costs down, but a customised service requires large investments from the LSP and provides small opportunity for leveraging of economies of scale to drive down cost. Therefore, the LSP will often have a deficiency of resources, which in turn results in the failure to maintain delivery performance [38].

As the LSP tries to standardise the service offered to the customer to reduce cost, the competitive advantage that the logistics service offers quickly diminishes and becomes easy to imitate by competitors. The customer then loses control as well as the competitive advantage of outsourcing logistics activities [38].

2.5.4 Factors that initiate the decline

Ackerman [39] takes an intuitive view of the reasons a 3PL arrangement might fail. He states that there are cases where the customer and the service provider have simply not reached an understanding of the job that has to be done. Executive management that does not understand the scope and depth of the operations to be outsourced will not add the right level of detail in the request for proposal (RFP) document. Alternatively the service provider simply does not understand the level of complexity that the operations will entail during the growth and maturity phase. This necessitates the service provider to increase fees or the customer to increase its level of investment. This in turn makes the customer realise that the service provider may not be fit for the job, loyalty and trust are lost and the arrangement may be terminated [39].

This is also in line with the second reason for termination, which occurs when the service provider over-promises during the tendering phase in a desperate attempt to get the job [35]. He also notes that customer's middle management might be the cause for an arrangement to fail, as they might want it to fail. Failure of the 3PL arrangement is synonymous with their job security. The arrangement is thus subtly sabotaged.

In some cases, the service provider will tender a low cost in another desperate attempt to gain business. This inevitably results in an unprofitable operation where the service provider will try to renegotiate fees, which will seldom happen since the buyer has committed to a budget based on the tendered fee. Subsequently, the service provider loses interest in rendering services to the customer, costs are cut, and service levels start to plummet [39].

Ackerman [39] states that it is usually the customer's sales and marketing department that will start to put pressure on the logistics management department to terminate the contract when service levels drop. Ackerman [39] proposes that customers improve the RFP writing process, qualify potential bidders before considering to sign, and initiate a culture of building a long-term relationship. He also suggests that both sides need to recognise that no contract can be perpetual and that provision for the eventual disillusion should be made. In contrast to Ackerman [39], Arino et al. [31] warn that potential partners risk raising concerns over opportunism and property rights when discussing the termination of the arrangement before it starts. They identify three types of termination clauses: clauses dealing with termination triggers, the procedure to be followed when terminating and the consequences of termination.

Triggers specify the circumstances in which termination is caused [31]. These triggers include a material breach of contract, breach of law, repeated deadlocks, regulatory changes, failure to meet targets and reaching a pre-specified time period.

Termination procedures refer to the rules that govern termination. These include termination for convenience where both parties can terminate the agreement by giving notice within an acceptable notice period irrespective of the cause. Other rules include fixed-term or joint renewal clauses where the arrangement is automatically terminated or renewed after a certain time period [31]. Facing termination consequences signifies the end of a logistics outsourcing arrangement.

2.6 Concluding remarks

Outsourcing of logistics functions has seen a lot of development in recent years. Originally it was a mere once-off transaction which has developed into a full supply chain partnership between the LSP and the customer. The expectation on LSPs are not only to transport goods from one point to another but to provide a whole range of value-adding services while nurturing a relationship with the customer.

It is clear that factors that cause the decline of the logistics outsourcing relationship should be identified during the initiation and growth and maturity phases. Care should be given regarding the method followed when making the insource versus outsource decision. In order to rule out LSPs tendering at unsustainable costs and ensuring that the complexities regarding the customer logistics functions are correctly represented and understood by the LSP. The method should take multiple objectives, company core competency and the availability of the service on the market into account and highlight the risk and costs faced by the customer.

It is important that LSP and customer fit be established. The customer requirement plays a vital role in the type of LSP appointed. LSPs should not take on business that is outside the scope of their competence.

Both parties should be cognisant of the factors affecting the sustainability of the relationship. Factors such as the cost model employed, alignment of objectives and creating value for the customer, and measures should be in place to manage both LSP and customer behaviour.

Chapter 3

Research Method

3.1 Introduction

This study uses various research tools, such as industry surveys, interviews, equity analysis and various case studies, to determine the characteristics of a successful logistics outsourcing arrangement and the process of keeping it sustainable.

3.2 Research approach and design

To address the objectives of the study, different research methods and tools were used. A combination of quantitative and qualitative research methodologies were followed. Qualitative research in the form of industry interviews with LSPs and customer representatives afforded the opportunity to obtain a holistic view of the logistics outsourcing arrangement trends within South Africa. Insights into the emotions and convictions of the actual stakeholders within the arrangement could be captured and points of contention were identified. It also added the element of a living organism's life cycle being followed. The quantitative research was performed in the form of industry questionnaires, Appendix B. The questionnaires provided a practical method of collecting large amounts of information regarding logistics outsourcing arrangements within South Africa from a larger unbiased group of representatives in a short period of time. The results from the industry questionnaire could be analysed quickly and objectively by means of statistical inference.

The interviews provided a taxonomy for analysing the results from industry questionnaires that were simultaneously distributed. Multiple case studies stemmed from the interviews and industry questionnaire results, which provided the opportunity to address the research objectives by means of more detailed analyses. The methods employed to address each secondary research objective are discussed in the subsequent sections, concluding with the methods used to address the main objective of the study. The source and description of the data collected for each research objective have been summarised in Table 1.

Table 1: Data used in addressing the research objectives of the study

Data source	Description of data	Associated research objective
Industry interviews	Current logistics outsourcing trends and practices within South Africa.	Determine the characteristics of a successful logistics outsourcing arrangement and the approach to keep it successful within a South African context.
Industry questionnaires	Current logistics outsourcing trends and practices within South Africa from both the customer and LSP perspective.	Identify the characteristics of typical logistics arrangements in South Africa within the context of the logistics outsourcing life cycle. Understand both the customer and LSP perspectives of the life cycle and draw a comparison between them.
Equity research	Published equity research of South African General Industrials and Support services conducted by sell-side analysts.	Understand both the customer and LSP perspectives of the life cycle and draw a comparison between them.
LSP case studies	Two case studies developed from industry interviews, which focus on two types of LSPs – asset-based and integrated vendors – and how they operate.	Getting insight into the factors that contribute to the sustainability of logistics outsourcing arrangement.
Customer case study	A case study developed from industry interviews which focuses on the process the customer follows in deciding to outsource logistics activities.	Identify opportunities where a logistics outsourcing arrangement will be mutually beneficial.
Customer participation in group decision making activities	Customer representatives provided their input into the factors taken into account when making the decision to outsource logistics activities or not.	
Request for proposal (RFP) results	The results obtained from an RFP process that a customer recently completed, which consists of LSP tender documents.	
Historical sales data	Detailed daily historical end-customer sales data depicting the number of end-customers, ordered product volumes and complexity that would be handled by the LSP on a daily basis.	
Historical performance data	In-house customer logistics performance data, depicting the in-house logistics capabilities of the customer case study company.	
Key performance indicator (KPI) case studies	Eight sets of KPIs from different customer-LSP arrangements.	Getting insight into the factors that contribute to the sustainability of logistics outsourcing arrangement.

The above data and results from subsequent analyses were collated to develop a framework that will guide customers and LSPs during the life cycle of the logistics outsourcing arrangement to ensure its success.

3.3 Research methodology

To properly investigate each phase within the logistics outsourcing arrangement in a South African context, various research methodologies and data sources were used to achieve each resource objective. The research methodologies used for each research objective are discussed in the following sections.

3.3.1 Identifying the characteristics of typical logistics outsourcing arrangements in South Africa

The purpose of this research objective is to determine which of the logistics outsourcing practices identified within the literature are prevalent in a South African context. An understanding of current practices affords the opportunity to draw a comparison between logistics outsourcing best practices and identify areas for improvement within the logistics outsourcing arrangement life cycle.

3.3.1.1 *Strategy and research design*

To establish which logistics outsourcing practices are prevalent within the South African context and to determine any factors impacting the sustainability of the arrangement industry questionnaires were distributed and interviews were held with major role-players within the logistics industry. In addition to the industry interviews held, two industry questionnaires were created based on the life cycle practices of both parties identified in the literature study. One questionnaire was aimed at customers of LSPs, and the other at LSPs.

The questionnaires were created making use of an online tool, which made it easy for participants to complete and submit the questionnaire by following a link to the survey website. The tool also made it possible to build logic into the questionnaire. This meant that the same link could be used to distribute the questionnaire to the LSP and the customer. By means of the built-in-logic, the questions relevant to the customer and LSP were shown separately. A link to the questionnaire could be emailed to potential participants or posted on a website.

To access as many participants as possible and to ensure an unbiased credible response rate, the South African Shippers Council (SASC), the Council of Supply Chain Management Professionals (CSCMP), The Southern African Institute for Industrial Engineers (SAIIE), the Engineering Council of South Africa (ECSA), various logistics-related publications and all LSPs, retail companies and manufacturing companies listed on the Johannesburg Stock Exchange (JSE) were approached to complete the survey. The SASC distributed the link to 7,000 delegates on their mailing list and the SAIIE allowed the author to post a link on the knowledge-sharing platform of their website. Furthermore, the author made use of social networking platforms such as LinkedIn and Facebook to post the link to the questionnaire and approach as many participants as possible.

Both questionnaires, refer to Appendix B, required the participant to submit a company name, the job title of the participant, as well as the industry of the LSP's main customer or that of the customer itself. The reasoning behind this was to ensure that the responses received came from a trustworthy source who has experience in the field of logistics services.

The customer and the LSP were asked to base the answers of the questions on either the main LSP or customer. This measure was put in place to ensure that no confusion existed where more than

one LSP served a customer or more than one customer belonged to an LSP. The definition of main customer or main LSP was left to the discretion of the participant.

The questionnaires were designed to answer the following research questions:

1. *What constitutes the South African logistics industry?*

The questionnaire aimed to collect information regarding the type of services offered to the customer, which industries make use of outsourcing to fulfil logistics requirements and to which degree logistics activities are outsourced. The questionnaire also determined whether logistics formed part of the customer's core competencies and whether it gave the customer a competitive advantage. Furthermore, the questionnaire required the participant to identify the main complexities faced by the logistics activities of the customer. The list of complexities corresponds to the complexity categories identified by Rao & Young [13] in Section 2.2.2 – namely, product, process and network complexities. This gave the author the opportunity to observe whether more complex logistics activities are popularly outsourced or performed in-house.

2. *Identify the steps in the life cycle of a logistics outsourcing arrangement in South Africa as perceived by the customer.*

The participant was required to answer a range of questions relating to major decision-making points or influential factors of each phase in the life cycle as perceived by the customer. These included the insource versus outsource decision-making method, engaging with a prospective LSP, the bonds created between the two parties, managing the LSP and the termination of the arrangement.

3. *Identify the steps in the life cycle of a logistics outsourcing arrangement in South Africa as perceived by the service provider.*

This question mirrors the question above, but it is viewed from an LSP's perspective. The objective is to determine similarities and gaps between the two views of the same process.

4. *What are the South African industry practices in terms of a sustainable relationship with an LSP?*

The questionnaire recorded information regarding the length of the logistics outsourced relationship. Together with information collected regarding the bonds that exist between the parties, the level of alignment between the two parties, performance measures, level of investment and dedication, and the content of the agreement. The information collected here was used to determine what constitutes the growth and maturity phase within the South African context.

5. *What is the level of satisfaction in logistics outsourcing arrangements in South Africa?*

The participants were required to indicate their level of satisfaction with the arrangement. This gave the author the opportunity to draw conclusions around the factors that result in a satisfied customer versus an unsatisfied customer.

6. *How are logistics outsourcing arrangements in South Africa terminated?*

Participants indicated the reasons that a logistics outsourcing arrangement might be terminated and the events that preceded the termination, so that the main cause of terminated arrangements could be determined.

All participants were afforded the opportunity to provide their contact details for follow-up questions or interviews.

3.3.1.2 *Data collection and analysis*

In total, 136 questionnaire responses were received from both LSPs and customers. The low response rate, 3% of the 7000 SASC delegate mailing list, could be attributed to the high volume

of research and marketing surveys that prospective participants are bombarded with on social media and other networking platforms. However, Waugh & Luke [40] embarked on a similar study to determine the logistics outsourcing practices of the manufacturing industry of South Africa. In the study they postulate that research into supply chains and logistics with relatively small sample sizes have produced significant results.

The online questionnaire applied logic to filter out any respondents that were not LSPs nor customers of an LSP, and this reduced the number of viable responses to 123 – 64 customer responses and 59 LSP responses. On further investigation of the results, multiple responses from the same company were found. The questionnaire required the respondent to supply a job title. Job titles were listed and associated with a certain management level: junior management, middle management, senior management and executive level. The highest management level response was used as the company response. This further reduced the number of viable responses to 92 – 37 customers and 55 LSPs. A total of 24 company executives completed the questionnaires, of which 14 executives were from prominent customers of LSPs and 10 executives from LSPs.

The degree to which the responses represented the South African market was analysed by looking at the position of the company in the market. This position was determined by establishing whether the company is listed on a stock exchange such as the JSE, the annual turnover of the company, the company size classification as per the Department of Trade and Industries (DTI), the number of employees in the company and whether the company is a large multinational corporation.

The 37 customer responses consisted of 23 companies listed on a stock exchange and 14 smaller companies. Three percent (3%) of customer responses represented the electricity, gas and water supply industry; 66% of responses the manufacturing industry; 14% the mining and quarrying industry; and 17% the trade industry.

The 55 LSP responses consisted of 37 responses from operating companies belonging to holding companies listed on a stock exchange and 18 smaller companies. The customers of these service companies belonged to the following industries: 5% to the construction industry; 38% to the manufacturing industry; 10% to the mining and quarrying industry; 12% to the trade and wholesale industry; 21% to the transport, storage and communications industry; and 14% was unknown.

The contribution to transport and railage cost per industry can be observed by analysing the available time series data in the Land Transport Survey of 2014 made available by Statistics South Africa [41]. The contribution to transport and railage cost per industry can be determined for the period 2003 to 2012. The average over the period gives a good indication of the contribution that the particular industry made to the transport and railage cost. This is compared to the response rate of the customer and LSP questionnaires (Figure 2). The results are indicative of the representativeness of the questionnaire responses of the industry.

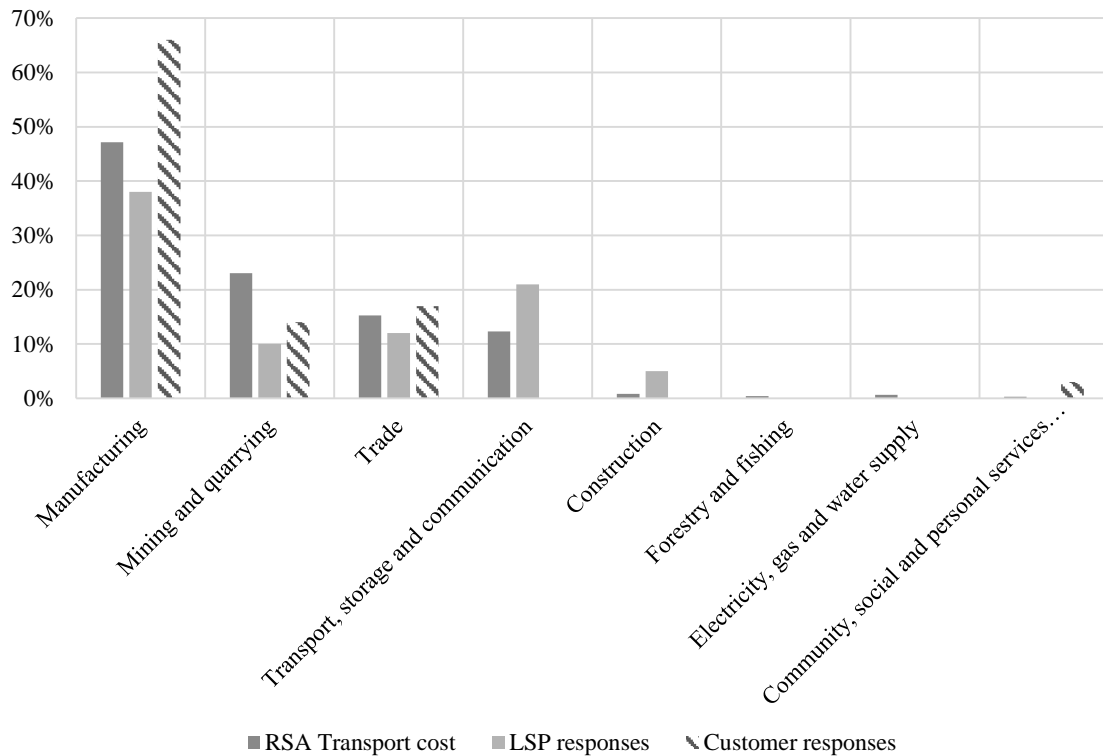


Figure 2: The contribution to national transport cost compared to the questionnaire response rate

The customer response rate is a close comparison to that of the industry contribution to land transport cost. No representation of the customer in the transport, storage and communication bucket is observed. This is typically the sector where the LSP operates, and the customer that is represented in this bucket signifies a relationship between a sub-contractor and an LSP. This does not form part of the scope of the study. The LSP response is just under-represented in the manufacturing, mining and trade industries. This, however, will be amended by the contribution of the case study companies which make a prominent contribution to these industries.

The responses per question in the questionnaire were analysed against the taxonomy derived from the industry interviews and a comparison was made between the corresponding questions in the LSP and customer questionnaires. Customer and LSP answers were compared to the expected answers as derived from the industry interviews and any deviations were discussed. Any misalignment between customer and LSP responses could be identified for further investigation.

3.3.2 The LSP perspective of the logistics outsourcing life cycle

To align the customer and LSP within a logistics outsourcing arrangement, both parties' perspectives of the arrangement should be taken into account. Coinciding and opposing views could be identified and possible solutions could be developed to better align customer and LSP.

3.3.2.1 Strategy and research design

Industry interviews with three executives from JSE-listed logistics companies were held to determine what constitutes the LSP perspective of the logistics outsourcing arrangement life cycle. Two industry case studies stemmed from these industry interviews, which created the opportunity to study industry practices within the life cycle context in more detail.

3.3.2.2 *Data collection and analysis*

The interviews were structured in the same way to ensure that comparative results were obtained. The interviews followed the progression of the logistics outsourcing life cycle and aimed to answer the questions:

1. *What business is good business in the logistics industry?*

Executives were questioned about the business's strategy to acquire new business to determine whether the traditional tender process and customer fit plays a big role in logistics outsourcing. Whether new customised solution channels are created to serve new markets; and whether strategic customers are targeted or whether it is a take-what-you-get scenario. The drive to access new markets and the role of creating a niche market were questioned. The executives were asked whether a core competency exists for an LSP and whether it is relevant to the success of the LSP.

2. *How can one keep existing business sustainable?*

The impact that retail distribution centres in South Africa have on the sustainability of business was questioned. In addition the role that technology and additional or supporting service offerings, such as sales and merchandising, play in sustaining and growing existing business was addressed. The executives were also asked how they create value for their customers.

3. *Why do arrangements fail?*

The executives were questioned about the main reasons for losing business, what the LSP has learned from losing customers and what measures have been put in place to prevent this from happening again.

These three questions were used to lead the conversation, but the executives were left to elaborate. Two LSP case studies stemmed from these interviews.

Case study: LSP A

LSP A is a company listed on the Johannesburg Stock Exchange (JSE) that provides dedicated customised solutions to its customers. The customers of this LSP included representatives from the fuel, chemical, gas, agricultural, automotive, forestry and mining industries. The service offered to these customers included transportation by means of tankers, warehousing and distribution, agricultural services such as harvesting and land preparation, as well as transportation of abnormal road loads, clearing and forwarding, and supply chain consultation.

The logistics solutions offered by this LSP require a high level of technical expertise and specialised equipment and the industries served can be very cyclical. Even though the solutions require many components, the complexity offered by the end-customer base is minimal as delivery would typically be to a limited number of locations, such as production facilities.

Case study: LSP B

LSP B is another JSE-listed company that has been operating in the South African logistics market in excess of ten years. The LSP makes use of the same resources to provide fully integrated supply chain solutions to many customers.

The services provided to the customer include supply chain consulting, import and export management, fleet management, distribution and warehousing and kitting functions. The customer base represents the automotive, IT, mining, pharmaceutical, FMCG, industrial product and dangerous goods industries. These customers include big multinational corporations.

The solutions offered by LSP B are all heavily supported by means of IT innovations to create visibility for the customer into the daily operations and progress with regard to the transportation

and storage of its goods. Aligning the different customers that are served by the same resources heavily contributes to the complexity that this LSP has to deal with.

The two case studies were used to provide context to the results obtained from the industry questionnaires. The questionnaire results were compared to the characteristics of the case study companies and their typical customer base, and any deviations were further investigated.

3.3.3 The customer perspective of the logistics outsourcing arrangement

To better align LSP and customer, the customer's perspective of the logistics outsourcing arrangement is taken into account. The customer can potentially impact the sustainability of the logistics outsourcing arrangement on the onset when making the insource versus outsource decision and selecting an LSP. For the arrangement to be a success, the transaction has to be mutually beneficial and factors affecting this should be identified.

3.3.3.1 *Strategy and research design*

The customer's perspective of the logistics outsourcing arrangement life cycle was investigated by means of industry interviews with top executives and employees from a FMCG company listed on the JSE. The company had recently decided to investigate the option of outsourcing and a case study that focused on the initiation phase stemmed from the information received during interviews. Historical sales data and RFP results were also provided by the company.

Evaluation criteria for making the decision to outsource logistics activities, including the insource versus outsource and supplier selection decisions, were identified through the literature study. Three proven decision-making methods were applied to the case study company's outsourcing decision problem to determine whether these methods were suitable within a logistics outsourcing context and the circumstances in which each method performs the best. The application of each method is discussed and an in-depth understanding of the opportunities wherein outsourcing is mutually beneficial to both parties is determined.

3.3.3.2 *Data collection and analysis*

The customer case study is used to study the detail of current customer practices which constitute the initiation phase of the life cycle and to determine under which circumstances a mutually beneficial arrangement exists between LSP and customer.

Customer case study

The case study company has recently completed a procurement process for logistics services to potentially realise its logistics strategy of achieving high service levels to end-customers at a sustainable cost. The company forms part of the wholesale and manufacturing of the food, beverages and tobacco industry. This industry consists of producers of food, packaged food, alcoholic and non-alcoholic beverages, meat and agricultural products as well as producers of tobacco-related products. It is defined by the Department of Trade and Industry (DTI) in the National Small Business amendment bill as a large enterprise by virtue of the industry type and annual turnover of seven billion rand.

It is important for the study of the initiation phase that the company has the means to practically implement either an in-house logistics solution or to outsource logistics activities. Investing in the development of an in-house solution requires a company to have a high level of liquidity to fund the start-up of such operations. The current ratio of the company is 1:7, which indicates an above acceptable liquidity ratio.

The company's current procurement process for logistics services was studied by means of semi-structured interviews and the application of various proven decision-making methods within the logistics outsourcing context.

Different employees were interviewed to ensure that multiple perspectives were captured and a detailed understanding of the case was developed. Employees were all knowledgeable in the area of company logistics capabilities and the strategic direction of the company. Questions were structured to lead the interviewee through the process of decision making from the inception of the insource versus outsource decision to the point where the decision is taken. The interviewer led the interviewee through this process without restricting answers to the questions posed and allowed the interviewee to elaborate where possible.

Access to RFP documents and results from the LSPs who responded to the RFP process was granted by the case study company. Historical data, in-house historical logistics performance figures and costs were made available.

Once the data and information provided had been scrutinised, a range of follow-up interviews and workshops were held. This afforded the opportunity to collect additional information needed to apply the proven decision-making methods to the insource versus outsource decision, which is at the core of the initiation phase.

The proven decision-making methods chosen included the decision tree method, a method developed by Platts et al. [6] and linear programming. Case-based reasoning promoted by McIvor and Humphreys [22] was excluded since a repository of supplier performance was required. This was neither at the disposal of this study nor the case study company when making the insource versus outsource or supplier selection decisions. McIvor and Humphreys [22] included multiple decision-making criteria to their study of outsourcing decision-making methods, which form part of the three methods chosen. These methods were applied to the insource versus outsourcing decision-making problem the customer case study company were faced with. This provided an insights into the the opportunities where a logistics outsourcing arrangement would be mutually beneficial to both the LSP and the customer. These methods are based on sound scientific or statistical inference; they minimise the risk of biased decision-making and take historical performance achievements, uncertainty, multiple attributes and multiple options into account.

These methods were applied to the case study company's outsourcing decision problem, making use of the same available data and information that the company had to its disposal when making the insource versus outsource decision. They were compared and a recommendation is made to ultimately improve the initiation phase of the life cycle.

3.3.4 Getting insight into the factors that contribute to the sustainability of a logistics outsourcing arrangement

To extend the growth and maturity phase of the logistics outsourcing arrangement, factors affecting the sustainability of the arrangement have to be identified. Both parties can be made aware of factors that promote alignment and create value, and factors that deteriorate the relationship.

3.3.4.1 *Strategy and research design*

The growth and maturity phase of the logistics outsourcing arrangement life cycle was investigated by making use of the industry questionnaire results and eight different LSP case studies. The eight LSP case studies stemmed from the industry interviews and questionnaire participants and consisted of the KPIs used in existing logistics outsourcing arrangements in various industries.

The objective of the investigation was to gain insight into which factors contribute to the sustainability of a logistics arrangement. Customer and LSP behaviour within the arrangement was reviewed within the context of the industry in which the customer and LSP operate, the cost model involved, the services on offer by the LSP, and the objectives of both parties involved. Opportunities and problematic areas were identified and the use of the correct KPIs and risk-reward sharing methods were investigated to better understand the factors that affect the sustainability of the arrangement.

3.3.4.2 Data collection and analysis

The KPI case studies, along with the questionnaire results, were analysed in detail to determine which KPIs were employed within different arrangement parameters. These arrangement parameters included the service offering or logistics functions outsourced, the type of LSP employed and the cost model in use. Each combination of these parameters found in the case studies and questionnaire results should offer a different set of KPIs to govern the arrangement.

The industry questionnaire results were used to determine which combinations of KPIs were popularly used to govern customer and LSP behaviour. Each questionnaire required the participant to list the three most important KPIs used to govern the other party in the logistics outsourcing arrangement. The responses were grouped by LSP type, logistics function and cost model in use. Each combination was then listed, forming the basis of a KPI matrix. The purpose of such a KPI matrix is to offer the logistics outsourcing arrangement a means aligning efforts. It is a method of checking whether existing KPIs are sufficient to highlight value-adding behaviour, oppose detrimental behaviour and promote achievement of joint objectives.

The KPI matrix was tested and refined by comparing the KPIs used by the eight case studies to that of the matrix. To ensure the practicality of the solution, the underlying variables used to calculate the KPI were identified and the period of review associated with the rate of change of the underlying variable was determined.

The result is a KPI matrix which can be used by both parties within an outsourcing arrangement to ensure that the right measures are in place to better align both parties and to oppose detrimental behaviour to the arrangement. The matrix takes into account the factors that affect the sustainability of the arrangement.

3.3.5 Develop a framework which will guide customers and LSPs to establish a successful arrangement

The information gathered in reaching the secondary research objectives can be combined to develop a framework which can be followed during the life cycle of the logistics outsourcing arrangement by customer and LSP to ensure a successful arrangement.

3.3.5.1 Strategy and research design

A framework or roadmap is collated from the findings of all the preceding chapters, which relate to the secondary objectives of the study. The purpose of the framework is to aid customers and LSPs to ensure that successful outsourcing arrangements are cultivated from the onset of the arrangement throughout the life cycle.

The framework was created by identifying the objectives of a successful logistics outsourcing arrangement and listing the actions required by the customer, LSP or both in reaching the objectives during the applicable life cycle phase. The findings from the detailed investigations and solutions developed in the preceding chapters were incorporated into the framework as part of these actions as well as general best practices identified in the study of existing research.

The framework can be referenced during any phase of the life cycle. It provides guidance for both the customer and LSP on which functions need to be in place, which checks should be completed and which processes should be followed to achieve the objectives of modern-day logistics outsourcing arrangements.

3.4 Concluding remarks

The research was performed by investigating each research objective separately, making use of different research methodologies and data sources. The research aims to determine what constitutes the logistics outsourcing arrangement life cycle within a South African context and taking the customer and LSP perspectives into account. These findings were then compared to international best practices and any gaps found were addressed by developing and testing various solutions, such as proven insource versus outsource decision-making methods. Current South African logistics trends, best practices and the solutions developed were then combined into a framework to achieve a successful logistics outsourcing arrangement.

Chapter 4

Current logistics outsourcing practices in South Africa

4.1 Introduction to logistics in South Africa

The South African logistics industry is mainly centred on road transportation driven by the inland economy from where the main sectors such as manufacturing, mining and quarrying originate. This chapter focuses on the logistics practices that are prevalent in South Africa to determine how LSPs and their customers operate within this context and whether any gaps between international practices have been identified within existing research.

4.2 Analysis

To determine what constitutes the customer and LSP perspectives in the logistics outsourcing arrangement industry, questionnaire and interview results were analysed. The industry interviews and published equity research of South African General Industrials and Support Services were also used to develop a taxonomy for analysing the industry questionnaires. Questionnaire results could then be analysed by grouping the results by LSP type, logistics functions outsourced, cost models, customer industry, investor requirements and LSP business model.

Results were populated into a spreadsheet and various comparisons could then be conducted. The analyses started with the highest level of data aggregation, comparing all customer results to that of all LSP results to determine whether LSPs and customers are generally aligned and whether any obvious logistics outsourcing practices are prevalent. Results were then subsequently split into the different classifications identified within the equity research and industry interviews. The results of different types of LSPs and customers of LSPs were compared to determine what is important to each type of LSP and its customer. Further to that how the results compare between the different types and whether there is any overlap. The results were also split into groups representing a certain cost model employed to determine which practices and behaviour could be associated with the use of a certain cost model.

All the results were visually represented in graphs and related back to the information gathered during the industry interviews, the equity research and the LSP case studies. Logistics outsourcing practices prevalent in South Africa were then inferred from the results of the industry questionnaires, interviews and equity research.

4.3 Results

4.3.1 The customer's perspective

According to Singh [3], product parity in the manufacturing industry drives manufacturers to continually reduce product cost to be competitive in the market. Fuel price hikes, road tolling, high interest rates and the cyclical nature of product demand influence consumer spending habits. It adds pressure to the manufacturers to reduce prices and either lose profit margins or reduce cost in the supply chain.

The introduction of large retailers into the logistics industry in the form of centralised distribution centres (CDCs) often adds to the transportation cost of manufactured volumes. The business model

for these CDCs requires manufacturers to deliver stock on a just-in-time (JIT) basis to the CDC. The CDC acts as a cross dock into the retail stores, holding minimal stock and distributing only by retailer vehicles. Although simplifying the route to market (RTM), the retailer takes full advantage of the economies of scale achieved by this RTM and imposes often high logistics costs on the manufacturer. The retailer controls the RTM, 62% of the customer case study's volumes are destined for retailer outlets. 'The resulting high logistics costs either reduce manufacturer margins or are transferred to the consumer in the form of price hikes and add to the existing pressure to cut costs or force the manufacturer to reduce cost elsewhere', Mountford [4] adds.

The complexity that the customer's product, process or network poses can heavily influence the cost of the logistics solution needed. The customer questionnaire reflects that the product complexities with the highest frequency of occurrence include high value and perishable products and environmental requirements to manage the product. Process complexities with high frequency of occurrence include inbound and outbound logistics and quality inspections. The network complexities with high frequency of occurrence include the geographical location of facilities and customers, indicating a widespread distribution of locations and often complex supply chains.

The customer questionnaire results reflected that customers rank an extensive customer footprint and market penetration, high customer service levels, low cost operations, and product distribution and availability all equally and as part of the company's competitive advantage. Protecting existing sales and potential sales is the customer's highest priority, and logistics evidently plays a major role in achieving that. Fifty-five percent (55%) of the customer responses indicated that the customer previously performed the currently outsourced logistics functions in-house and thus made the insource versus outsource decision, which resulted in outsourcing.

4.3.2 The LSP's perspective

Rossouw [5] claims, 'Diminishing LSP profit margins in an economy where manufacturing activity is rising indicates a very competitive logistics industry where logistics service offering parity is driving LSPs to innovate and restructure to stay profitable.' LSPs are also pressurised to ensure that invested capital is put to good use. Economic value is added when a company's return on invested capital is larger than the weighted cost of capital [38]. A company's return on invested capital is the efficiency generated when inputs such as labour, raw materials, property and equipment are converted to outputs such as profits and cash flows. Rossouw [5] maintains, 'The degree to which LSPs make use of their assets plays a large role in keeping investors and the customer content.'

The introduction of large retailer presence in the logistics industry of South Africa has taken a large portion of market share from LSPs, but has not replaced them altogether. Some LSPs have innovated and found a role to play amidst this drastic change within the FMCG industry. For example, the introduction of supply chain visibility tools and advanced planning and coordination functions [5]. Others have been fortunate enough to win the tenders to act as LSP to these retailers. While some are still required to store and manage stock and transport products on a JIT basis from the manufacturing facility to the CDCs. LSPs are forced to adapt their business models to cater for bulk storage, kitting and staging operations and payload shuttling to the CDCs at predefined times as per the CDC instructions.

Mountford [4] says, this conversion of LSPs has a ripple effect which impacts on the rural markets. Volumes sent out to rural areas which traditionally would have included volumes to major retailers are now sent out in underutilised vehicles, often making these channels unprofitable to service.

These CDCs also prompt the question of logistics as a competitive advantage. Since the manufacturer has no control over store orders and no backdoor relationship exists, it cannot be distinguished from other manufacturers that offer the same product [4]. Smaller manufacturers that traditionally did not have the same geographical coverage as large market players now enjoy equal opportunity nationally.

The presence of a few large players in the South African logistics industry has resulted in service offering parity [39]. These logistics giants identify possible niche markets within the logistics industry and simply acquire existing companies who have the necessary expertise and infrastructure to manage the complexities required to serve these markets. Thus, the tail of smaller and some specialised LSPs is fast diminishing and larger LSPs continually need to restructure to ensure that internal operating companies are not competing for the same market.

4.3.3 Types of LSPs

Singh [3] claims ‘To ensure that a logistics outsourcing arrangement is sustainable, customer and LSP fit is a very important consideration.’ Different types of LSPs offer different solutions and have different objectives [5]. It is imperative for the customer to ensure that the LSP chosen can align itself to the customer’s business objectives and add value. Hsiao et al. [21] identify three main factors which influence customer decision makers when selecting LSPs – namely, asset specificity, core closeness and supply chain complexity. Rossouw [5] identifies two main classes of LSPs within the South African road transport industry. These classes, use business models which address Hsiao et al.’s factors differently – namely, asset-light LSPs and asset-heavy LSPs. Asset-light LSPs, refers to integrated vendors operating mainly in the commoditised markets, and asset-heavy LSPs, which refers to asset-based vendors who specialise in customised dedicated solutions.

4.3.3.1 Integrated vendors

Mountford [4] maintains the LSPs operating within the commoditised market sphere of the logistics industry, cannot rely on the relationship with a customer to extend existing business beyond the initial contractual period.

The customers of integrated vendors include large multinational manufacturing corporations who follow international policy to go on tender every three years and select LSPs based on the outcome of online bidding wars with other LSPs. RFP documents are sent out, often with little or misrepresenting information, which the LSP uses to complete a tender to compete with other highly competent LSPs [4].

Singh [3] argues, thatthe South African logistics market – in particular where commoditised markets are concerned, such as the FMCG and retail industry – has become highly competitive and very risky.

Mountford [4] adds that these LSPs cannot afford to design a logistics solution around a single customer; logistics solutions need to be interchangeable between customers for LSPs to quickly replace a customer when a tender is lost.’ LSPs will also try a ‘lock-in’ strategy when acquiring new business by means of contractual clauses or major investment requirements from the customer, which causes mistrust from the onset of the outsourcing agreement.

The traditional core competency of an LSP dissipates since these LSPs need to follow opportunities in the market as they present themselves. By either taking on non-traditional customers which might not necessarily fit the LSP or by developing additional functions to attract the customer [4]. LSPs are also including non-traditional services in their repertoire to attract customers and maximise revenue.

The results from the LSP questionnaire show that the services most offered to the customer by integrated vendors include the traditional primary transport, warehousing, distribution and reverse

logistics management, and that inventory management, order processing, shipment tracking and sales and telesales are also popularly offered to customers. The customer questionnaire reflects that currently outsourced functions include primary transport, warehousing, distribution and reverse logistics. Functions such as inventory management, order processing, sales and telesales and in-store merchandising are less popular. It seems as if the customer is yet to release control of functions which directly influence their revenue stream, such as sales and telesales, and the availability of product.

LSPs operating in commoditised markets in South Africa are now also offering customers a method of growing the market by means of providing alternative RTM solutions.

Mountford [4] claims, the most popular alternative RTM is providing access to the informal market as well as solutions outside of the large retail sector, such as serving the hospitality industry or forecourts business directly.

These RTMs are usually very expensive to serve. This is mainly due to the high number of stock keeping units (SKUs), low volumes and high frequency of delivery required, which is driven by the lack of storage and shelf space at these end-customers.

These LSPs are directly exposed to the demand side risk that the end-customer creates by seasonal demand profiles and ever-changing consumer spending habits. The LSP is forced to hedge itself by making use of contractual clauses and costing models which provide enough gearing against the volatility of the commoditised market. This often passes the risk onto the customer, which is conflicting to the objective of outsourcing the logistics function of reducing risk associated with performing logistics functions in-house. These cost models often do not have a linear relationship with the volume output activity of the customer. It complicates the performance management of the LSP if the level of complexity required to provide this service is not understood by the customer.

The integrated vendor LSP is pressurised to ensure invested capital is put to good use. Economic value is added when a company's return on invested capital (ROIC) – the efficiency generated when inputs such as labour, raw materials, property and equipment are converted to outputs such as profits and cash flows – is larger than the weighted cost of capital (WACC) [42]. The ROIC to WACC ratio of integrated vendors is much larger than that of asset-based LSPs, which differentiates the way investors view these businesses. Rossouw [5] notes that 'focus is given to growing profit margins that are highly susceptible to the exposure to demand side risk.'

4.3.3.2 *Asset-based LSPs*

The asset-based LSPs that operate in the dedicated solutions sphere of the South African logistics industry mainly focus on customers seeking customised solutions, which requires a high level of technical expertise and experience from the LSP in the handling of often high value goods or abnormal loads [3]. Such customers often form part of the mining and quarrying, agricultural, manufacturing and construction industries [44].

Singh [3] notes that asset-based LSPs in South Africa have a strategic approach to signing customers, as long-term contracts of five years or longer are negotiated. These solutions are customised and dedicated to the customer and a substantial investment is made by both parties to build the required infrastructure necessary for the solution. These LSPs keep to a certain core competency.

The services offered to the customer are often highly technical and require expertise in specialised services, such as warehousing of dangerous goods, agricultural services or mining services. These highly technical services are mainly driven by product complexities, while process and network complexities are normally kept to a minimum. Therefore, the LSP is not exposed to the demand

side risk to the same extent as the integrated vendors operating in the commoditised markets [3]. The LSP operates on the push side of the supply chain. Decoupling point and activity forecasts are more accurate due to the level of demand aggregation at this point in the supply chain and therefore profit margins stay fairly constant and larger than the LSPs operating in the commoditised markets. The ROIC to WACC ratio of these LSPs is much smaller than that of integrated vendor LSPs, which means investors will constantly apply pressure to the LSP to sweat the assets [5]. This objective is more in line with that of the customer to reduce cost if it is reflected in the cost model.

Cost models often used by asset-based vendors in South Africa are directly linked to the activity of the customer. Even though it might be a very cyclical industry, the solution is often of such a nature that the LSP can add or reduce the required capacity easily [3]. There thus exists a linear relation between the transport cost and the customer volume output, making periodic performance management much less complicated.

Singh [3] notes that ‘customers are not taken on by asset-based vendors just for the sake of business; if there is not a cultural fit between the two parties, the arrangement will not last.’ Singh [3] identifies the introduction of new management in existing customer business as a major risk for asset-based vendors. The cultural fit and relationship has to be grown from scratch.

In the arrangement between an asset-based LSP and the customer, the majority of savings and efficiencies can be established on a daily basis by means of good communication [5]. ‘Whether it is by pushing volumes before the high season instead of during the high season or by combining products in loads or warehouses, these opportunities exist daily, and by means of clear communication lines these opportunities can be leveraged’, Rossouw [5] comments.

Rossouw [5] further states that ‘the sustainability of existing LSP business is also improved by focusing on customer cost reduction.’ He takes cognisance of the fact that logistics costs are one of the first places where the customer looks to cut costs and aims to deliver before the customer makes any request to reduce cost. ‘The asset-based vendor ensures that the relationship is of such a nature that it is close to the customer’s cost and understands which cost drivers impact the customer most’, Singh [3] adds. It structures its business in such a way that it adapts to the customer, since a distressed customer makes for a conflict situation [3].

The distinction between the integrated vendor and asset based vendor classification isn’t always as straightforward. Overlap in services on offer, customer requirements and objectives can be observed in both types of LSPs.

4.3.4 South African logistics practices during the initiation phase

The initiation phase of the life cycle of a logistics outsourcing arrangement consists of the insource versus outsource and supplier selection decisions that the customer performs, and the implementation of operations by the LSP.

4.3.4.1 *The insource versus outsourcing decision*

The customer decision to outsource logistics functions is driven by a variety of factors. These factors include the customer’s reflection on its own in-house capabilities and core competency, the drive to reduce cost and risk, the opportunity that outsourcing presents in terms of extending the market in order to generate new sales, technological considerations, service level improvements and available service providers in the market. The customer questionnaire required customers of asset-based vendors and integrated vendors to rate the relevance of some of these factors, where three is the most relevant and one is not relevant. The results were analysed by isolating each customer group according to the LSP type employed and calculating the average for each reason.

Observing Figure 3 it is evident that both types of LSP customers consider more or less the same factors when making the insource versus outsource decision. Cost being the highest ranked factor, followed by long-term growth and reduced risk.

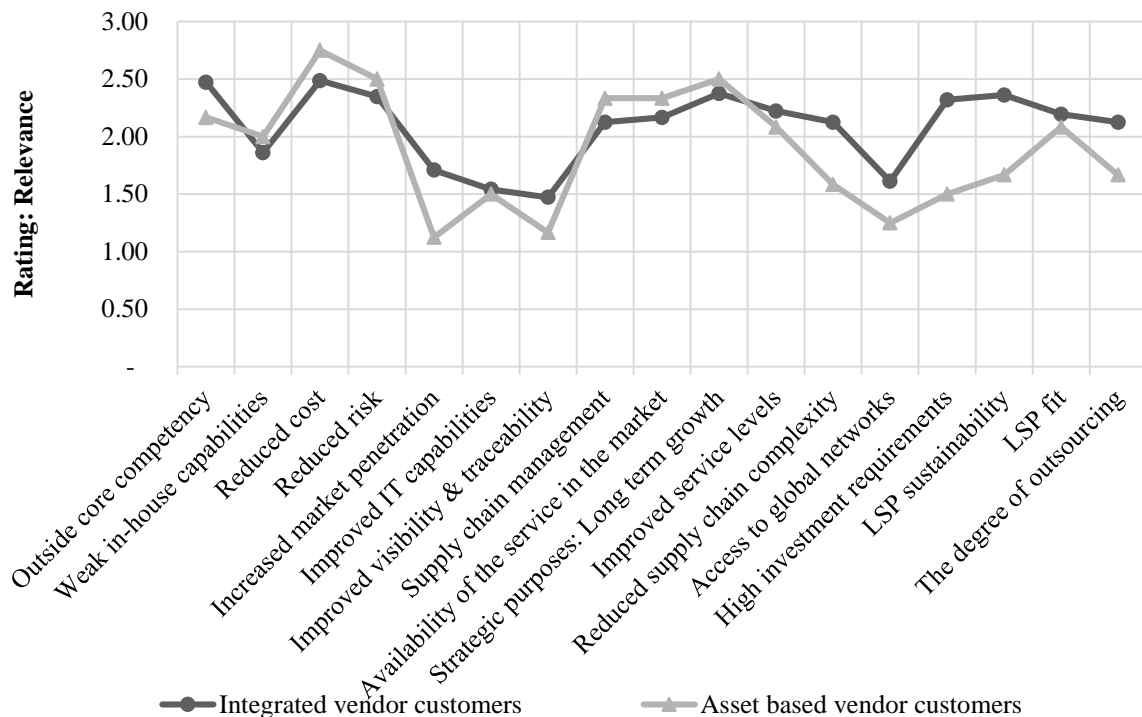


Figure 3: Reasons for outsourcing

The customers of asset-based vendors ranked increased market penetration, improved visibility and traceability and access to global markets the lowest. This was expected, since the asset-based LSPs traditionally operate upstream in the supply chain, servicing local production facilities, refineries and breweries. In the case of an integrated supply chain this forms part of the customer’s business. The small number of delivery points and operations means that the complexity associated with managing this supply chain is much lower and a reduced requirement for visibility and traceability is observed.

The customers of integrated vendors have also ranked visibility and traceability very low, which contradicts the business model of the case study integrated vendor, LSP B (Section 3.3.2.2). This could point to a customer base that is yet to be educated in the advantages that visibility and traceability could add to their business. These customers also rank high investment requirements, LSP fit and sustainability higher than the asset-based customers. This reflects the very stringent outsourcing policies imposed by multinational corporations to hedge against the risk that the demand volatility of the commoditised market poses. Investing heavily in a solution that might change seasonally does not produce the required return in the short payback periods needed. Therefore, these corporations rather seek out LSPs that have geared themselves in such a way as to absorb the impact that market volatility creates.

The next step in the inception phase, once the customer has decided that the particular function should be outsourced, is that the customer has to source the service in the market. This is achieved either by a formal tendering process; by going directly to the industry leader for the service; by means of a legacy appointment – extending the services of a current service provider – or by means

of referral. It is important that the customer choose the LSP which has the necessary capabilities to provide the service.

4.3.4.2 Supplier selection

Figure 4 depicts the rating that both types of LSPs and their corresponding customer base gave to certain LSP capabilities. A rating scale from one to three was used, where three represents capabilities that are critical for business and one represents capabilities with no importance to business. The purpose of Figure 4 is to illustrate the importance that each party associates with each capability and whether there are any similarities or gaps. This will indicate to the service provider whether focus is given to the aspects that are of importance to the customer. This affects the relationship between the LSP and the customer at the onset of the life cycle, during the initiation phase. The customer has certain requirements that affect the insource versus outsource decision, which the LSP has to be cognisant of.

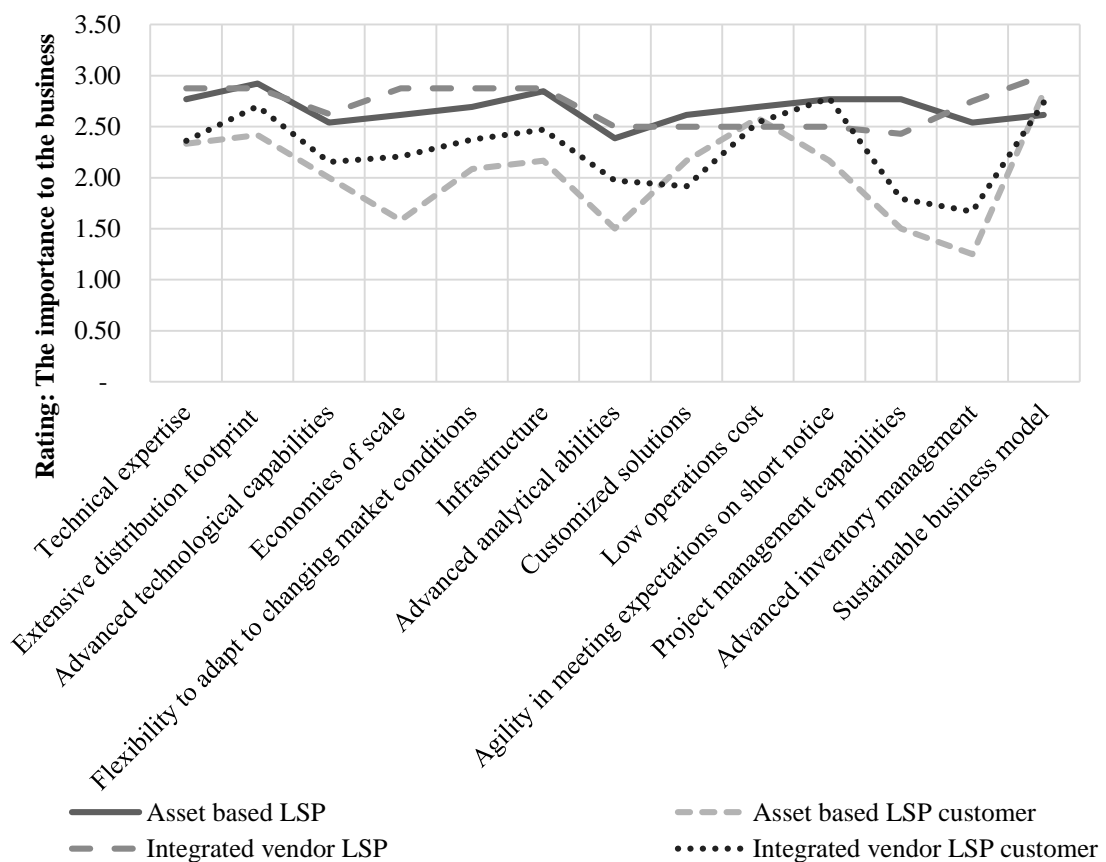


Figure 4: LSP capability analysis

Figure 4 illustrates that both types of LSPs consider an extensive distribution footprint and infrastructure to be two of the most important capabilities. As expected, the asset-based LSP considers customised solutions, low cost operations, agility in meeting expectations on short notice and project management capabilities to be important. Conversely, the integrated vendor rates advanced technological abilities, economies of scale, flexibility to adapt to changing market conditions, advanced inventory management and a sustainable business model as more important. The customers in both these cases find all except low cost operations, the agility in meeting expectations on short notice and a sustainable business model to be less important than the LSPs do. Interestingly, the customers of the asset-based LSPs rated advanced inventory management very low; the rating is almost one, which makes it unimportant to business. This could reflect

customers that operate within the construction and agricultural industries where SKU complexity is not a problem. Grains, sand and gravel are kept in silos and the LSP is not responsible to keep track of long ranges of product with limited shelf lives.

The customer questionnaire participants were asked to reflect on their own logistics capabilities to possibly insource and rate the internal capabilities from one to four. One represents non-existent capabilities, which require a high level of investment to develop. Two represents capabilities that can be easily developed in-house and three represents acceptable internal capabilities and four represents excellent internal capabilities. The aim of this exercise was to determine which functions give the LSP a competitive advantage above that of the customer’s internal capabilities. If the customer has high internal capabilities, less value is associated with the particular function offered by the LSP, since the customer regards its own internal capabilities either in line or superior to that of the LSP. This should accentuate the functions that give the LSP a competitive advantage.

Figure 5 shows that very few of the customer participants rated their internal capability less than excellent or even average. LSPs should take cognisance of the capabilities that the customer considers to be excellent, since they will be continually challenged by the customer to improve these. The lowest and highest ranked capabilities of the asset-based vendor include market footprint and process capability respectively. Customers feel that they can easily reach the same level of market penetration as the LSP but that they lack the expertise to perform the function. This is expected since upstream in the supply chain where asset-based vendors specialise, the market is limited to the production, supplier and storage facilities within the customer’s supply chain. The same measures for integrated vendors include process capability and leveraging economies of scale. The customers of integrated vendors rate the expertise needed to perform the actual logistics function that the integrated vendor performs very low and indicates that the expertise required to perform this function exists in-house. The reason why these customers outsource to integrated vendors is to leverage the economies of scale provided, by pooling customers so that lower resultant costs of logistics can be achieved. Thus, integrated vendors are not necessarily appointed for their expertise, but rather for their low cost solutions.

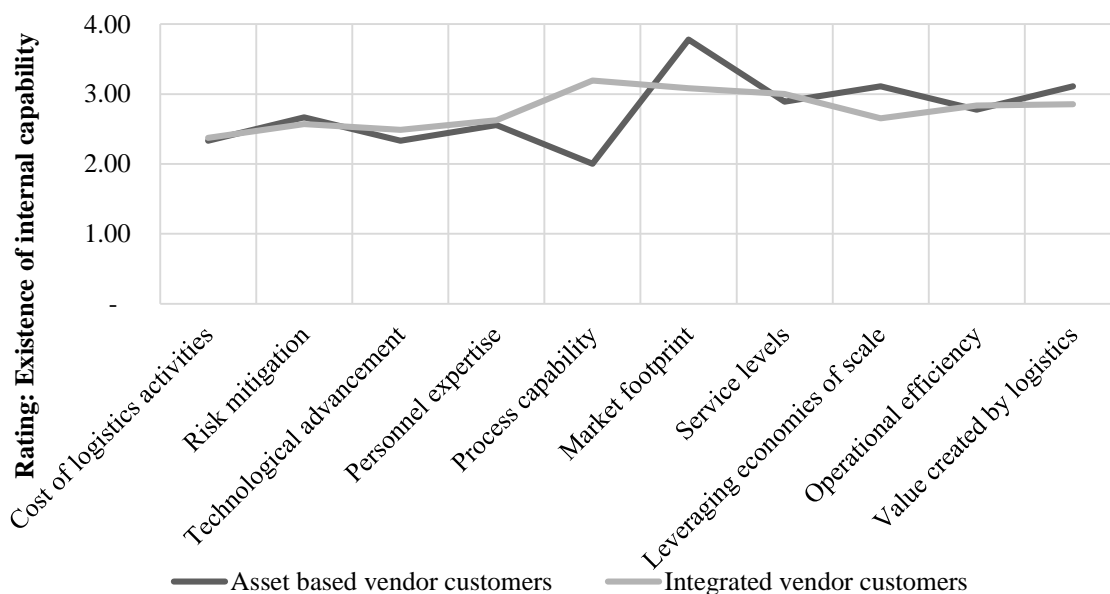


Figure 5: Internal customer capabilities

4.3.4.3 Customer selection

Industry interviews have shown that integrated LSPs, particularly those that operate within the FMCG and retail industries, have very little or no preference of whether to take on a new customer or not. The LSP questionnaire required LSPs to rank the relevance of factors traditionally taken into account when taking on a new customer, where one is the least relevant- and three is the most relevant consideration.

In Figure 6 both the integrated and asset-based vendors were observed to be reluctant to take on a customer that does not fit the existing services offered or to customise a solution to accommodate a customer. As expected, the asset-based vendor placed more emphasis on the level of investment required to take on a new customer and the level of risk associated with serving the customer than the integrated vendor did. The integrated vendor specialises in combining customers who make use of the same investment, thereby offsetting the risk by accommodating a variety of customers into one solution.

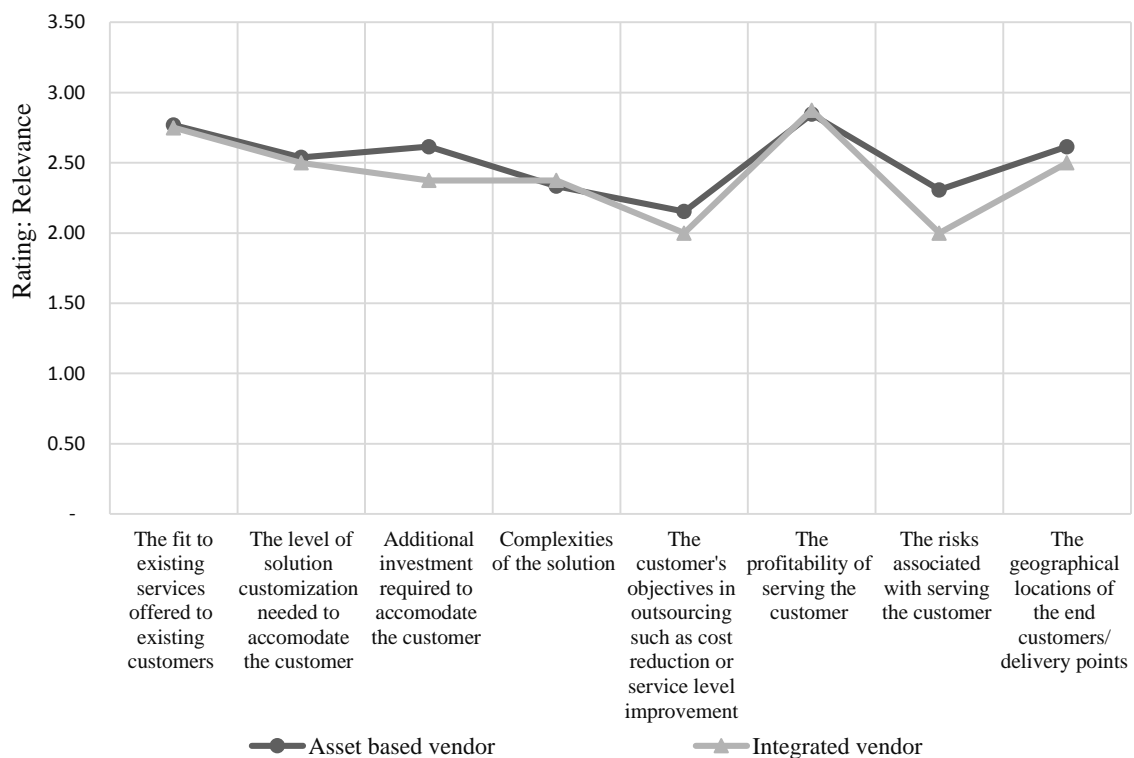


Figure 6: Relevant factors when taking on a new customer

The profitability of serving the customer was the highest ranked factor that influences the decision to take on the customer in both cases. The unanimously lowest ranked factor was the customer's objective in outsourcing, such as cost reduction or service level improvement. This is worrying since this will be the measure the customer uses to determine whether outsourcing was a success or not.

4.3.4.4 Implementation

During implementation, both parties are required to adapt to accommodate the new solution. Customers of LSPs often rethink the decision to switch service providers or outsource because of the high switching cost involved. As a result of the adaptations and investment, this cost is associated with taking on an LSP or new customer. The level of investment required to accommodate an LSP

also directly affects the customer’s level of satisfaction, should the customer investment be more than that of the LSP. The proportion of the customer and LSP participants that have made these adaptations or investments is depicted in Figure 7.

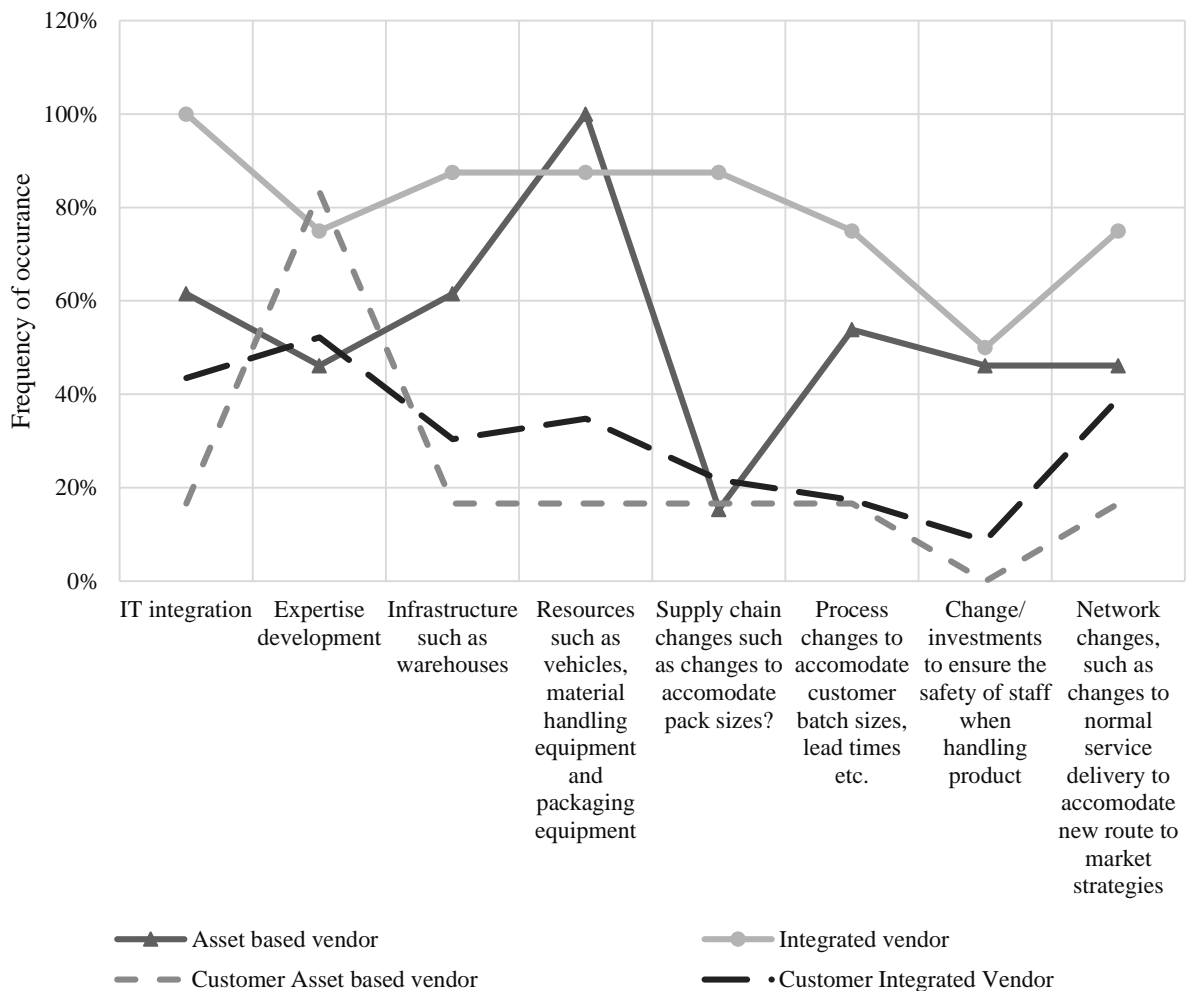


Figure 7: Adaptions to accommodate the other party

IT integration refers to the changes made for one party’s enterprise resource planning (ERP) system to either transmit and receive orders or transfer notes from the other party’s ERP system. This entails either adapting to fit a certain extensible mark-up language (XML) file format or to accommodate a telesales centre. The LSP requires this integration to accommodate advanced transport planning systems or transport management systems (TMS). The TMS optimises the day’s distribution plan and sends it to the warehouse management system (WMS) for the warehouse to expedite orders and to track agents for execution management purposes. IT integration is key in creating visibility and traceability in the supply chain. Access to information and having visibility of the supply chain can create a sense of control for the customer, which eases the transition from performing the function in-house to outsourcing [14].

A smaller percentage of customers reported an adaption in IT processes or IT integration than the LSPs reported. All integrated vendor responses indicated that some form of IT integration was necessary when taking on a new customer. Integrated vendors have made advanced IT solutions part of the solution offering to the customer [4]. IT supports all operational functions and needs to be flexible to adapt to multiple customers.

Expertise development refers to the training of all staff to understand and manage the logistics solution. LSP staff should, for example, learn to identify the customer products and any shipping and handling requirements. The customer staff will be required to understand feedback from the LSP pertaining to planning and execution management. A higher percentage of occurrence is observed in the customer responses, which indicates that special emphasis should be given to change management when taking on a new LSP.

Asset-based LSPs specialise in developing a solution around a customer and making significant investments to accommodate a customer for long contractual periods. The higher percentage of responses came from the integrated vendors. This is highly irregular, unless a large amount of development has recently been done to accommodate customers. Particularly in the light of the recent introduction of retailer CDCs into the market, which still require post-production storage before sending goods to the CDCs. Smaller manufacturers do not necessarily have the economies of scale to send daily volumes to CDCs to meet the cross dock requirements imposed on them.

The technical nature of asset-based LSP solutions requires continuous change and innovation pertaining to the type of resources employed to create the customer solution. A high level of occurrence was observed from asset-based vendors related to the level of investment in resources such as vehicles and material handling equipment (MHE).

Integrated vendors reported that changes to accommodate product pack sizes and network changes to accommodate new route to markets were frequent. Whereas both reported that process changes were often and asset-based vendors had to make adaptations to ensure the safety of staff. The frequency of adaptations reported by LSPs was much higher than that of the customers. This is a positive sign, since in the opposite situation the customers perceived quality of performance and long-term loyalty of the LSP to be negatively influenced [29].

4.3.5 South African logistics practices during the growth and maturity phase

Industry interviews reflected that LSPs often acquire more and more services to offer the customer as the relationship between the customer and the LSP grows. Customer trust grows with time and good stable service is experienced. Eighteen percent (18%) of integrated vendor customer respondents reported that the vendor exceeds expectations, 82% reported that the vendor meets expectations. All (100%) of the asset-based customer respondents reported that the LSP meets expectations and no respondents reported that their main LSP performs below expectation.

Results from industry interviews with LSPs show that LSPs organically grow existing business by focusing on cost reduction and by ensuring continuous improvement. Further growth is achieved by reinvention, offering a means of integrating the customer's supply chain and by following the customer's strategic direction.

4.3.5.1 Cost reduction

Customers rated the LSP capability to run low cost operations as the most important factor to consider when choosing a supplier or during the insource versus outsource decision. If the LSP shows cost reduction through innovation or efficiencies, the customer's trust is gained and the customer is more willing to give control of other functions to the LSP. Interviewees indicated that a low cost culture should exist with the LSP; large flashy head offices and big performance bonuses create the wrong impression when customers are struggling in tough economic conditions. Thus, the LSP should operate with cost sustainability in mind and ensure that innovation results in reduced costs. To establish a trusting relationship between the two parties, both should understand

the cost drivers in the two businesses and how inefficiencies affect each party's cost. Costs should be transparent to reduce any friction around the subject.

LSP and customer behaviour is heavily influenced by the type of cost model involved. The questionnaires required all participants, both customers and LSPs, to identify the type of cost model in use. These cost models included:

- *The unit rate cost model*
The service provider charges the customer a constant rate per unit of measure throughput. Any additional cost incurred by the LSP to render a service to the customer is for the LSP's account. It is thus in the best interest of the LSP to ensure that operations are lean, highly efficient and cost effective. The customer's cost of logistics is directly proportional to the activity generated by sales. The LSP carries the demand side risk and is heavily reliant on the customer to reach sales targets.
- *The fixed and variable costs model*
The service provider charges a monthly fixed fee for warehousing and distribution. In addition to the fixed fee a variable rate is linked to the number of kilometres travelled by the secondary fleet and/or a rate per unit of measure when volumes go beyond a certain level of activity. Any additional cost incurred, such as overtime, additional staff and additional vehicles, is recovered from the customer. It is thus in the customer's best interest to ensure that the LSP run a lean operation, putting pressure on the LSP to show savings and improve efficiencies. The LSP has little motivation to reduce cost and improve inefficiencies other than customer satisfaction.
- *The percentage of sales value charge / commission income model*
The service provider charges the customer a percentage of the sales value of goods sold. Thus the customer's logistics costs grow as the values of its products grow; this is not directly proportional to the logistics activity that is required of the LSP. Factors such as the cost of raw materials will then increase the logistics charge, as it influences the market price of the product. This costing model is appropriate when moderately priced products that are heavily competed against in the market are in question, especially if the LSP offers a sales and merchandising function. The commission income cost model is ideal to boost sales, reduce return of good stock and reduce logistics costs by means of an LSP that has extensive market coverage and high service levels.
- *The open-book cost model*
The service provider shares its exact cost with the customer in the form of a monthly income statement. Costs are perused and covered by the customer and a management fee is charged by the LSP. The LSP thus has a constant revenue stream which is not linked to its service delivery performance. It is thus very important that the KPI be set up to manage the LSP, ensuring that costs are reduced by means of improving inefficiencies and that end-customer satisfaction is ensured by high service delivery.
- *The cost plus cost model*
The *cost plus cost model* is similar to the *open-book cost model*, except that the LSP charges a management fee as a percentage of cost. It is thus very important that the KPI be set out to drive down cost and improve service delivery.

The questionnaire results show that the *fixed and variable costs model* is by far the most popular. 67% of asset-based vendor customers and 62% of integrated vendor customers make use of this type of cost model. Thirty-three percent (33%) of asset-based vendor customers and 24% of integrated vendor customers make use of *unit rate cost models*. The remaining integrated vendor customers make use of either the *percentage of sales cost model*, the *open-book cost model* or the *cost plus cost model*.

4.3.5.2 Continuous improvement and reinvention

Integration of customer supply chains by means of advanced planning and visibility is established by implementing reliable technology. LSPs have added the technology solution to the traditional functional solutions to grow along the customer’s supply chain or any new direction in which the customer grows strategically.

The LSP questionnaire participants were required to indicate whether any joint efforts to develop or improve exist between themselves and the customer. Figure 8 shows the results obtained.

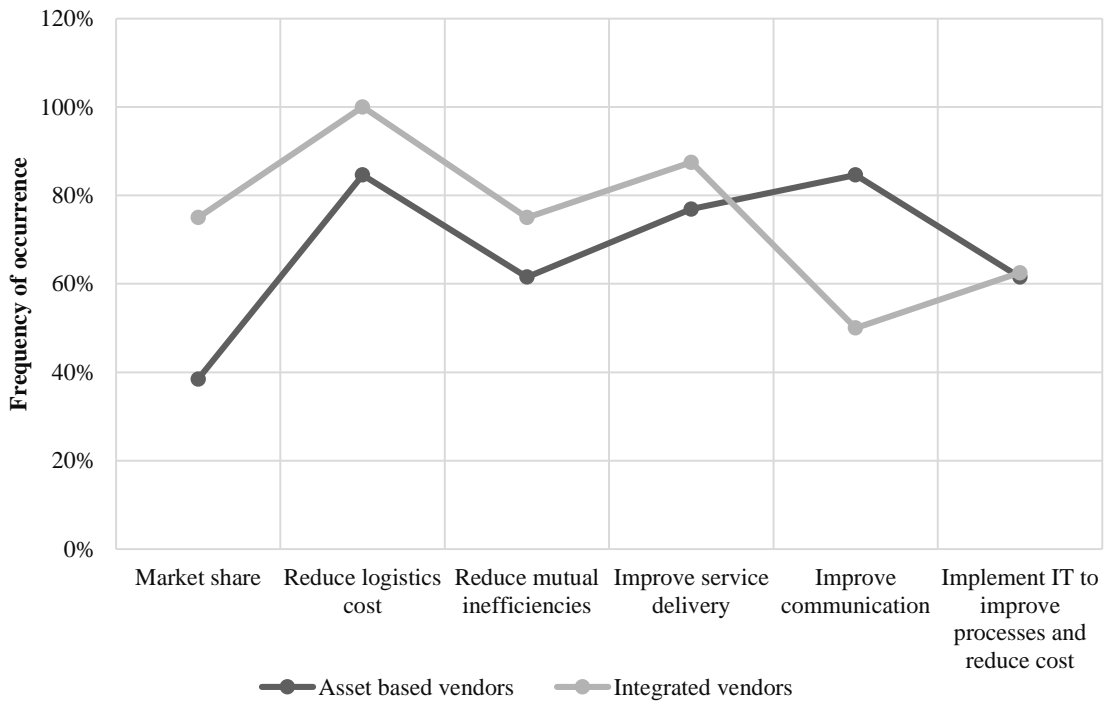


Figure 8: Joint efforts

The integrated vendor LSPs listed joint efforts to improve customer market share, reduce logistics cost, reduce mutual inefficiencies and improve service delivery as having the largest focus. These areas correspond to the customer objectives for outsourcing. Improving communication and implementing IT to improve processes was less popular and by chance highly rated capabilities by the LSPs (Figure 3).

Asset-based vendors reported a high focus on reducing logistics costs and improving communication and much less focus on customer market share and reducing inefficiencies. The operating environment of asset-based vendors is frequently upstream in the supply chain, therefore the customer market share would not be a major focus area. With regard to reducing inefficiencies, the cost model already drives this behaviour. Joint efforts focusing on customer objectives were clearly favoured.

4.3.5.3 Performance management

Managing the LSP behaviour

Performance management of the LSP plays a crucial role in showing the customer that value has been added and expectations have been met. It creates the opportunity for the customer to influence LSP behaviour and for the LSP to influence customer behaviour. It is the LSP’s responsibility to ensure that reachable targets are set, against which its performance can periodically be measured.

If customers are not periodically reminded of the good performance achieved by the LSP, it might only be the exceptions that make an impression on the customer. It is also important that KPIs be assigned to the customer. The customer's behaviour might affect the LSP's performance; for example, when a sales team created expectations of after hour deliveries to end-customers without considering the effect it would have on LSP overtime costs.

The frequency at which KPIs are reviewed by the customer and the LSP was recorded in the customer questionnaires. Customers of asset-based vendors indicated that 67% of respondents only review KPIs annually and the remaining 33% reviewed KPIs on a monthly basis. The customers of integrated vendors indicated that 18% are reviewed annually, 45% monthly, 27% quarterly, 5% weekly and 5% daily.

The frequency at which KPIs should be reviewed should be aligned with the pace at which the complexities and operational factors that influence operational performance and cost might change. If the period is too long, important detail might be lost in aggregation, and if the period is too short, focus might be given to special causes of variation.

The customer and the LSP questionnaires required the participants to submit the top three most important KPIs to manage the other party's performance. The customer responses were scrutinised by combining customer responses which make use of the same cost models to manage the LSP. The results are shown in Table 2.

Table 2 shows the KPIs required to manage the LSP compared to the cost model in use, the behaviour that the cost model promotes, and whether any conflicting objectives exist between the customer and the LSP. The KPIs used to manage the performance of the LSP should support the customers' objectives and oppose any detrimental behaviour of the LSP created by the type of cost model in use.

When comparing the KPIs proposed by the customer and the actual requirement of the KPIs based on the conflicting objectives and customer requirements, one can determine which KPIs are successfully used and which are redundant.

Table 2: KPIs that manage LSP behaviour

Cost model	KPIs derived from the questionnaire responses	LSP behaviour promoted by cost model	Customer requirements	Conflicting objectives
% of sales value cost model	Cost	High drive to push sales Reduce good stock returns Reduce cost End-customer satisfaction Low stock levels	High sales volumes High level of market coverage Customer satisfaction High stock levels to reduce risk of stock outs	LSP requires lean / Just-in-time operation, customer requires large buffers.
	On-time delivery			
	Innovation			
Cost plus cost model	On-time delivery	LSP revenue has a direct relationship to customer cost incurred. Little motivation to improve inefficiencies and service delivery.	Low cost operation End-customer satisfaction High service levels	Customer requires low cost versus LSP requires high revenue.
	In-full delivery			
	Reliability			
Fixed and variable costs model	Adaptability	LSP revenue directly related to cost incurred to service customer. Less efficient traveling results in higher revenue. Cost are passed onto customer. No accountability for inefficiencies. No drive to innovate and improve inefficiencies. Service levels do not influence the LSP's revenue.	High service levels End-customer satisfaction Low risk operations Low cost operations Stability Dedicated resources	Customer requires operations that produce high service levels at a certain predetermined cost and an LSP that is honest and innovates to improve operations to the detriment of its revenue.
	Cost			
	Customer care			
	Delivery window adherence			
	Flexibility			
	In-full delivery			
	Innovation			
	Km travelled			
	On-time delivery			
	Picking accuracy			
	Picking efficiency			
	POD management			
	Reliability			
Resource availability				
Resource utilisation				

	Shrinkage			
	Vehicle appearance			
Open-book cost model	Cost	Constant management fee charged. Little motivation to improve inefficiencies and service delivery.	Low cost operation End-customer satisfaction High service levels	Low cost high service level operations.
	Innovation			
Unit rate cost model	Cost	LSP's profit margins directly affected by inefficiencies. End-customer dissatisfaction might lead to reduced sales and thus less revenue for the LSP. Share resources among many customers to manage the demand side risk it is exposed to.	High service levels End-customer satisfaction Agility in responding to market fluctuations Reliability	Low cost high service level operations.
	Flow of information			
	On-time delivery			
	In-full delivery			
	Reliability			
	Resource availability			
	Responsiveness			

In the case of the *percentage of sales value* or *commission income cost model*, the customer respondents listed cost as a KPI to manage the LSP. However, cost is driven by the cost model and produces no real additional benefit to the customer. It is in the best interest of the LSP to maximise the sales made so that the percentage allocated to it can also be maximised. LSPs can achieve this by ensuring that all orders are completed in full and also by prioritising shipments based on the most order value and not necessarily the ordered volumes when the operation is under pressure. If the customer's revenue is maximised, so is that of the LSP. In addition to maximising the value of the goods handled, the LSP is incentivised by the cost model to run lean operations to maximise the realized profit margin. This might be problematic for the customer since the highest value products might not be the most profitable products, resulting in sometimes thin customer margins dissipating. In this case, it might be beneficial for the customer to add priority to certain products and measure the LSP on the output of these.

Customers use this cost model to leverage logistics as a competitive advantage by improving market penetration, end-customer satisfaction and maximising sales volumes. KPIs that are not listed and which will align the LSP with the customer's objectives include percentage new customers, volume growth, good stock returns, on-time delivery and alternative route to markets. These KPIs will drive the LSP to innovate and improve its service offering to minimise the cost needed to satisfy these KPIs to maximise the return.

In Table 2 the *cost plus cost model* is shown to promote the customer's objectives of good service delivery but no KPIs that drive cost reduction are included. The LSP's revenue stream is dependent on the cost incurred to run the operation. The LSP's objectives are to maximise revenue, which is a percentage of the cost incurred to run the operation. This type of cost model is favourable to the customer when the operation is very seasonal and the required flexibility to add and remove resources in quick reaction to market demand is high. Thus, the LSP carries a lot of risk and needs to gear itself in such a way as to reassign resources to other customers quickly and to avoid resources standing idle. This service comes at a premium, but the flexibility offers customers medium- to long-term savings. It is thus important to establish what the resource requirements associated with the level of activity generated by the market are, and monitor this to ensure that costs stay constant and fair to both parties. Additional KPIs should include resource requirements and cost per unit of throughput to ensure that the applied cost and resources are monitored.

In Table 2 the *fixed and variable costs model* customer respondents provided the largest assortment of KPIs. Flexibility as KPI seems to be unfair towards the LSP, since it is contracted with a *fixed and variable costs model* to provide semi-dedicated resources to the customer. Resources aren't always easily interchangeable and the LSP is contractually obligated to provide the resource and service to the customer. All the KPIs listed by these customers hedge against costs spiralling out of control and focus on improving service delivery. Detrimental behaviour created by the cost model, such as vendor opportunism, is well-hedged against in the case of the customer respondents with *fixed and variable costs models*. The KPIs of innovation and adaptability provide a good platform from which to report on any value added to the customer's supply chain by means of the outsourcing agreement.

In Table 2, respondents using an *open-book cost model* lack KPIs that protect and promote better service delivery and focus on the end-customer. The LSP is paid a management fee and the cost incurred to run the operation is for the customer's account. A multitude of KPIs which protect the customer against spiralling costs are listed, but no incentive is given to good service delivery on the part of the LSP. Additional KPIs to this list would include on-time delivery, in-full delivery, resource utilisation and end-customer satisfaction. On-time and in-full delivery as well as end-customer satisfaction are KPIs that promote higher service levels from the LSP. Resource utilisation incentivises the LSP to make better use of less resources, which therefore reduces cost.

Table 2 shows that customer respondents who make use of a *unit rate cost model* listed flow of information as a KPI. This is very important, since activity-based rate schedules can be very technical and, to protect the relationship, complete transparency of activity and easy access to information is required. These respondents

also listed resource availability as a KPI to manage the LSP. In this case, since LSPs pool resources between many customers in order to hedge against the demand side risk, it may result in resources being assigned to the highest profit-generating activity. It is therefore advisable that customers try and oppose this behaviour by instilling such KPIs.

Managing the customer's behaviour

Table 3 shows that the LSP responses were collated into the two main types of LSPs that participated in the questionnaire – namely, asset-based vendors and integrated vendors. Table 3 was used to determine whether the proposed KPIs oppose customer detrimental behaviour which impacts on the LSP and its performance. LSP's main objectives, the customer's requirements and the impact the customer has on the LSP and the proposed KPIs were listed in Table 3 along with the results received and analysed..

Table 3: KPIs which manage the customer

LSP Type	LSP Objective	Customer requirements	Customer impact on LSP	KPIs proposed by LSP's in order to manage the customer.
Asset-based vendors	<ul style="list-style-type: none"> Show return on substantial investment in dedicated assets. Reduce cost and improve profit margins. Sweat the assets in use. High service levels. 	<ul style="list-style-type: none"> High service levels Low cost operations Technical expertise or process capability Innovation Reliability High levels of investment 	<ul style="list-style-type: none"> Customer inefficiencies at production facilities and planning result in underutilised LSP resources. Customer volumes not making target impacts on revenue stream. Inventory management if done by customer affects LSP service levels. Customer sales teams create unrealistic expectations with the end-customer. The number of exceptions created by the customer. End-customer expectation management. End-customer product returns as a result of poor packaging material and product quality. End-customer ordering patterns and NDD (nominated delivery day) adherence. Sales promotions which cause volume spikes within the distribution network. 	Cost Efficiency End-customer satisfaction Facility management Hazardous compliant Km per ton Payload Picking accuracy Planning Relationship with the customer Reliability Resource utilisation Revenue earned Staff competencies Stock accuracy Stock availability Stock losses Volume moved Volume returns Cost to serve Customer service level Exception management Flexibility Market growth On-time delivery Payload Product quality Stock accuracy and availability Volume returns
Integrated vendors	<ul style="list-style-type: none"> Show economic value-adding. Pool resources and offset customer requirements against each other. Deal with demand side risk and the complexities created by the end-customer. Create visibility of complexities dealt with. 	<ul style="list-style-type: none"> High service levels Low cost operations Economies of scale Reliability Flexibility Adaptability Agility 	<ul style="list-style-type: none"> Customer inefficiencies at production facilities and planning result in underutilised LSP resources. Customer volumes not making target impacts on revenue stream. Inventory management if done by customer affects LSP service levels. Customer sales teams create unrealistic expectations with the end-customer. The number of exceptions created by the customer. End-customer expectation management. End-customer product returns as a result of poor packaging material and product quality. End-customer ordering patterns and NDD (nominated delivery day) adherence. Sales promotions which cause volume spikes within the distribution network. 	Cost Efficiency End-customer satisfaction Facility management Hazardous compliant Km per ton Payload Picking accuracy Planning Relationship with the customer Reliability Resource utilisation Revenue earned Staff competencies Stock accuracy Stock availability Stock losses Volume moved Volume returns Cost to serve Customer service level Exception management Flexibility Market growth On-time delivery Payload Product quality Stock accuracy and availability Volume returns

Table 3 indicates that LSPs protect the bottom-line by instilling KPIs which focus on cost and sources that drive revenue. This is directly linked to the cost model; thus, if the LSP makes use of a *unit rate cost model*, there exists a dependency on volume output from the customer. The LSP further tries to protect service delivery by means of the KPIs. Service delivery is affected when the customer's behaviour affects the time or capacity utilisation of resources or the impression of the end-customer.

It is important for both the customer and the LSP to understand the factors that drive each party's behaviour and how it affects them. The LSP has to understand how inefficiencies in the upstream and downstream supply chain function might affect its cost and performance and ensure it implements methods of dealing with this effect, or measure it to challenge the customer. It is also important for the customer to understand the effect that its supply chain has on the LSP and that a mutual understanding exists, and that both parties agree on a method of dealing with it. It is furthermore important that the LSP understand that it has a direct impact on end-customers and thus the lifeline of the customer, its revenue stream and ultimately profitability. Customer KPIs should guard against opposing behaviour from the LSP, but it is also important to take the LSP perspective into account. The LSP is required to provide investors with high returns and offer the customer a low-cost solution with high service levels, which is a very complex balance to strike.

The customer and LSP have to manage opposing objectives created by the cost model in use, by not only implementing KPIs but by also joining efforts to reach joint objectives. Joint efforts should be structured in such a way as to provide a risk-reward trade-off to both parties. Such an arrangement could exist if both parties agreed on a *gain sharing cost model*. This means that certain cost-saving objectives or volume targets are set and both parties work together to reach the targets whereby they share in the fruits of their joint labour.

An industry interview revealed the mechanics of such a gain sharing arrangement. An LSP was appointed by a large retailer to perform the national secondary distribution functions from the retailer's warehousing facilities to its stores across the country. The previous LSP left a legacy that consisted of a very large inefficient fleet of vehicles, which incurred a lot of cost and did not provide the high service levels required by the retailer. The newly appointed LSP agreed on a gain sharing arrangement. The arrangement promoted the reduction of the fleet in use. For every vehicle that the LSP reduced the fleet with, while upholding or improving the existing service levels, they would receive a portion of the saving realised by removing the vehicle. This would be the payoff until no more vehicles could be removed and satisfactory service levels were upheld for a certain timeframe, after which the arrangement defaulted to a *fixed and variable costs model*.

This arrangement laid a very important foundation for a good relationship right from the onset of the arrangement. The LSP earned the customer's trust and showed that it was willing to align objectives and join efforts to reach these objectives. The arrangement was a great alternative to instilling KPIs that oppose bad behaviour created by the cost model and both parties were rewarded.

4.3.5.4 Bonds

As the relationship between the LSP and the customer grows, certain bonds exist between the two parties. These bonds include social processes, IT integration, shared services such as administration, legal agreements and inter-organisational ties such as shared project managers or shared property. The bonds that exist between these parties signify the maturity of the arrangement and make it more complex for either party to exit the arrangement. The customer questionnaire participants were asked to identify the bonds that existed between them and their main LSP.

The asset-based vendor customers reported that shared administration, social processes and a formal legal agreement were the most popular bonds that existed between the customer and LSP. The

integrated vendor customers reported that a formal legal agreement is the most popular bond between customer and LSP, and that very few other bonds exist. This indicates a more relationship-focused approach by the asset-based LSP. More energy is spent on creating bonds outside of the legal agreement that binds the two parties, thus ensuring the sustainability of the arrangement and customer loyalty to renew the contract upon termination.

4.3.5.5 The formal legal agreement

The formal legal agreement between an LSP and customer is created on the onset of the relationship and creates the opportunity for both parties to establish the base on which the relationship is built. If each party's objectives, risks and requirements are not captured in the formal legal agreement, no premise exists for dealing with differences later on in the relationship.

Figure 9 reflects that the legal agreement between a customer and an asset-based vendor focuses strongly on defining the services the LSP will offer the customer, the adaption procedures, KPIs and the duration of the arrangement and how it will be terminated. The legal agreement between an integrated vendor and a customer focuses on the termination procedure and the duration of the agreement, while service specifications and KPIs are also important. It is also worth noting that asset-based vendor agreements have a higher focus on informal exchange than that of integrated vendors. Therefore suggesting a stronger focus on the relationship with the customer than that of the integrated vendor.

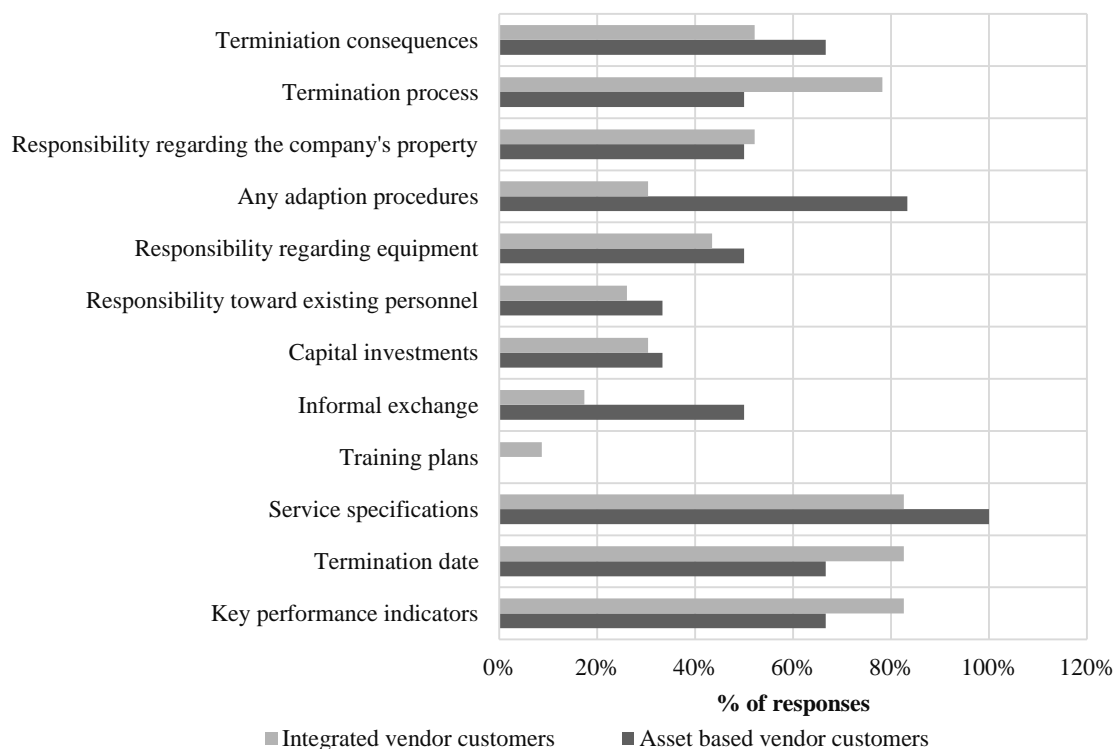


Figure 9: The contents of a formal legal agreement

4.3.6 South African logistics practices during the decline phase

The process during which the arrangement approaches a termination point is called the decline. The process can be initiated by a variety of factors. Some of these factors can be traced back to the initiation phase where the rates and terms and conditions were agreed upon and even to the initial insource versus outsource decision. If these factors are identified early in the relationship, measures

can be put in place to pre-empt the decline of the relationship. The LSP questionnaire required participants to indicate which factors caused the termination of a logistics outsourcing arrangement.

Figure 10 indicates that cost was the main cause of failed arrangements. Meeting client expectations and a lack of shared goals were highly ranked by the integrated vendors, whereas asset-based vendors suggested that competition, relationship issues and service levels were major factors in the termination of logistics outsourcing arrangements. Demands to adapt to market changes was one of the lowest reported causes of termination by both parties, indicating that LSPs are putting in the effort to adapt and align with the customer.

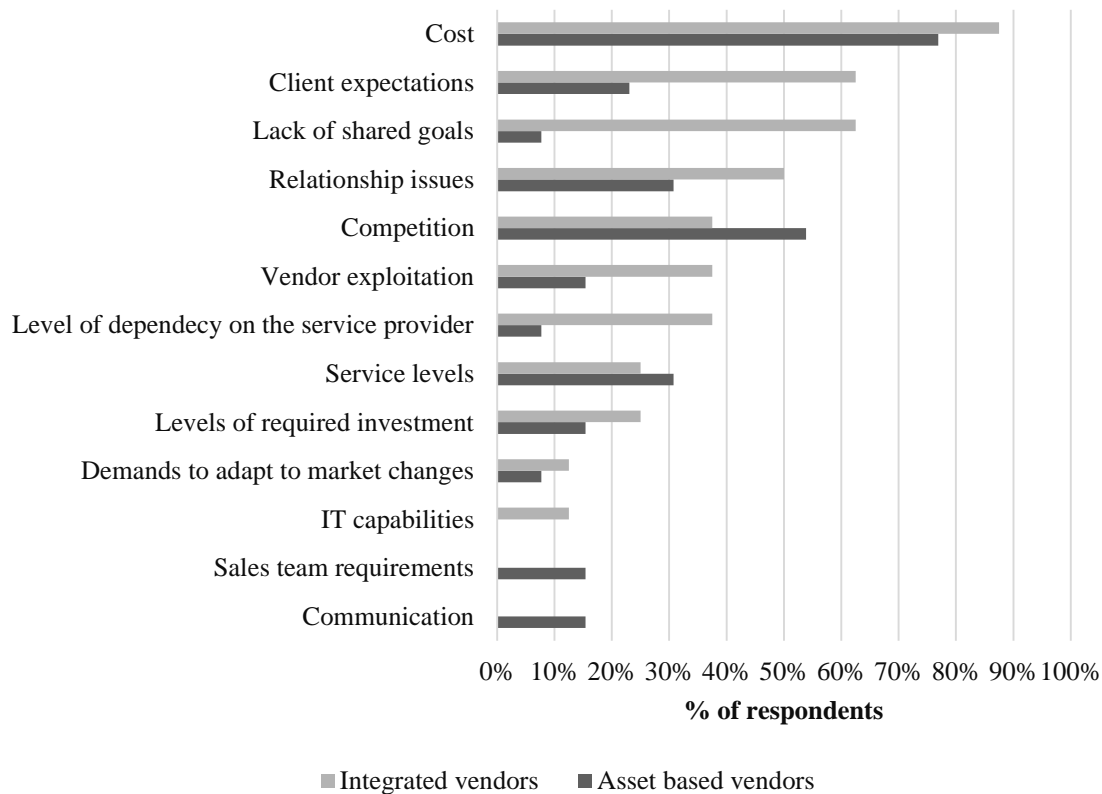


Figure 10: Termination causes

4.4 Concluding remarks

The objective of this chapter was to determine which logistics practices are prevalent in a South African context. The results from industry interviews and questionnaires reflect that asset-based LSPs and integrated vendor LSPs are the predominant LSP types operating within a South African context.

It is imperative that each LSP type understand the customer expectations and the value that the customer attaches to certain factors throughout the life cycle of the arrangement. The customer has to ensure that outsourcing is the right option and subsequently that the right supplier has to be chosen. LSPs should take on the customer whose requirements fit existing services on offer and who has long-term aspirations for the arrangement in the case of the asset-based LSP. LSPs should focus on showing the value created for the customer throughout the life cycles, in particular during the growth and maturity phase to extend this phase as long as possible. Periodic review of KPIs, joint efforts and communication are currently used to ensure that customer objectives are met.

Arrangements are terminated in most of the integrated vendor cases because the contractual period was finished and customer policy dictates that the RFP process be followed.

Chapter 5

The insource versus outsource decision

5.1 The initiation phase

The initiation phase of the life cycle of logistics outsourcing arrangements can be broken down into various sub-processes. As proposed by Platts et al. [6], an environmental trigger causes a company to do introspection and question the role of performing logistics operations in-house. The most popular of these environmental triggers within a South African context, as derived from the industry questionnaire results (Section 4.3.4.1), include the need to reduce cost and risk; focus on company core competency – the redundancy of such functions within the company’s core focus areas; the strategic focus on long-term growth of the company; and the abundance of the service in the South African market.

The process shown in Figure 11 was developed from the insight gained from industry interviews with customer and LSP representatives and depicts the basic steps of the initiation phase. In Figure 11 an environmental trigger is followed by a process whereby outsourcing is explored. LSPs are approached and the motivation to outsource grows. The company mostly compares in-house logistics costs to that of the logistics market. This can be achieved by sending out an RFI to various LSPs. Based on a high level cost comparison, the company is now in a position to decide if a formal tendering process should be embarked on by sending out an RFP..

LSPs react to the RFP by submitting a formal tendering document which outlines the scope, cost and assumptions made to find a solution for the particular customer. The customer can now select the best supplier from the responses received. Customer questionnaire participants listed low cost; agility to meet expectations on short notice; and a sustainable service provider business model as the most important criteria when selecting LSPs (refer to Section 4.3.4.2). In comparison, the LSP survey participants rated infrastructure, economies of scale; and an extensive distribution footprint as the most important criteria when customers select a service provider. A disparity between customer requirements and LSP offering exists during the initiation phase.

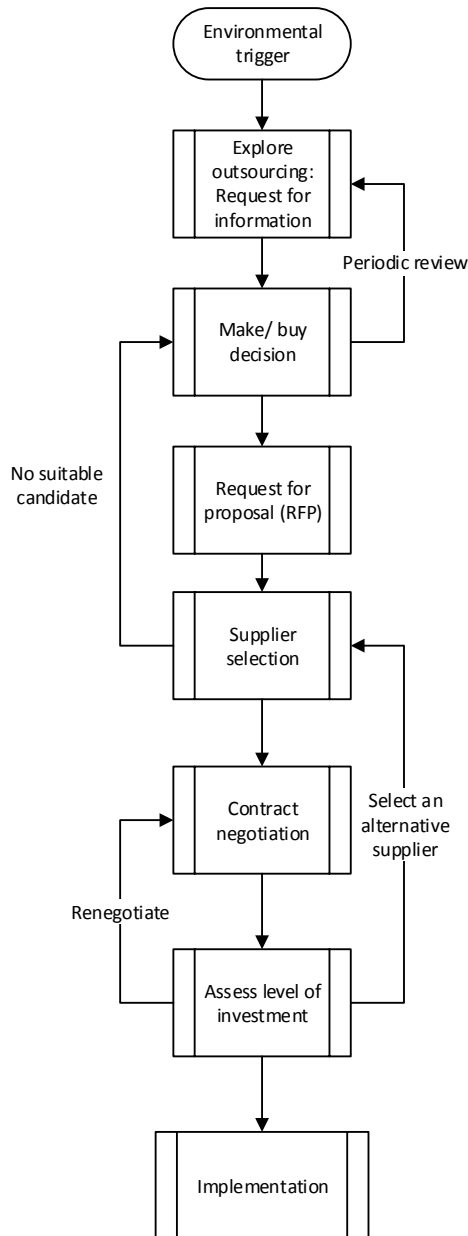


Figure 11: The initiation phase

Once the appropriate supplier has been selected, both parties take part in contract negotiations and assess the level of investment required from both parties for the agreement to be signed. This becomes an iterative process where both parties go back and forth until an acceptable middle ground is established. Should the level of investment become too large for any party, the customer could return to the supplier selection process and revisit the supplier selection. Once all contract negotiations have been completed, implementation can commence.

The process followed by the customer in the initiation phase during the insource versus outsource and supplier selection decisions is very important. It is during this process that many factors that might affect the sustainability or cause the termination of a logistics outsourcing arrangement can be identified and dealt with before the damage can be done. These factors include the LSP's understanding of the customer's expectations and the customer's understanding of the complexity involved in the LSP's service offering.

To determine whether an arrangement will be mutually beneficial for the customer and the LSP, an appropriate method is required to assist management in the insource versus outsource decision and in choosing the most appropriate service provider. The method should take the appropriate evaluation criteria, such as operational complexities, different outsourcing options, risks and rewards, the company's core competency and long-term logistics strategy into account.

The decision tree method, a method developed by Platts et al. [6] and linear programming was applied to the customer case study. The case study was derived from industry interviews with representatives from a FMCG company to determine the circumstances in which a logistics outsourcing arrangement would be mutually beneficial. Ultimately a recommendation for the use of such methods in practice is made.

5.2 The method developed by Platts et al

A method of decision making developed by Platts et al. [6] combines technology considerations, a cost model and the strategic company framework into a single structured decision-making model to directly answer the insource versus outsource decision. This method was developed and tested for the purpose of manufacturing outsourcing.

The method consists of three phases: the preparation, the data collection, and the analysis and results phase. During the preparation phase, the project team, which consisted of different stakeholders within the case study company, was assembled and briefed on the decision to be made. The data collection phase comprised the identification of areas within which factors could be clustered which should be considered by the project team when making the insource versus outsource decision.

The areas identified for the decision to insource versus outsource logistics services in the context of the case study company were identified as cost, service levels, technology and process and auxiliary functions, as shown in Table 4. The project team was requested to assign a weighting of importance to each area.

Table 4: Weightings of importance per area

Description	Weight
Cost	37%
Service	27%
Technology and process	18%
Auxiliary functions	18%

The project team then associated evaluation criteria with each area and assigned a weighting of importance to the evaluation criteria. The weighting of importance was derived from the average of the individual weightings assigned by each project member. The project team consisted of different levels of management each with a different perspective on the decision to be made; thus all representative weightings were considered to be equal. Table 5 lists the four different areas with the corresponding criteria and weightings.

Table 5: Criteria weightings per area

Area	Criteria	Weighting
Cost	Cost of logistics activity	50%
	Economies of scale	50%
Service	Market footprint	30%
	Risk mitigation	30%
	Service levels	30%
	Operational efficiency	10%
Technology and process	Technological advancement	33%
	Technical expertise	33%
	Process capabilities	33%
Auxiliary functions	Advanced analytics	17%
	Project management capabilities	33%
	Financial stability	50%

Table 5 shows that the cost area identified by the project team included logistics costs and economies of scale along with the weighting associated with each criteria. The service level area consisted of market footprint, risk mitigation, service levels and operational efficiency. The technology and process area consisted of technological advancement, technical expertise and process capabilities. The auxiliary functions area included advanced analytics, project management capabilities and financial stability of the service provider.

Once each area and evaluation criteria had been assigned a weighting, the project team assigned a rating per evaluation criteria for the in-house capabilities as well as the LSP capabilities. A rating out of four, where one is the lowest rating and four the highest, was assigned by each individual in the team. The average of all the individual ratings multiplied by the weighting per factor becomes the score for the particular evaluation criteria for either the in-house capabilities or LSP capabilities.

During the analysis and results phase of the method developed by Platts et al. [6], the score per evaluation criteria per area was summed to produce a score per area, which was then multiplied by the weighting per area. All areas were summed to obtain a total score. Thus, as per Table 6, the in-house score for the cost of logistics activity criteria was obtained by multiplying the weighting of 50% with the rating of four. This resulted in an in-house score of two. To obtain the in-house score for the cost area, the scores for the criteria cost of logistics (two) and economies of scale (one) were added to produce a score of three.

Table 6: Scoring of in-house and LSP capabilities for comparison

Area	Factor	Weighting	In-house rating	Supplier rating	In-house score	Supplier score
Cost	Cost of logistics activity	50%	4	3	2.00	1.50
	Economies of scale	50%	2	2	1.00	1.00
Service	Market footprint	30%	3	3	0.90	0.90
	Risk mitigation	30%	1	2	0.30	0.60
	Service levels	30%	3	3	0.90	0.90
	Operational efficiency	10%	3	2	0.30	0.20
Technology and process	Technological advancement	33%	2	3	0.67	1.00
	Technical expertise	33%	2	2	0.67	0.67
	Process capabilities	33%	2	2	0.67	0.67
Auxiliary functions	Advanced analytics	17%	2	3	0.33	0.50
	Project management capabilities	33%	2	3	0.67	1.00
	Financial stability	50%	4	2	2.00	1.00

Table 7 shows how the in-house total score was calculated by multiplying the score per area by the corresponding weighting per area to produce a total in-house score of 2.66. Similarly the LSP score comes to 2.50.

Table 7: Overall results of the comparison between in-house and LSP capabilities

	Cost	Service	Technology and process	Auxiliary functions	Total
Weight	37%	27%	18%	18%	100%
In-house score	3.00	2.40	2.00	3.00	2.66
LSP score	2.50	2.60	2.33	2.50	2.50
Gap	0.50	0.20	-0.33	0.50	0.16

The difference or gap between the in-house score and that of the LSP is analysed. Should the gap be negative, it represents areas where the company can improve the in-house capabilities or consider outsourcing. The company can improve its capabilities in the technology and process area. If the gap is positive, the in-house capabilities exceed that of the LSP. If the total in-house score is higher than that of the LSP, it indicates that the insourcing decision should be made.

To test the robustness of the insourcing decision, a sensitivity analysis for each area is performed. This analysis requires the weighting of the area under question to be changed to determine the impact it has on the total score. The weightings of the other areas are changed, maintaining the original proportions, the sum of the area weightings, add to one. If the area's weight is changed to zero, it represents the case where the area is not taken into account to make the decision. A graph displaying the total in-house and supplier score per iteration is drawn up. If the lines cross, the decision is sensitive to changes in the weighting of the area. Figure 12 indicates that the breakeven point is very close to zero. This means that the decision is robust in the cost area since the weighting cannot be lowered any further than zero, which means the LSP score for the evaluation criteria for cost will never exceed that of the internal score.

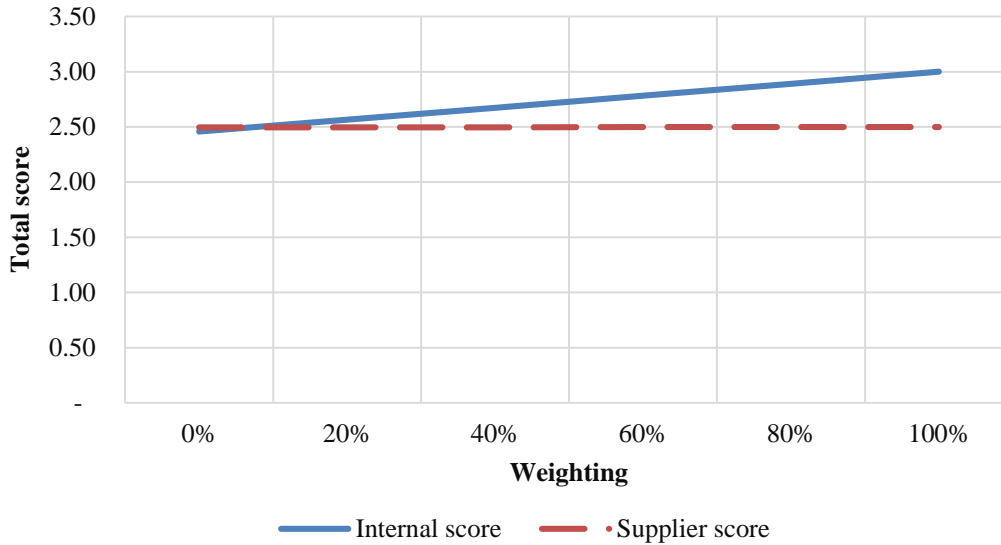


Figure 12: Cost sensitivity

Figure 13 indicates that there exists a breakeven point at 60% weighting. This shows that should service levels become more important to the company and the weighting increases in this area, the decision would swing towards the supplier. There is, however, a sufficient gap between the assigned weighting of 27% and the breakeven point. The decision is thus slightly sensitive towards service levels, which should be reviewed periodically to ensure that the right insource versus outsource decision is made, but at this stage it is still in favour of insourcing.

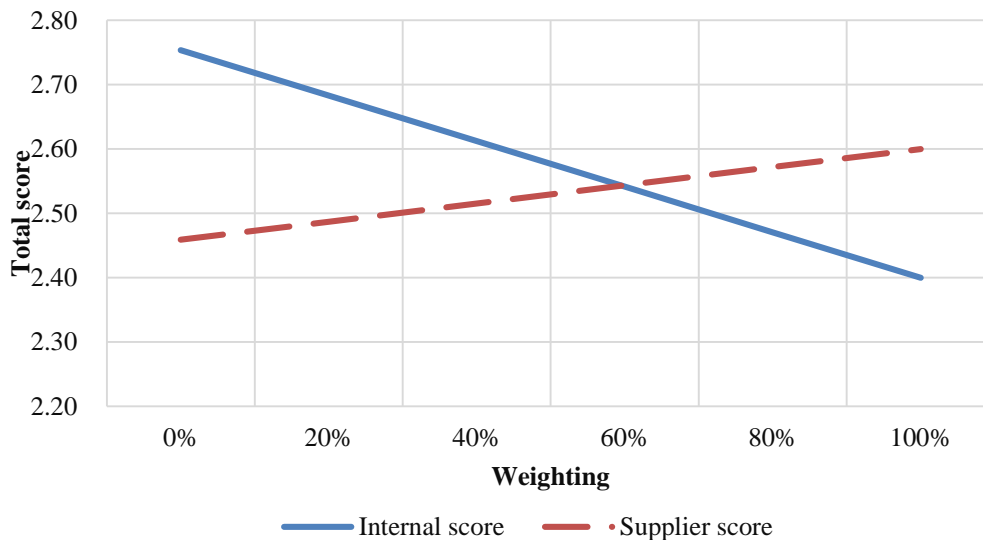


Figure 13: Service sensitivity

Figure 14 shows a breakeven point at 50%, which presents the project team with a gap of 32% between the original weighting of 18% and the breakeven point. This is three times the original weighting, and the probability of the area becoming three times more important relative to the other areas is small. The decision is therefore not sensitive in the technology and process area.

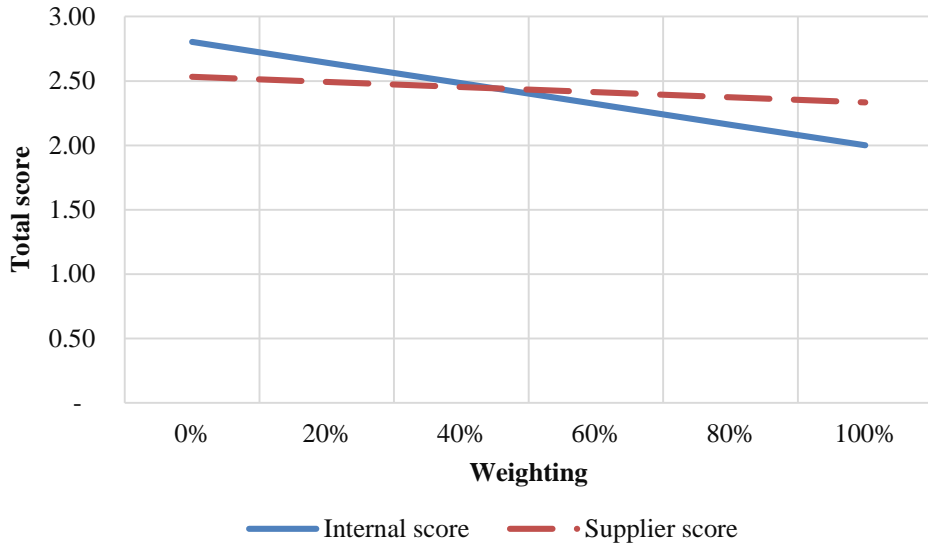


Figure 14: Technology and process sensitivity

Figure 15 shows similar results to that of Figure 12, for the auxiliary function area and does not indicate a sensitivity in this area.

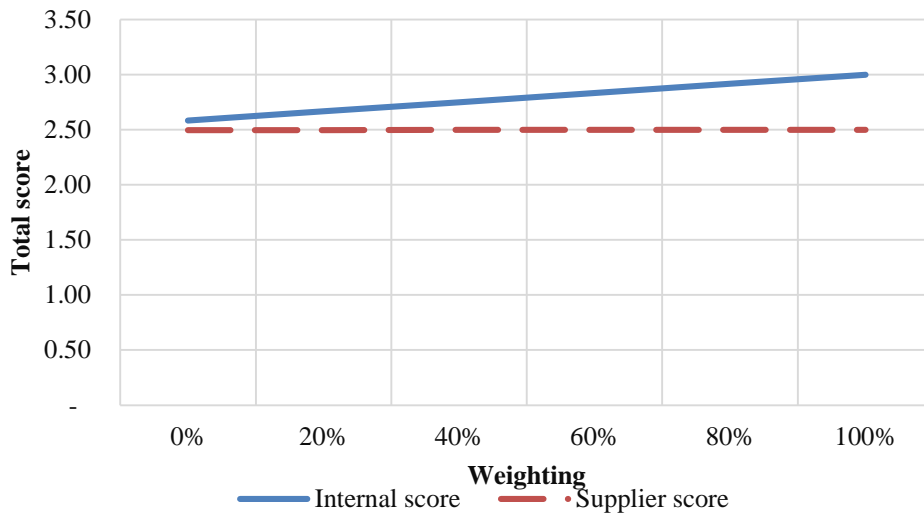


Figure 15: Auxiliary function sensitivity

The method developed by Platts et al. [6] takes multiple attributes into account for decision-making purposes and allows the decision maker to apply the methods in a logistics outsourcing context. The insource versus outsource and supplier selection processes are easily combined into this method. The risk of biased decision making is reduced by increasing the size of the project team. The company's core competencies and long-term logistics strategy can be included by selectively choosing the focus areas and criteria affecting the areas. The decision-making process is further simplified to such an extent that the risk and rewards as well as operational complexities are not properly quantified and exposed. It might not be sufficient to use as motivation for an insource versus outsource decision.

5.3 Decision trees

5.3.1 Method

A decision tree is a method used to make decisions by taking into account possible outcomes stemming from the decision's alternatives, associating a probability of occurrence to each outcome as well as a utility earned per outcome [45]. The method consists of a tree fallen on its side. The decision forks represent the different options. The uncertainty forks represent the different outcomes from each option. The utility function in the leaves of the tree could represent a payback on an investment decision or a cost incurred on an expense related to that decision [45].

In a logistics outsourcing decision problem, the decision tree can thus be structured in such a way that it takes into account all the important factors identified by the customer's long-term logistics strategy, appetite for risk, cost sensitivity and service level requirements, to name a few. Each alternative, or branch, represents an option to either insource or outsource by means of different outsourcing models. Factors that affect the outcome of each alternative or branch, such as demand variability and reaching target service levels, can be modelled. Adding uncertainty forks to each branch, representing the probability that demand and service levels will exceed, elude or meet expectations and adding the associated utility to each outcome.

The probabilities of outcomes pertaining to demand activity realisation can be closely modelled by completing a statistical analysis of historical sales data. The same probabilities of reaching service level targets can be determined by analysing historical in-house performance or contacting the LSP references. The utility associated with each outcome can be modelled by associating the cost of adding capacity to deal with increased demand or by calculating the opportunity cost due to lost sales as a results of service levels not achieved.

5.3.2 The decision tree model

The information retrieved from the interviews held with representatives from the FMCG Company, as well as from the RFP responses, in-house performance results and historical data was used to set the parameters of the logistics operations in question.

A data model was built to determine the daily resource requirements to serve the market by either the in-house team or by LSP. The model was based on the premise that demand activity drives resource requirements and incurs cost. Actual in-house performance results were used to determine the resource requirements in the case of the in-house scenario. Industry benchmarks, which are derived from tender document assumption lists and results were used in the case of the LSPs.

By means of a thorough analysis of historical sales figures, it was observed that demand activity contains multiple dimensions that drive cost in different areas of the logistics operations, as indicated in Table 8.

Table 8: Cost driving dimensions identified in the data

Dimension	Description	Logistics functions affected
<i>Volume</i>	The actual weight or volumetric mass of goods ordered by a customer.	Secondary distribution. The required vehicle payload is affected by the volume of the order.
<i>Complexity</i>	The number of different products in the customer basket regardless of the volume.	Warehousing operations and secondary distribution. Goods have to be sorted by product when entering and exiting the warehouse and upon delivery at the customer.
<i>Handling units</i>	The number of the smallest unit of product that a customer can order.	Warehousing operations.
<i>Sales value</i>	The value of goods ordered.	Some service providers charge a percentage of the sales value of goods.
<i>Drops</i>	The number of deliveries to be completed in a day.	Secondary distribution. Each delivery has a travel time and waiting time component which drives the number of resources required to serve all the customers.

Each dimension in the data was analysed by drawing up a histogram of the data, fitting a distribution and testing the goodness of fit by means of the Chi Square goodness of fit test. All variables except complexity were fitted with a normal distribution. No existing distribution could be fitted to the complexity variable, but since the standard deviation for this variable is so small, it was decided to assume a constant value of 114, which corresponds to the mean. Based on the distribution fitted to each variable, an expected value for each variable could be determined within a certain confidence interval, as indicated in Table 9.

Table 9: Confidence intervals for the expected value of each variable

	$E(x)$	CI	z^*	CI_{LL}	CI_{UL}
Volume	322,166	95%	1.96	308,068	336,263
Handling units	48,783	95%	1.96	46,685	50,881
Sales value	3,336,300	95%	1.96	3,193,359	3,479,241
Drops	606	95%	1.96	585	628
Complexity	114	95%	1.96	112	116

The expected value, $E(x)$, corresponding to the confidence interval of each variable was then used as base for the logistics solution design. This design included components such as the fleet size required for secondary distribution and the warehouse requirements; staff compliment and material handling resources required to perform the receiving; and storing and picking operations within the warehouse. All the design component-related costs such as vehicle cost, warehouse rental, material handling equipment rental and staff compliment were combined to obtain the cost of performing the logistics functions in-house.

In order to, for example, relate cost to the design component (fleet), we know that the expected number, $E(x)$, of drops affects the in-house secondary distribution solution. The solution consists of the fleet of vehicles and staff. As a simple example, the expected number of daily deliveries (606)

would be divided by the number of drops an in-house vehicle could achieve in a day (6) relative to the volume of the order to determine the number of vehicles required or the fleet size (101 vehicles). The fleet size is then multiplied by the cost of a vehicle and staff to obtain the in-house expected cost associated to this particular design component. To assess the secondary distribution cost if the number of drops exceeded or eluded expectations, the confidence interval's upper limit of drops (628) and lower limit of drops (585) were used in the cost calculation instead of the expected value of drops, $E(x)$. In many cases where the expected value of the cost driver is exceeded, additional capacity in the form of daily rented vehicles must then be hired, which comes at a premium.

All in-house design components and related costs are determined in this fashion. The cost driver is identified and the corresponding expected value is used as a base for design purposes associating in-house costs to the logistics solution component. The information obtained from the RFP responses highlighted three different LSP offerings: a *unit rate contract*, *fixed and variable costs contract*, and a *percentage of sales value contract*. The details of these contracts, also popularly referred to as cost models, are discussed in Section 4.3.5.1.

Each LSP offering was applied to the same level of distribution activity as per the confidence intervals determined for the in-house capability model to determine the resultant charge, and documented in the decision tree.

A decision tree was developed to show the options facing the case study company in the logistics outsourcing decision. The first decision fork (Figure 18) represents the four choices the customer faces: keeping the logistics functions in-house; outsourcing with a *unit rate per kilogram cost model*; outsourcing with a *fixed and variable costs model*; and outsourcing with a *percentage of sales value cost model*.

The second level of branching (Figure 16) illustrates the first uncertainty fork, which represents the volatility of demand activity and the effect on logistics costs to the case study company within the parameters of the option. Uncertainty forks branching from here indicate different levels of demand activity spread from each option. The top prong indicates demand activity above the expected (larger than the upper limit of the 95% confidence interval); the middle prong represents demand activity within the 95% confidence interval; and the lowest prong represents demand activity lower than the expected (below the lower limit of the 95% confidence interval). Each option facing the case study company was designed to accommodate the expected level of demand activity. Any activity outside the confidence interval will be outside of the normal logistics costs and may indicate a saving or additional cost incurred due to lack of logistics capacity.

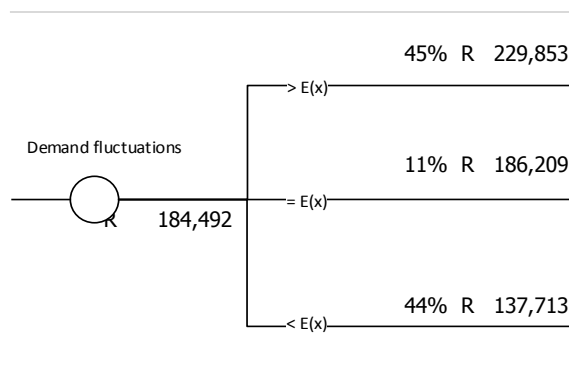


Figure 16: First uncertainty fork

The third level of branching or the second uncertainty fork that illustrates the resultant service level based on the demand activity fluctuation is presented in Figure 17. The expected service level corresponds to the service level promised by the service provider in the RFP responses. It further

includes the degree to which the orders were delivered in full-time and on-time to the end-customer. The probability that the service level will be lower is determined by the service provider’s means of dealing with potential demand fluctuations. This was determined by comparing the service provider’s means of accessing additional resources, such as additional vehicles and labour, and leveraging economies of scale among other operations on a relative basis. A service provider would perform better in this case if it had access to a pool of vehicles; if it had an agreement with a short-term vehicle rental company or had other operations with which it could pool the risk of demand fluctuation.

Actual in-house service level trends were used to establish the in-house values. The expected yield from lower than expected service levels corresponds to the opportunity cost lost or value of lost sales, which is determined using the average value of lost sales per service level percentile from historical data.

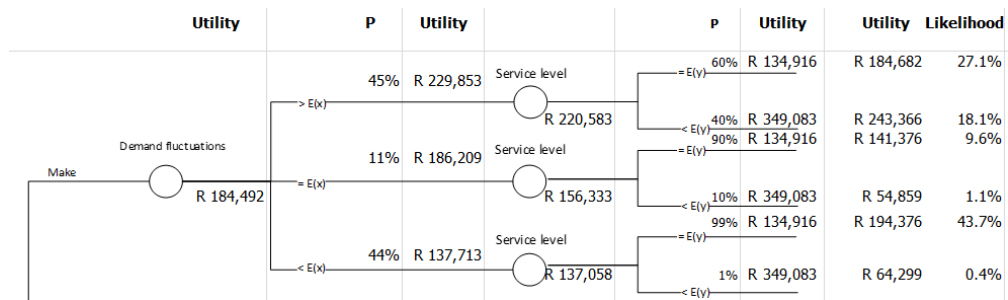


Figure 17: Service level uncertainty

The expected utility was determined for each branch by adding the product of the probability of the demand fluctuation and the cost thereof to the product of the probability of service level fluctuations and the loss of sales. In Figure 18 this corresponds to a 45% probability of the demand, being higher than expected, multiplied by the cost of R 220 583, which will be incurred to manage the demand spike and adding the product of the probability of 60% that the expected service level will be reached and the opportunity cost of the value of sales loss of R134 916. This results in an expected utility for the particular branch of R184 492.

The likelihood of occurrence for the same branch can be determined by multiplying the probability of the expected demand (45%) and the probability of the service levels making target (60%). This results in a likelihood of 27%. The sum of the likelihood of all the branches belonging to an option results in 1. The maximum likelihood for each option can be determined. The full decision tree is presented in Figure 18. It can be observed that in this case study the branch depicting demand fluctuations eluding expectations and service levels meeting expectations has the highest likelihood of occurrence at 43.7%.

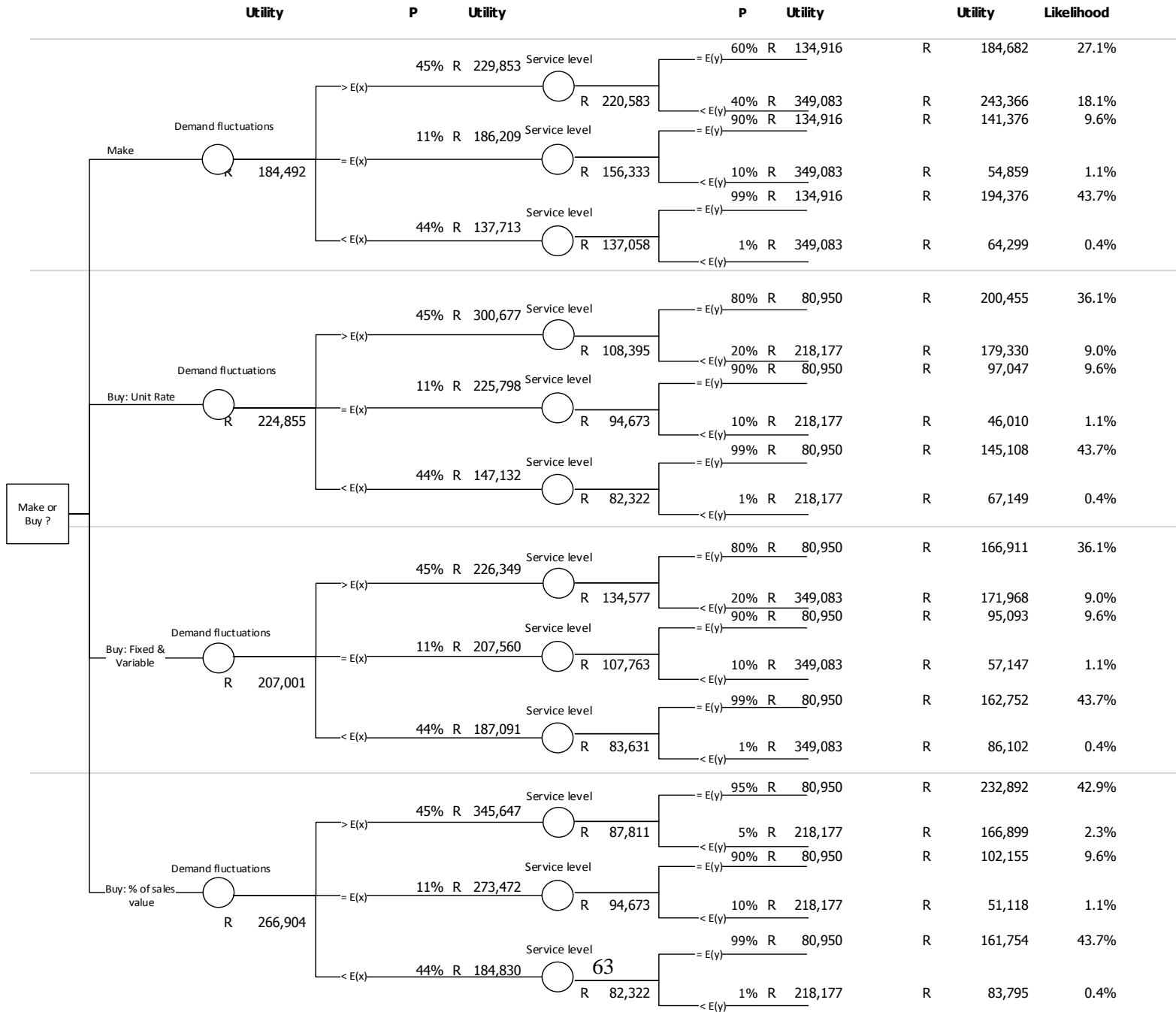


Figure 18: Decision tree

5.3.3 Linear programming

A linear programming model was used to determine whether this method could successfully be applied to the logistics outsourcing decision problem of the case study company. The historical data provided by the case study company were used as logistics activity inputs (customer demand, number of deliveries, volume to be picked in the warehouse and delivered, etc.), similar to the decision tree method. The model then optimised the insource versus outsource decision and supplier selection problem for each day in the historical data. Each day consisted of a set of variables, such as volume, handling units, number of products and the number of deliveries to be completed. These variables were applied to the various LSP offerings, as discussed in the decision tree section, to form the objective function of the model. Certain constraints were imposed on the model and the results were analysed. The mathematical model was built in Excel Solver, which made use of the Evolutionary Solving method and completed in excess of a thousand iterations for each daily decision problem. The model produced a preferred service provider per logistics function per day of historical data used as inputs. The daily results data could be aggregated to determine which service provider, or in-house option, was the most frequently selected by the LP model.

5.3.3.1 The decision variables

The decision variables influence the outcome of the LP model.

$I^W \triangleq$ the in-house warehousing option has been selected where $I^W \in I = \{0,1\}$

$I^S \triangleq$ the in-house secondary distribution function has been selected where $I^S \in I = \{0,1\}$

$S_n^W \triangleq$ the warehousing function of supplier n has been selected where $S_n^W \in I = \{0,1\}$

$n \triangleq \begin{cases} 1 & \text{LSP with a unit rate contract} \\ 2 & \text{LSP with a fixed and variable contract} \\ 3 & \text{LSP with a percentage of sales value contract} \end{cases}$

$S_n^S \triangleq$ the secondary distribution function of a supplier has been selected where $S_n^S \in I = \{0,1\}$

5.3.3.2 Parameters

The parameters are values that represent the in-house cost impact of operating the secondary distribution and warehousing functions, and the cost impact of the LSPs operating the secondary distribution and warehousing respectively.

$C^{iS} \triangleq$ the in-house cost of performing the secondary distribution function

$C^{iW} \triangleq$ the in-house cost of performing the warehouse function

$C_n^S \triangleq$ the cost of LSP n performing the secondary distribution function

$C_n^W \triangleq$ the cost of LSP n performing the warehousing function

5.3.3.3 The objective function

The objective of the model (1) is to determine which service provider to select on a daily basis based on the cost impact the service provider would have on that day. The cost impacts consist of the sum of the supply charge, driven by the cost model employed, and the opportunity cost lost or loss of sales value as calculated for the decision tree method.

$$\mathbf{min} \mathbf{z} = \mathbf{I}^S(\mathbf{C}^{iS}) + \mathbf{I}^W(\mathbf{C}^{iW}) + \sum_{n=1}^3 [\mathbf{S}_n^S(\mathbf{C}_n^S) + \mathbf{S}_n^W(\mathbf{C}_n^W)] \quad (1)$$

The objective (1) to be minimised is the total daily cost impact of using the particular LSP or operating the logistics function in-house, sole or multiple service providers.

LSPs could be assigned to either the warehousing or the secondary distribution function or both. The in-house option was also compared along with the LSPs. The number of service providers assigned to a logistics function was constrained by equations 2 and 3.

5.3.3.4 Constraints

Only one supplier can be allocated the warehousing function:

$$\mathbf{I}^w + \mathbf{S}_1^w + \mathbf{S}_2^w + \mathbf{S}_3^w = \mathbf{1} \quad (2)$$

Only one supplier can be allocated the secondary distribution function:

$$\mathbf{I}^s + \mathbf{S}_1^s + \mathbf{S}_2^s + \mathbf{S}_3^s = \mathbf{1} \quad (3)$$

5.4 Research Results

5.4.1 Platts et al.'s method

The method developed by Platts et al. [6] suggests that in-sourcing is advisable but that the case study company should focus on improving the technology and process area, which consists of technology advancement and expertise and process capabilities. Technology advancement and expertise can easily be outsourced in isolation to a specialist service provider that focuses on transport management systems and transport planning. On presentation of the results to the case study company, the representatives conceded that secondary distribution planning had only been implemented recently and that managed services or a transport management system probably is the next step in achieving logistics excellence.

The possible sensitivity of the decision to the importance of service levels also proved to be of value to the decision makers. Since the second round of interviews with the executive committee and managers, the in-house service levels have deteriorated and have become great focus points within the business. Thus, the periodical review of this decision by means of the method developed by Platts et al. [6] would have highlighted this and indicated that the company should consider outsourcing.

5.4.2 Decision trees

5.4.2.1 Descriptive statistics

The decision tree produces the following results per branch to be taken into consideration when making the logistics outsourcing decision: the maximum utility; the expected logistics costs; the expected loss of sales; and the highest likelihood of occurrence. The ranking of these results for each branch from the decision tree should correspond to the company's overall logistics strategy. The branch results are compared and ranked from one to four, where four is the lowest ranking. Table 10 illustrates the results from the case study.

Table 10: Comparison of options

Branch	Decision tree results			
	Maximum utility	Maximum expected logistics cost	Maximum expected loss of sales (Service level)	Highest likelihood
In-house logistics activity	4	1	4	4
Outsource: R/kg cost model	2	3	2	1
Outsource: Fixed and variable costs model	1	2	3	3
Outsource: Percentage of sales	3	4	1	2

Viewed in isolation, the *unit rate* and *fixed and variable costs model* options have the lowest rated utility values, indicating the lowest potential loss of sales and logistics costs combinations. The *in-house* option is rated as the lowest actual logistics costs solution but at a low service level trade-off. The *percentage of sales* outsourcing option is rated as having the best service level expected value but at the highest expected logistics cost. The highest ranked utility from the highest likelihood branch is associated with the *in-house* solution, which indicates the risk associated with the low level of expected logistics cost.

These weightings should correspond to the root cause of the change in logistics strategy. For example, if a company decides to pursue outsourcing as a viable option to create value for the end-customer by improving service levels, focusing on reducing loss of sales should be assigned a higher weighting. To this end, four different logistics strategies with the corresponding weightings of each variable are shown in Table 11.

Table 11: Variable weightings per strategy

Logistics strategy	Maximum utility	Maximum logistics Cost	Maximum loss of sales (SL)	Highest likelihood
Higher service levels	10%	20%	60%	10%
Lower logistics cost	20%	60%	10%	10%
Reduced risk	30%	30%	30%	10%
Overall improvement	25%	25%	25%	25%

The resultant scores of each option are shown in Table 12. These results were obtained by multiplying the weighting assigned in Table 11 with the ranked results in Table 10. Thus, if the decision tree results for a particular branch showed a high overall utility (corresponds to high cost) and the company's strategy is to reduce cost, the weighting assigned to the maximum utility would penalise the option. Depending on the company's logistics strategy, the best associated option with the lowest score can be selected.

Table 12: Decision tree option results

Option	Higher service levels	Lower logistics cost	Reduced risk	Overall improvement
In-house logistics activity	4.20	2.20	3.10	4.25
Outsource: R/kg cost model	2.30	2.50	2.20	2.25
Outsource: Fixed & variable costs model	3.20	2.00	2.10	3.00
Outsource: % of sales	2.30	3.30	2.60	3.00

If the company desired higher service levels, then outsourcing with a unit rate or percentage of sales value contract would be favourable. If lower logistics costs and reduced risk were desirable, a fixed and *variable*

costs contract would be favourable. Should the company require an overall improvement, a unit rate cost structure would be the best fit solution.

5.4.3 Linear programming results

The LP results were obtained by observing the frequency at which each service provider was selected throughout a one-year period. As well as analysing these results along with trends in the historical data, such as seasonal volume fluctuations and distribution network changes. Correlations can be drawn as to which service provider or outsourcing option is preferable under different circumstances.

Observations of the results show that the in-house option was selected to perform the secondary distribution function 87% of the days in the historical data. The supplier with the *percentage of sales value contract* was selected 7% of the days; and the *unit rate contract* 6% of the days. The in-house cost of performing the secondary distribution function and the historical in-house performance resulted in the lowest cost option in the case of the secondary distribution function.

In the case of the warehousing function, the LSP with the *percentage of sales value contract* was selected 50% of the days. It was prevalently selected during the first six months of the year. Whereas the LSP with the *fixed and variable costs model* was selected 43% of the days and prevalently towards the latter six months in the year. On further inspection, the standard deviation of the design variables increased towards the end of the historical period under review. This translates to larger demand volatility and affects the LSP's ability to provide high service levels and minimise cost. The LSP with the *fixed and variable costs model* performed the best during this period.

5.5 Evaluation of results

The decision-making method used to aid management in making the logistics outsourcing decision should ideally address logistics cost, the associated risk, long-term strategy [22], service provider fit, the degree of market growth achieved, and service levels [16]. In this case, these factors are used to compare the methods applied to the logistics outsourcing decision problem.

5.5.1 Logistics cost

All the decision-making methods take logistics costs into consideration. The method developed by Platts et al. [6] assigns a rating to the expected in-house logistics costs as well as to the expected LSP cost. Although this method of cost comparison is probably the most frequently adopted in the industry, it does not take into consideration demand variability and the risk associated with dealing with consumer spending behaviour. Using the decision tree method, the decision maker is forced to analyse the demand fluctuations, assign a probability to the less favourable outcome and produce an associated cost which highlights the risk associated with decisions. LP offers a detailed approach that focuses on minimising the logistics costs impact on a granular level. The effect of fluctuating demand on cost and sales is quantified in the case of the LP method.

5.5.2 The associated risk

Although the method developed by Platts et al. [6] gives an indication of the sensitivity of a decision to certain factors, it does not associate a cost or utility to the sensitivity or risk that the decision maker faces. The decision maker has no frame of reference regarding the size of the risk when looking at the gap between the breakeven point on the sensitivity graph and the associated weighting of the area. Biased decision making comes into play here. Since the information is aggregated to such an extent that it is taken out of context and the decision maker will either over- or under-estimate the representativeness of the information and will draw inaccurate conclusions from it. In comparison, the LP method creates

visibility of daily changes in LSP preference. This can be analysed together with market demand changes and future product promotions to select the LSP which best suits the company's marketing strategy.

Although the decision tree method highlights the risk faced in each outcome by adequately assigning a probability derived from sound statistical analysis, biased decision making still plays a major role in the outcome of the decision. Prospect theory postulates that individuals are more sensitive to changes in probability if the probability is small (close to 0) or large (close to 1) and will often result in decision makers making the decision contradictory to the utility of such a decision [23].

5.5.3 Long-term strategy

All methods take the company's logistics strategy into account by placing more emphasis on certain decision variables than others. The method developed by Platts et al. [6] provides a quick method of checking whether the decision is viable, by changing the weightings and ratings assigned to the decision variables. Whereas updating and changing the decision tree and LP models will require a new statistical analysis of the latest available data. The decision tree and LP models can, however, be adapted to run various what-if scenarios. By changing the historical data used to portray different scenarios in the future, such as massive demand fluctuations or increased volumes due to new product launches, the decision makers can extend the period under review and take the strategic direction of the company into account.

5.5.4 Service provider fit

The cost model used in logistics arrangements has a big impact on the service provider and customer behaviour. Integrated vendors will apply shared resources to the most profitable customer. Customers of LSPs using the *fixed and variable costs model* would require the LSP to reduce cost, while dedicating resources and upholding service levels. Customers are also often surprised when additional costs are incurred due to labour strikes and demand-related resource requirements when using a *fixed and variable costs model*. The main cause of this is the fact that the expected cost is used when comparing LSPs.

The method developed by Platts et al. [6] only assigns a rating to the service provider based on their expected cost relative to each other and the in-house expected cost. The decision tree and LP methods expose the actual cost impact of fluctuating demand and service levels by applying the in-house cost of performing the operation or the LSP rate to the daily demand activity. Hence, decision makers can understand exactly what will happen should market volatility increase.

Service provider fit should include a cultural aspect as well as a technology advancement component. These items are easily worked into the method developed by Platts et al. [6] but will require an additional step to be added to the decision tree and LP models to compare service providers on an observed level of cultural fit and technological advancement, such as the use of fuzzy logic proposed by Guneri et al. [24].

5.5.5 The degree of market growth achieved

The degree of market growth can be modelled using the decision tree and LP methods by extending the expected service levels to above 100%. This means that all customers are fully served, which indicates that the customer base has grown beyond the initial base at the onset of the relationship. The market growth can be added to the method developed by Platts et al. [6] by contacting the service provider references and obtaining the market growth achieved in the case of the reference, and assuming that the relatively same level of growth is possible if the reference was not a new company.

5.5.6 Service levels

All methods address service levels. Again, the decision tree method exposes and quantifies all the risks and rewards associated in more detail than the method developed by Platts et al. [6], and the LP method

requires the decision makers to further identify correlations and trends within the results to expose potential risks.

5.6 Conclusion and recommendations

When approaching the insource versus outsource and supplier selection problems in a structured fashion, the customer can ensure that an arrangement is chosen that will be mutually beneficial to both parties. Each method applied in this chapter is associated with a certain level of detail, and the customer can select the appropriate method based on the information and resources available.

In the case of the case study company, the method developed by Platts et al. [6] indicates that the logistics services should stay in-house. Based on the logistics strategy of the company to produce high service levels at sustainable cost, the decision tree method suggests that the answer lies between the two strategies: higher service levels and low logistics cost. The average score between the two strategies suggests logistics outsourcing with a *unit rate contract*. The LP method offers the decision makers the opportunity to select an LSP per logistics function under consideration, without additional complex calculations. In the case of the secondary distribution function, an in-house operation is proposed. In the case of the warehousing function the decision maker needs to determine whether the change in demand volatility is a seasonal occurrence or whether the market has changed. Then, either the LSP with the *percentage of sales value cost model* or the *fixed and variable costs model* should be selected.

Although the method developed by Platts et al. [6] produces a quick definitive answer. The decision tree method creates a more detailed view of the decision problem that the company faces as the upside and the downside of options are highlighted and the decision maker gets an idea of the probability and associated risk of each option. The LP method creates the opportunity for the decision maker to choose an LSP per function without overcomplicating the decision-making process. The LP and decision tree methods are both flexible and can accommodate changing market conditions, projected values and perceived risk for scenario modelling purposes.

The use of the decision tree method is proposed, as it has the advantage of displaying the decision problem in one compacted view from which the decision maker can compare all the information simultaneously. The decision maker is allowed to explore the detail of all possible alternatives.

Chapter 6

The growth and maturity phase

6.1 Extending the growth and maturity phase

The questionnaire and industry interview results revealed that the objectives of the two predominant types of LSPs differ during the growth and maturity phase. The asset-based vendor's objective is to earn trust to extend and grow the service offering to the customer, while showing a return on the often very high level of investment made to accommodate the customer. The integrated vendor's objective is to improve agility to recover quickly once an arrangement has been terminated and to maximise the economic value added to keep investors happy. The customer objectives in outsourcing logistics functions observed in the industry questionnaire responses (Section 4.3.4.1) include achieving logistics costs reduction, improved service levels, reduced risk and a sustainable logistics solution. The misalignment between LSP and customer on factors such as cost, objectives and expectations is observed to be the most popular reasons for termination of logistics outsourcing arrangements. To defer the decline phase as far as possible, both parties have to focus on the factors that threaten and promote the sustainability of the logistics outsourcing arrangement.

6.2 Analysis

6.2.1 Conflicting and joint objectives

6.2.1.1 *Asset-based vendors and their customers*

The customer's objectives as seen in the industry questionnaire results are in both cases reduced risk, low logistics cost, high service levels and a sustainable logistics solution. Asset-based vendors were observed to be more aligned with customer objectives. The customers of asset-based LSPs who participated in the industry questionnaire indicated that the weakest in-house function for which they appointed the asset-based LSP is technical process capability (Section 4.3.4.2). This refers to the technical and operational expertise required to perform the logistics function in question. For the asset-based LSP to live up to this customer expectation, the type of logistics solutions provided require specialised equipment, highly technical expertise, a high degree of solution customisation and a single-customer focus. These components require high levels of investment and investors apply pressure on these LSPs to show a return on these investments.

For the asset-based LSP to show a return to investors and provide a customised, highly technical solution to the customer, its objectives include maximising revenue, lean operations stability and reduced risk. These objectives are imposed by the type of cost model employed, and no key performance indicators (KPIs) or joint efforts were identified within the questionnaire results which favour the asset-based LSP's objectives. Comparing these objectives to that of the customer, the objective of maximising revenue conflicts with the customer's objective of low cost logistics. Lean operations can very easily conflict with high service levels since the cost or service level trade-off is a very fine balance to strike for the LSP. Stability aligns with sustainable logistics solutions as well as reducing risk in both cases. There is thus an opportunity to find a middle ground for conflicting objectives and better align joint objectives.

6.2.1.2 *Integrated vendors and their customers*

Integrated vendors showed less alignment with customer objectives, which could mostly be attributed to the fact that the LSPs have multiple customers sharing resources, and aligning with all customer objectives is impossible. The customer participants in the industry questionnaire indicated that the

weakest in-house function for which they appointed the integrated vendor is economies of scale (Section 4.3.4.2). For the integrated vendor to provide a customer with a logistics solution which leveraged economies of scale within operations, the integrated vendor has to strategically match customers which offset each other's resource requirements, focus on multiple customers, share resources strategically, implement technology to create visibility of resource requirements and optimise the use thereof, and maximise the number of customers sharing by implementing generic solutions.

The level of investment required is much lower than that of asset-based LSPs and investors require that integrated vendor LSPs maximise the economic value added by continually improving profit margins. For the integrated vendor LSP to increase margins while offering a low-cost solution by leveraging economies of scale, its objectives include lean operations, maximising profit, reduced risk and creating visibility. Comparing these LSP objectives to that of the customer, lean operations and maximising profit margins conflict with the customer's objective of improving service levels since profits are maximised by focusing limited resources on the most profitable customer activity. Improving visibility complements the customer's objective of improving service levels but provides the LSP with the opportunity to favour certain more profitable customers when resource requirements are high. The objective to reduce risk can be an opportunity to jointly improve service levels or it might be an opposing objective, depending on the cost model in use.

6.2.2 The resulting behaviour

The objectives facing each party should be instilled by a combination of the mechanisms, such as type of cost model, the use of KPIs and the implementation of joint efforts or gain sharing initiatives. To understand the resultant behaviour of different cost model and KPI combinations, eight case studies consisting of different cost models, KPIs, industries, complexities and logistics solutions offered were analysed. Appendix C shows the detail of each case study under the headings: industry, type of vendor, cost model, logistics functions outsourced, current KPIs and complexities.

The behaviour of the LSP and customer in each case study, which is dependent on the type of vendor and the cost model employed, can be compared to KPIs instilled by the customer. This comparison makes it possible to determine how well the arrangement is hedged against bad behaviour from either party, whether the value added by both parties is reported on; whether the KPIs are biased towards any party; and if any joint efforts exist to better align the parties.

Case study 1 in Table 20, Appendix C, is used as an example. In this case study, the main objectives of the integrated vendor is to leverage economies of scale and maximise profit margins. The cost model employed is a hybrid of a *unit rate* and a *fixed and variable costs model*, where the primary logistics and warehousing functions are assigned a *unit rate cost model* and the secondary distribution function a *fixed and variable costs model*, whereby the variable portion would be linked to the units handled.

6.2.2.1 LSP behaviour driven by the cost model

The LSP in case study 1 would aim to smooth demand for resources to optimise the minimum resource requirements and ensure low cost and high profit margins. This can be achieved by implementing nominated delivery days (NDDs), where customers will only receive deliveries on assigned days of the week, which will smooth out the distribution vehicle requirements.

The complexity within the warehouse created by the multitudes of different products and the volume of products handled can be reduced by implementing minimum order quantities. Fewer picking staff are required to perform the case pick operation, since ordered volumes are combined into larger orders. In addition, primary vehicle utilisation is increased by increasing stock holding within the network and thus increasing storage revenue as well.

Should high resource requirements exist, the LSP would focus on the most profitable customer. The LSP creates value for the customer, since it has the economies of scale to absorb the volatility of the end-customer demand fluctuations and deliver the logistics solution at low cost. Service levels are not always guaranteed and focus is given to multiple customers. It is in the LSP's best interest to promote volume growth of the customer (end-customer satisfaction) and maximise volume throughput (in-full deliveries). The LSP's behaviour is driven by the cost model and is not necessarily in the customer's best interest.

6.2.2.2 Case study KPIs

The KPIs instilled by the customer in the case study drive the following behaviour: improve end-customer satisfaction (measured by the number of backdoor issues, on-time delivery percentage, in-full delivery percentage); improve operational accuracy (measured by order pick accuracy, CO² emissions, proof of delivery (POD) management, short loaded or delivered orders, stock accuracy); improve resource utilisation (measured by vehicle turnaround times); reduce waste (measured by CO₂ emissions; good stock returns; damaged goods return percentage); reduced cost (measured by cost and monthly savings); improve operational safety and the quality of goods. The listed KPIs drive LSP behaviour as well as the customer's behaviour. Table 13 shows the alignment between customer and LSP objectives to that of the KPIs for the case study. The alignment between the LSP objectives and the customer objectives are shown respectively. The alignment of the KPI on the left to the customer objective on top, as well as the alignment of the KPI to the LSP objective at the bottom. The ticks indicate alignment and the crosses indicate opposing objectives.

Table 13: Identifying complementing and opposing KPIs

		Customer objectives				
		High service levels	Economies of scale	Reduced risk	Low cost operations	Sustainable logistics solutions
KPIs instilled	Improved end customer satisfaction	✓				
		✓	✗	✓		
	Improved resource utilisation		✓			
			✓			
	Improved operational accuracy			✓		
				✗		✓
Ensure safety and quality of goods			✓			
				✓		
Reduce cost				✗		
		✓	✓			
		Increased throughput	Lean operations	Maximise profit	Reduce risk	Create visibility
		LSP objectives				

Table 13 shows that KPIs driving operational accuracy and reduced cost are opposing KPIs to the LSP behaviour and that improved customer satisfaction can be both an opposing and a joint objective. Improving customer satisfaction brings about the cost service level trade-off for the LSP and favours reducing cost in the case of less profitable customers. Improved resource utilisation and ensuring safety and the quality of goods are joint objectives. It is interesting that the customer lists reduced cost as a measure, when the cost model dictates that cost is directly proportional to the level of activity that the customer creates. The only way additional savings can be made is by renegotiating the rates or creating a gain sharing incentive.

However, both parties listed reduced risk as an objective, which can be achieved by using a gain sharing model instead. The customer could invest in the LSP's warehousing operation, providing capital for the

extension of the warehouse to secure dedicated storage space. The LSP locks in the customer until another customer or the LSP can take over the investment and the customer is only charged for the handling cost within the warehouse. This affords the customer an opportunity to stockpile and ensure stock availability during peak periods, which reduces the risk of running out of stock, and the LSP's investment stays low.

The analysis of case study 1 reveals that the KPIs listed favour the LSP's objectives more than that of the customer. The objectives of low cost operations and sustainable logistics arrangements are not enforced by means of the KPIs listed, whereas all the LSP objectives are covered by the KPIs. The KPIs are biased towards the LSP and show the value added by the LSP in that costs are highlighted and can easily be benchmarked in the market but no joint effort incentive exists.

6.2.2.3 *KPI matrix*

The KPIs listed in Section 4.3.5.3 by the customers and LSPs that completed the industry questionnaires can be used to formulate a method for customers and LSPs to determine whether the cost model and KPIs in use are sufficient to ensure that detrimental behaviour is opposed, value added is reported on and that bias is reduced. The customer and LSP questionnaire participant responses were combined and categorised by cost model, LSP type and the services on offer. The KPIs provided in each response were listed to create a list of recommended KPIs per cost model, LSP and service type combination. These KPIs have been used and tested within the industry for years in combination with new and mature logistics outsourcing arrangements; thus no new measures were developed and the application of existing measures were refined. This formed a basic matrix whereby customers and LSPs could determine whether the right KPIs were in use.

Each KPI was further analysed to determine the rate of change of the underlying variable to determine the period within which it should be reviewed. This is important, since special causes of variation seldom occur and if a review occurs too frequently, too much focus will be given to this special cause of variation instead of the real, frequently occurring issues. If reviews occur too far apart, data will be aggregated to such an extent that real issues are lost. As an example in Appendix D, adaptability is a KPI that should be assessed monthly. The measure of adaptability in the case of the secondary distribution function is the varying number of deliveries or volume handled by the fleet. One should view the variance over a whole month to be able to view not only the value added by the LSP in handling the variability, but also the inefficiency on the part of the customer sales team for not smoothing out customer orders. Each KPI is assigned a review indicator which shows the period within which the KPI should be reviewed: daily (D), weekly (W), monthly (M), quarterly (Q), bi-annually (B) or annually (A).

This matrix was further refined and tested by comparing the analysis of each case study listed in Appendix C to the matrix in Appendix D and adding or removing KPIs on the basis of whether the KPI opposed detrimental behaviour, shows the value added to the arrangement, and incentivises joint efforts. Each case study KPI was compared to the proposed KPI in the matrix and evaluated based on the aforementioned criteria. If the KPI satisfied the criteria, it was added to the KPI matrix. The resulting list of KPIs per class could then be compared to the existing KPIs of each case study to determine the overall coverage that the set of KPIs provides. In this case, coverage referred to the number of KPIs in use by the case study company compared to the number of KPIs proposed by the KPI matrix and is expressed as a percentage. Table 14 displays the KPI coverage per logistics function for each of the eight case studies used to test the KPI matrix.

Table 14: KPI coverage

Case study #	Complexity rating	Primary transport score	Warehousing score	Secondary distribution score	Shipment tracking
1	6.27	50%	60%	65%	
2	5.32		22%	18%	
3	5.19			21%	33%
4	5.35			44%	20%
5	7.09			25%	
6	13.96			68%	
7	10.00			75%	
8	8.27			43%	

A complexity rating could be assigned to each case study based on the number of logistics components required to perform the logistics function. Such as fridge units for perishable products and specialised material handling equipment in the case of heavy products.

Rao & Young [13] categorise logistics complexity as product-, process- or network-related. Product complexities include attributes of the product, such as the temperature at which products must be kept, or whether the product is perishable, fragile, hazardous or valuable. Process complexities include process attributes such as stringent timelines, quality inspections, cargo processes and customs processes. Network complexities include the attributes of the company's network and the geographical location of the customer.

The complexity rating is based on the product, process, and network complexities presented by the customer's logistics solution. An assortment of highly complex and less complex operations formed part of the case studies with different logistics functions outsourced to LSPs. A more complex case should have a higher KPI coverage to hedge both parties in the arrangement against detrimental behaviour.

If one views the level of complexity associated with the secondary distribution function of each case study against the KPI coverage score in Figure 19, a weak linear relationship exists between the level of complexity and the KPI coverage. The R^2 value indicates a weak fit, which can be attributed to the small number of case studies used. The Pearson's correlation coefficient between the two variables is 0.66, which also indicates a weak linear correlation between the complexity of the operation and the KPI coverage. Case study 8 has a very low level of KPI coverage for the level of complexity presented by the customer's product, processes and network. More complex operations require higher levels of KPI coverage to mitigate risk.

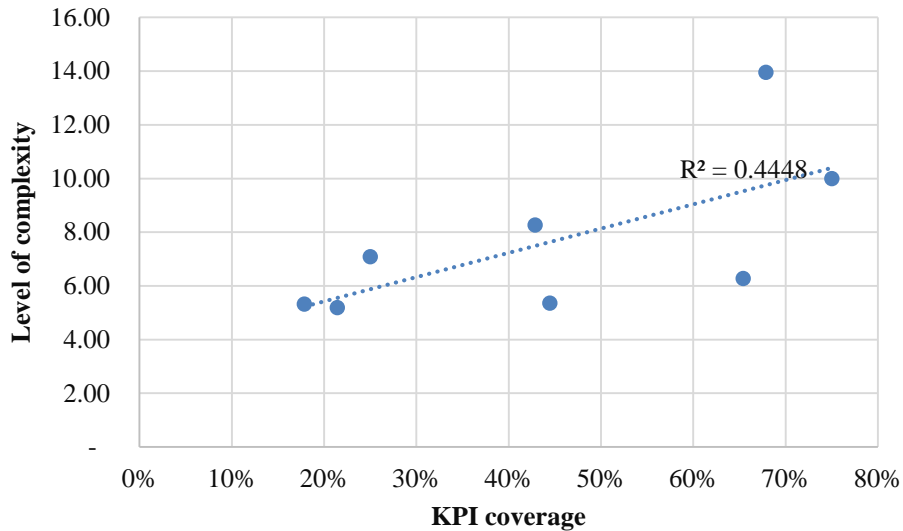


Figure 19: KPI coverage versus complexity

6.3 Results

The results discussed in this section were incorporated into the KPI matrix in Appendix D, where the method of calculation and the appropriate circumstance for implementation is shown.

6.3.1 KPIs aligning the LSP with the customer

It is imperative that the LSP be aligned with the customer's objectives. These objectives centre on generating profitable sales from existing end-customers and new end-customers. It is thus very important that end-customer expectations be met, a good first impression is made and that the end-customer is satisfied when it receives the product. KPIs which show the customer that the LSP is aligned with its objectives include adaptability (the extent to which the LSP can adapt to changing customer market conditions and deliver good service), end-customer care, proof of delivery (POD) document management, vehicle appearance, market growth and CO₂ emissions.

6.3.2 KPIs opposing customer behaviour

Customers should ensure that operations stay compliant to legislation and product quality. LSPs often accommodate all the customer's needs in an effort to impress the customer. It is the customer's responsibility that these needs never require the LSP to operate outside of legislation. The customer must further ensure that products handed over to the LSP meet all the necessary quality standards and that the packaging material can withstand the handling within the distribution network.

Customer sales teams often create certain expectations with the end-customer without consulting with the LSP or without considering the cost impact that these special requirements create. After-hour deliveries require warehouse staff to pick and load orders later than the norm and overtime is also incurred on the secondary distribution vehicles. Therefore, KPIs such as exception management and order rule adherence (Appendix D) will measure how well the customer adhered to the order cut-off times and nominated day of delivery (NDD).

Customer volume should be measured on a monthly basis since *unit rate contracts* heavily rely on activity generated by the customer for revenue. *Fixed and variable costs models* are required to show that the resources dedicated to the customer are fully utilised. Both LSPs thus rely on the customer to produce the targeted volumes upon which assumptions regarding rates are made.

LSPs using *unit rate contracts* should further ensure that customers are measured against stock availability to reach targeted volumes and thus revenue for the LSP. Kilometre per ton payload to reduce small volume deliveries in outlying areas; payload per vehicle to reduce volume spikes and smooth resource requirements.

6.3.3 KPIs opposing LSP behaviour

KPIs such as financial stability, stock losses, in-full delivery, on-time delivery and delivery window adherence should be used to manage LSP behaviour, regardless of the cost model type in use. Reducing waste and improving the end-customer's experience are directly related to the customer's objectives.

LSPs using *fixed and variable costs models* should be measured against the percentage cost saving shown, overall cost of operating, and kilometres travelled to oppose vendor opportunism.

Integrated vendors should be measured against resource availability to ensure that resources are not assigned to the most profitable customer in high-demand periods.

6.3.4 Mutual KPIs

Mutual KPIs drive both LSP and customer behaviour to improve efficiencies and reduce cost. Mutual KPIs include the following:

- Planning – the customer ensures demand planning and forecasting accuracy and therefore product availability, and the LSP ensures daily optimal logistics plans to execute.
- Stock returns – customers drive to reduce good stock returns due to uncontrolled ordering and the LSP drives down damages to stock in transit.
- Additional resource requirements – measured by the number of additional resources employed on a temporary basis. This requirement arises due to customer inefficiencies upstream in the supply chain, impacting on LSP resource utilisation.. The LSP should also focus on reducing inefficiencies within operations that do not promote higher existing resource utilisation.
- Vehicle turnaround time – customers should leverage their relationship with retail buyers to ensure that vehicles are not held up at end-customer backdoors. LSP improves its processes to ensure that minimum time is spent at the backdoor picking stock from the vehicle.

6.3.5 Value-adding KPIs

Value-adding KPIs are those that should be reviewed over a longer period of time and are the result of LSP performance above the norm. These KPIs include innovation, reliability, flow of information, facility customisation and facility management. Although it might be complicated to quantify some of these KPIs, it is still important to bring these measures to the customer's attention before the customer asks for it. It is imperative that the LSP periodically show the value it added to the customer.

6.4 Concluding remarks

The proposed solution provides customers and LSPs an opportunity to periodically monitor KPIs that oppose detrimental behaviour caused by the cost model in use. It further promotes behaviour that adds value towards the customer's goals and opposes the detrimental influence that the customer's behaviour might have on the LSP. The proposed solution takes cognisance of the fact that there exists complexities created by customer products, processes and networks, and that the logistics functions offered by the LSP play a critical role in which KPIs should be implemented.

The solution aims to extend the growth and maturity phase of the arrangement's life cycle by putting focus on the factors that promote and threaten the sustainability of the arrangement, thereby deferring the decline phase.

Chapter 7

A roadmap to a sustainable logistics outsourcing arrangement

7.1 Introduction

South African industries are increasingly dependent on the logistics industry. Whether it be the financial sector requiring a dedicated courier service, the mining sector seeking a customised solution for the transport of expensive abnormally sized mining equipment, a retailer in need of warehousing expertise or a manufacturer requiring a whole supply chain solution. There is always a need for sustainable logistics solutions.

Both the LSP and the customer entering into a logistics outsourcing arrangement are under pressure to perform in a challenging economy where fuel price hikes, labour unrest, electricity shortages and increasing competition threaten their existence.

Integrated vendor LSPs in South Africa are challenged by short contractual periods imposed by the procurement policies of large multinational corporations and the prospect of short-term savings when existing customers switch service providers. Return on investment is not achieved during such short contractual periods and therefore asset-light LSPs tend to resort to standardising their service offering, where the focus deviates from a specific customer to grouping customers to leverage economies of scale. Integrated vendor LSPs have accepted that there is no guarantee of customer loyalty after the contractual term has ended; therefore, the LSP has even more reason to make use of standardised offerings which will fit a wide array of customers and are easily interchangeable to adapt to the quick change of losing a customer.

The asset-based LSPs within South Africa are forced to be very selective when taking on customers to lock in a longer contractual period which validates the required investment. These LSPs tend to specialise in customised solutions for the selected customers and run the risk of reducing the market space within which they operate. Substantially longer contractual periods were observed in the industry questionnaire responses in the case of asset-based LSPs and the degree of customer loyalty seems to be much higher than that of integrated vendor LSPs. This is partly due to the dependency of the customer on the investment and infrastructure offered by the LSP, but also because of the relationship-focussed approach taken by the LSP. Customer and cultural fit is a factor when these LSPs take on new business, and can be developed or improved over time.

The customer is under immense pressure to reduce costs and show returns to investors. They turn to outsourcing as a solution, often for the prospect of short-term savings. The study showed that both parties, the customer and the LSP, are dependent on one another, but that conflicting objectives and mismanagement threaten the sustainability of such an arrangement.

The opportunity identified within this study is to structure the approach of both parties to the arrangement for the arrangement to be deemed successful. The traits of a successful logistics outsourcing arrangement are to ensure the sustainability of the arrangement; see to it that all parties meet expectations and achieve joint and own objectives; ensure a fair price; extend the duration of the contract as far as possible; and ensure that the arrangement ends amicably on termination. Sustainability in this case does not necessarily refer to elongating the contractual period but rather to ensuring that both parties remain productive and maintain a condition whereby the arrangement is mutually beneficial until the termination of the contract

at the end of the contractual period. Each party is provided guidance in achieving these objectives, which is incorporated into a roadmap targeting each objective per phase of the life cycle.

7.2 Achieving a sustainable arrangement

The section of the roadmap that will provide guidance to both parties in reaching the objective of achieving a sustainable arrangement in the South African context. It is shown in Table 15 and discussed in subsequent paragraphs following the procession of the life cycle.

Table 15: Logistics outsourcing roadmap: Achieving a sustainable outsourcing arrangement

Vision	Party	Initiation	Growth and maturity	Decline
Sustainable outsourcing arrangement	<i>Customer</i>	<ul style="list-style-type: none"> - Understand own core competency and competitive advantage - Improve the RFP process - Ensure management buy-in - Use proven insource versus outsource evaluation methods - Choose the right supplier type - Ensure LSP fit - Ensure that the LSP is not overpromising - Clearly communicate expectations 	<ul style="list-style-type: none"> - Understand complexity and expertise requirements needed to offer the logistics solution. - Clearly communicate expectations 	<ul style="list-style-type: none"> - Clearly communicate expectations
	<i>Joint</i>	<ul style="list-style-type: none"> - Assess any misalignment between customer expectations and LSP offering - Detailed scope of services - Continuous communication 	<ul style="list-style-type: none"> - Determine compromise on opposing objectives - Continuous communication 	<ul style="list-style-type: none"> - Continuous communication
	<i>Integrated vendor LSP</i>	None	None	None
	<i>Asset-based vendor LSP</i>	None	None	None
	<i>All LSP's</i>	<ul style="list-style-type: none"> - Customer fit - Manage customer expectations 	<ul style="list-style-type: none"> - Manage customer expectations 	<ul style="list-style-type: none"> - Manage customer expectations

7.2.1 The initiation phase

On the onset of the initiation phase of the outsourcing arrangement, the customer has to understand its own in-house capabilities to make an informed insource versus outsource decision. Table 15 indicates that the customer has to ensure that the logistics function in question does not form part of the companies' core competency before making the decision to outsource. This decision and supplier selection are done simultaneously. This process is facilitated by ensuring that the RFP process is refined and a proven method of decision making is used. RFPs require a high level of detail for an LSP to design a suitable solution, accurately assess the risk associated with the customer's business and provide a competitive

cost. The customer has to ensure management buy-in by proving that outsourcing does not form part of the company's core competency and that outsourcing will create a competitive advantage.

The evaluation criteria used in the method of decision making should include logistics costs, the associated risk, the company's long-term strategy, the service provider's fit, the degree of market growth and the service level requirement. Making use of a proven decision-making method, such as the methods evaluated in Chapter 5, the customer is able to compare alternatives on the same basis. If enough service providers take part in the RFP process, the customer will be able to identify those LSPs who are overpromising. Action can be taken to either exclude them from the exercise or request a review of the respective RFP response.

It is also imperative that the LSP ensure that the customer is a good fit to the existing services on offer and that the solution designed for the customer is profitable. Both LSP types were found to not take on a new customer, which requires a service outside the scope of services on offer. The LSP will, however, extend its repertoire by adding new services for existing customers. The initial risk of taking on a new customer and a new offering is too daunting and LSPs prefer to prove themselves to existing customers and then branch out. It is therefore imperative during this phase that both the customer and the LSP jointly agree on a detailed scope of services to prevent disappointment later in the life cycle.

The customer has to clearly communicate its expectations to the LSP by means of a detailed RFP. They should jointly assess any misalignment between the customer's expectations and the solution of the LSP. It is essential that both parties be honest during this process for the LSP to manage expectations going forward and to ensure that trust is built between the two parties. It is also the responsibility of both parties to communicate, should the requirements or service offering deviate from the originally agreed requirements.

7.2.2 Growth and maturity

The sustainability of the arrangement can be fostered during the growth and maturity phase by ensuring continuous communication between both parties to ensure that expectations are met. It is during this phase that the customer should understand the complexity and expertise required to operate the logistics solution. If the customer understands the complexity and how it influences the efficiency of the solution, corrective action can be taken to ensure that detrimental behaviour is reduced. An example would be the effect that a sales team has on an outsourced warehousing and distribution operation; at the end of the month the sales team tends to push sales to reach a certain budget target. This creates a massive spike towards the end of the month to which the LSP has to quickly react by adding resources and incurring costs to uphold service levels. The party that is impacted the most depends on the cost model, but it is often the customer who suffers the blow. If the sales team continually communicates its strategy to the LSP before the end of the month, the LSP will have some time to source cheaper resources or pull standing orders forward.

7.2.3 The decline

It is still important for both parties to continuously communicate expectations during the decline phase. The objective of a successful outsourcing arrangement is to ensure that a certain condition is maintained by both parties throughout the life cycle. Thus, even during the ramp-down of an arrangement both parties should be treated fairly and not experience unnecessary damage.

7.3 Meeting expectations and objectives

Table 16 details the guidelines which the LSP and customer can use to meet both parties' expectations and objectives. Even though not all expectations and objectives can be met, a compromise can be reached and trust is built in the process.

Table 16: Logistics outsourcing roadmap: Meeting expectations and objections

Vision	Party	Initiation	Growth and maturity	Decline
All parties meet expectations by achieving joint and own objectives	<i>Customer</i>	None	None	None
	<i>Joint</i>		<ul style="list-style-type: none"> - Compare customer objectives versus the LSP offering - Establish shared goals - Established KPIs and an incentive mechanism governing behaviour - Determine a compromise on opposing behaviour 	None
	<i>Integrated vendor LSP</i>	None	<ul style="list-style-type: none"> - Information sharing - Customer market expansion 	None
	<i>Asset-based vendor LSP</i>	None	None	None
	<i>All LSP's</i>	<ul style="list-style-type: none"> - Understand which LSP capabilities are required by the customer - Quick, seamless implementation - Determine customer perception of value - Establish a good cost or service level trade-off 	<ul style="list-style-type: none"> - Understand customer cost drivers - Create more value than customer can in-house - Create value for customer by subcontracting, proper customer integration, lean operations, supply chain integration - Report effectively on value created - Translate value-added to financial benefits - Establish good cost/service trade-off - Increase the number of outsourced activities 	None

7.3.1 The initiation phase

Once the customer has selected an LSP and established that the LSP has the ability to meet its expectations, it is important to understand whether the customer's objectives and that of the LSP are aligned. Whether the LSP has the ability to meet customer expectations is not enough, as it is the LSP's objectives that drive its behaviour. Both parties have to compare objectives and determine the degree of alignment. The cost model plays a major role in this case since it is the biggest motivator for the LSP's behaviour. Should an integrated vendor experience high levels of activity from customers, it will divert resources to the most profitable customers. The customer has to ensure that it understand the cost model to oppose vendor opportunism.

Once the contract negotiations and investment assessments have been completed, a legal agreement is signed and the onus now lies with the LSP to execute a quick and seamless implementation. This acts as a first impression of the LSP's abilities and a lot of trust can be built during this step if done correctly.

As the operation ramps up, the LSP has to determine the customer's perception of value and which capabilities are the most important to the customer. There is, for example, no use in showing a customer how green an operation is when the customer's focus is on cost, or in investing in a capability that is not of importance to the customer. This can be achieved by frequent communication with the customer and periodic performance reviews reflecting on the implementation as well as starting performance.

The initiation phase gives the LSP a good opportunity to establish the standard against which it should be measured. It is therefore important to establish a good cost or service level trade-off. Making the customer aware of the cost implications of achieving very high service levels is important. Since additional costs are incurred to serve late orders and special or emergency deliveries, which often require additional resources and incur overtime costs.

7.3.2 The growth and maturity phase

After implementation, both parties should lay down the facts regarding their objectives. Jointly aligned and opposing objectives should be established and a compromise should be determined for opposing objectives. Gain-sharing incentives are a good mechanism for establishing a middle ground for opposing objectives.

An example would be the secondary distribution offering to a retail group mentioned earlier in the study.

The parties should jointly agree on a set of KPIs and incentive mechanisms to drive behaviour to reach joint and own objectives. The KPI matrix developed in Chapter 6 can be employed by both the parties in the arrangement to ensure that the appropriate KPIs are employed. KPIs should be selected based on the type of cost model in use, the services on offer and the value that the LSP creates. These KPIs should be reviewed periodically based on the rate of change of the underlying variable. Thus, if cost reduction is a KPI, it should be measured monthly, whereas plan adherence should be measured daily.

The customers of integrated vendor LSPs often acquire the services of such LSP types to expand the customer base. An integrated vendor should ensure that frequent information sharing be established and that the market expansion is tracked by KPIs and brought under the attention of the customer. All LSP types should understand customer cost drivers and the perception of value. Focus should be given to reduce cost where it has the maximum impact and create more value than the customer can create in-house. Value can be created by soliciting the services of sub-contractors to reduce cost, encourage proper customer integration, and establish lean operations.

Once the LSP has determined what the value perception of the customer is, it should ensure that reporting effectively displays the value created, accentuating the above average performance and bringing it to the attention of the customer. The most effective method of this type of reporting is to translate any value added into financial benefits. The customers of both LSP types reported reduced cost as the most important reason for outsourcing. The LSP should aim to show as much value added as possible outside of its scope of services to add more outsourcing activities to its repertoire and grow along the customer's supply chain.

By establishing clear objectives, measuring the performance of both parties periodically and incentivising a compromise, both parties can work towards achieving these goals and meeting expectations.

7.4 Ensuring a fair price

A basic expectation within any transaction is that a fair price can be agreed upon. Table 17 lists the items that are key in ensuring that a fair price is agreed upon.

Table 17: Logistics outsourcing roadmap: Ensuring a fair price

Vision	Party	Initiation	Growth and maturity	Decline
Fair price	<i>Customer</i>	- Refine RFP document and process by including the right amount of detail	None	None
	<i>Joint</i>	- Clear uncompromising cost model - Opportunity mutually beneficial	None	None
	<i>Asset-based vendor</i>	- Highly complex customised solutions, consider a partnership.	None	None
	<i>Integrated vendor LSP</i>	None	None	None
	<i>All LSPs</i>	None	None	None

A successful outsourcing arrangement is mutually beneficial to both parties. It is important to jointly establish a clear uncompromising cost model. By refining the RFP process, the customer gives the LSP the opportunity to present such a solution. Making use of a proven decision-making method, such as decision trees, the customer can fully understand the risk associated with each solution presented and compare the results. Thus both parties get a fair opportunity to evaluate the cost and risks associated with the arrangement and put any concerns on the table before the agreement is signed.

Factors listed by Rese [30] in Section 2.4.2 suggest that in the case of asset-based vendors that provide highly customised solutions with a high level of investment, a partnership with the customer should be considered.

7.5 Extended duration

Even though the integrated vendor LSP has geared itself to deal with short contractual periods, it is still beneficial for the LSP to extend the contractual period as far as possible. Table 18 shows the guidelines for both the LSP and customer which will help achieve the objective of extending the contractual period.

Table 18: Logistics outsourcing roadmap: Extending duration

Vision	Party	Initiation	Growth and maturity	Decline
Extend	<i>Customer</i>	- None	- None	None

	<i>Joint</i>	<ul style="list-style-type: none"> - Prepare customer for real cost of outsourcing 	<ul style="list-style-type: none"> - None 	None
	<i>Asset-based vendor LSP</i>	<ul style="list-style-type: none"> - Ensure investment and capability not easily imitated - Assess customer cultural fit - Implement customised solutions - Management relationship 	<ul style="list-style-type: none"> - Ensure customer focus - Management relationship - Establish bonds 	None
	<i>Integrated vendor LSP</i>	<ul style="list-style-type: none"> - None 	<ul style="list-style-type: none"> - None 	None
	<i>All LSPs</i>	<ul style="list-style-type: none"> - None 	<ul style="list-style-type: none"> - Continual adaption and innovation - IT integration to establish flow of information needed for supply chain integration 	None

Though the procurement policies of the customer dictate the duration of the arrangement, it is always easier to sell more to an existing customer than to sell to a new customer. It would therefore be beneficial to both LSP types if the duration of the arrangement could be extended. Asset-based vendors can ensure that the investment and capability required for the solution are not easily imitated, therefore increasing its competitive advantage. Furthermore, it should assess the customer cultural fit on the onset of the arrangement and management of both parties should be compatible. This is especially true in the case of a partnership.

The asset-based vendor should ensure that a customer-focused approach is taken throughout the life cycle of the arrangement and should aim to create as many bonds as possible with the customer. This includes social bonds, legal bonds and various IT and administrative bonds.

All LSPs should continually adapt and come up with innovative solutions to improve the customer's supply chain. IT integration gives the LSP the opportunity to establish the flow of information needed for supply chain integration and provide the LSP with the opportunity to grow along the customer's supply chain.

7.6 Amicable termination

Table 19 provides guidelines to ensure that the arrangement ends amicably when the contractual period is reached.

Table 19: Logistics outsourcing roadmap: Ensuring an amicable termination of the arrangement

Visio n	Party	Initiation	Growth and maturity	Decline
Ends amicably	<i>Customer</i>	- None	None	- None
	<i>Joint</i>	<ul style="list-style-type: none"> - Ensure an unbiased contract by adding implicit and explicit contracts - Recognise that no contract is perpetual, provide for disillusion - Include clauses for termination 	None	- Apply clauses for termination
	<i>Asset-based vendor LSP</i>	- None	None	- None
	<i>Integrated vendor LSP</i>	- None	None	- None
	<i>All LSPs</i>	- Understand customer procurement policies	None	<ul style="list-style-type: none"> - Ramp operations down - Reassign resources to alternative operations

Short contractual periods present themselves as three-year cycles where, on termination, a large multi-national corporation will procure the services of another LSP. For the LSP to stay competitive and improve its chances of being awarded the contract in the future, it has to ensure that the arrangement ends amicably.

The parties have to recognise that no contract is perpetual. The LSP has to be familiar with the customer's procurement policies and provide for disillusion by including termination clauses into the contract. These clauses deal with the ramp-down of the operations and any joint property that might exist between the parties. Once the contractual period has ended or another cause of termination comes into play, the termination clauses should be applied and the LSP should ramp-down the operation and reassign resources to alternative operations in a phased approach as the customer exists.

7.7 Concluding remarks

Should one perform a post-mortem analysis on an unsuccessful logistics outsourcing arrangement and trace the cause of the termination back to the source, one could learn from the mistakes made and probably do things differently when the next opportunity presents itself. Unfortunately, businesses do not always have second chances and a solution is required to guide LSPs and customers through the best practices associated with logistics outsourcing.

This study addresses the need to better understand what constitutes a successful logistics outsourcing arrangement in the South African context and the steps required to achieve this. The objective of the study was therefore to determine the characteristics of a successful logistics outsourcing arrangement and the approach to keep it successful within a South African context. To achieve this, the outsourcing arrangement was viewed from a life cycle perspective and classified into three phases for closer investigation – namely, the initiation, growth and maturity, and decline phases. Each phase was studied in detail to determine which factors within each phase influenced the success of the arrangement. The results from the detailed studies of each life cycle were collated into a framework which guides the customer and LSP through the life cycle of the arrangement to ensure that the arrangement is successful. The framework addresses the main research objective in that it combines best practices and characteristics of a successful outsourcing arrangement and offers an approach for both parties to keep the arrangement successful.

To determine the characteristics of a successful outsourcing arrangement within each phase of the life cycle and ultimately to develop the framework, a range of secondary research objectives were achieved. Industry questionnaires were distributed to identify the characteristics of typical logistics arrangements in South Africa within the context of the logistics outsourcing life cycle, to understand both the customer and LSP perspectives of the life cycle and draw a comparison between the two. Various insource versus outsource decision-making methods were applied to a South African case study to identify opportunities where a logistics outsourcing arrangement would be mutually beneficial. It was discovered that the decision to outsource should be revisited periodically and that the decision tree method provided the most information for the decision maker to take into account. The questionnaire results, industry interviews and case studies of existing logistics outsourcing arrangements were used to gain insight into the factors that contribute to the sustainability of a logistics outsourcing arrangement. These factors were combined into a KPI matrix and tested against eight industry case studies to determine whether it would be a practical tool to manage the logistics outsourcing arrangement within the life cycle.

The research problem could be addressed as follows:

The characteristics of a successful logistics outsourcing arrangement is to ensure the sustainability of the arrangement; see to it that all parties meet expectations and achieve joint and own objectives; ensure a fair price; extend the duration of the contract as far as possible; and ensure that the arrangement ends amicably on termination.

The steps to achieve a successful outsourcing arrangement are structured in the framework discussed in sections 7.1 to 7.6.

A shortcoming of the study is that the framework has not practically been applied and tested within the industry. The duration of such a study would take a minimum of three years, the duration of the typical logistics outsourcing contract. It would require the involvement of a willing industry partner and a full-time objective evaluation of the relationship. Future research should look at alternative LSP costing models that will ensure better alignment of both parties within the arrangement.

To the best of the author's knowledge, this framework is the first that combines logistics outsourcing best practices with logistics solutions developed and tested in a South African context. It provides guidance to LSPs and customers in achieving the objectives of a modern-day outsourcing arrangement.

Additional contributions of this study include the South African logistics outsourcing trends identified in the customer and LSP questionnaires, the application of proven decision-making methods in the context of logistics outsourcing and the application of appropriate performance measures using the KPI matrix developed. The study therefore makes a significant contribution to the fields of logistics service procurement and logistics management.

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Appendix A

Ethics approval



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Reference number: EBIT/08/2014

1 April 2014

Miss N Bloem
PO Box 70342
Die Wilgers
0041

Dear Miss Bloem,

FACULTY COMMITTEE FOR RESEARCH ETHICS AND INTEGRITY

Your recent application to the EBIT Ethics Committee refers.

- 1 I hereby wish to inform you that the research project titled "The life cycle of third party logistics arrangements" has been approved by the Committee.

This approval does not imply that the researcher, student or lecturer is relieved of any accountability in terms of the Codes of Research Ethics of the University of Pretoria, if action is taken beyond the approved proposal.

- 2 According to the regulations, any relevant problem arising from the study or research methodology as well as any amendments or changes, must be brought to the attention of any member of the Faculty Committee who will deal with the matter.
- 3 The Committee must be notified on completion of the project.

The Committee wishes you every success with the research project.



Prof. J.J. Hanekom

Chair, Faculty Committee for Research Ethics and Integrity
FACULTY OF ENGINEERING, BUILT ENVIRONMENT AND INFORMATION
TECHNOLOGY

Appendix B

Customer and LSP questionnaires

Logistics Outsourcing in South Africa

A study to determine current industry practises

This is a survey designed to determine the current industry practises concerning outsourcing of logistics services in South Africa. The survey has been designed and validated by researchers from the University of Pretoria.

Participation is on a voluntary basis and you can withdraw at any stage. The survey is anonymous and confidential, you are only requested to provide your contact details if you would like to participate in further follow up interviews.

1. Company name

2. Job title

3. Please select the best fit description that matches your company pertaining to logistics.

Logistics Outsourcing in South Africa

The customer

The questions below relate to logistics services used by the logistics "customer". The "customer" refers to any retail-, manufacturing, fast moving consumer goods producer etc. which makes use of a logistics service provider for services such as warehousing, secondary distribution, long haul transport etc.

4. Please select the industry that your company belongs to.

- Forestry and fishing
- Mining and quarrying
- Manufacturing (Food, beverages, fuel etc.)
- Electricity, gas and water supply
- Construction
- Trade (Wholesale, retail etc.)
- Transport, storage and communication
- Activities auxiliary to financial intermediation, real estate and other business services
- Community, social and personal services

5. Does logistics form part of the company's core competency?

6. Are any of the following part of the company's competitive advantage?

- Extensive customer footprint and market penetration
- High customer service levels
- Low cost operations
- Product distribution and availability

7. What product complexities are presented by the company logistics network?

- High value product
- Perishable product
- Flammable product
- Hazardous product
- Specialized material handling equipment needed for handling
- Fragile product
- Commodity item
- Environmental requirements (Dry, cool etc.)

8. What process complexities are presented by the company's logistics network?

- Inbound and outbound logistics
- Reverse logistics
- Specialized freight
- Imported parts
- Quality inspections
- Law & regulations
- Time sensitivity (Product has to reach its' end destination in a very short time span due to cost to other operations or the perishable nature of product.)

9. What network complexities are presented by the company's logistics network?

- Geographical location of facilities and customers (National or international footprint)
- Multi modal transport (e.g. road, sea and rail)
- Proximity to the market
- Trading partners in South Africa
- Multiple trading countries

10. How many logistics service providers does the company make use of?

11. Has the company ever performed currently outsourced logistics functions in-house?

- Yes
- No

12. Please indicate which of the following functions are outsourced to a logistics service provider?

- Primary logistics, long haul transport
- Warehousing (Excluding factory warehousing)
- Inventory management
- Order processing
- Secondary distribution (Transport from warehousing facility to customer)
- Reverse logistics
- Shipment tracking
- Sales and telesales
- In store merchandising

Please answer the following questions based on the company's main logistics service provider which requires the most management involvement.

13. Rate the logistics service provider capabilities.

	Critical for business	Important	Not important
Technical expertise	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Geographical presence	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Advanced technological capabilities (e.g. Automated racking, warehouse management systems, Transport)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Economies of scale	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flexibility to adapt to changing market conditions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Infrastructure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Advanced analytical abilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Customized solutions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Low cost operations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Agility in meeting expectations on short notice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Project management capabilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Advanced inventory management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Financially stable service provider	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

14. Please rate the reasons for outsourcing.

	Most relevant	Medium relevancy	No relevance
The function doesn't form part of the company's core competency	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Weak in-house capabilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduced cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduced risk	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increased market penetration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improved IT capabilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to improved information management and analytics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improved supply chain management capabilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of the service in the market	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strategic purposes: Long term growth	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improved service levels	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduced supply chain complexity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to global networks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The level of investment required in order to create in-house capabilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Service provider financial stability and business model	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Service provider fit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The degree of outsourcing (2pl- 4pl)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

15. What is the duration of the relationship with the logistics service provider? (Years)

16. What is the level of satisfaction with the service provider?

- Exceeds expectations
- Meets expectations
- Totally dissatisfied

17. Which of the following adaptations/ investments has the company made to accommodate the service provider?

- IT integration
- Expertise development with the service provider, thus people development
- Infrastructure build such as warehouses
- Resources such as vehicles, material handling equipment and packaging equipment
- Supply chain changes such as changes in packaging size etc.
- Process changes such as batch sizes, lead times etc.
- Product changes such as changes to ensure the safety of staff when handling product
- Network changes such as direct ex factory loads versus warehouse combinations
- IT system changes or new IT investments

18. List the 3 most important key performance indicators used to govern the relationship

KPI 1

KPI 2

KPI 3

19. How often does the company review KPI's with the service provider?

- Annually
- Quarterly
- Monthly
- Weekly
- Daily

20. Please indicate the type of cost model used.

- Unit rate cost model
- Fixed and variable cost model
- Open book cost model
- Cost plus cost model
- % of sales value cost model
- Other (please specify)

21. Which of the following links exist between the company and the service provider?

- Information transfer through advanced IT
- Social processes (Example: sharing a meal, playing golf etc.)
- Shared administration (Invoicing, credit control, returns management)
- A formal legal agreement
- Inter-organizational ties (shared resources such as project manager between the two companies)
- Shared property (Physical and intellectual)

22. Which of the following items are covered in the formal legal agreement?

- Key performance indicators
- Termination date
- Service specifications
- Training plans
- Informal exchange
- Capital investments
- Responsibility toward existing personnel
- Responsibility regarding equipment
- Responsibility regarding the company's property
- Any adaption procedures (changes made to accomodate both parties)
- Termination process (notice period and renewal process)
- Termination consequences (property rights, disposition of assets)

23. Are there any functions/ items that have fallen back under the responsibility of the organization since the agreement was signed. Please specify.

24. Is the management team of the company committed to building a long term relationship with the service provider?

- Yes
- No

25. Should the company reflect on it's own logistics capabilities to possibly insource, rate the company's internal capabilities.

	Excellent capabilities	Acceptable capabilities	Capabilities can easily be developed	No capability exists without large investment
Cost of logistics activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Risk mitigation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technological advancement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Personnel expertise	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Process capability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Market footprint	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Service levels	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Leveraging economies of scale	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Operational efficiency	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Value created by logistics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

26. If you wish to make yourself available for possible follow up questions in the form of email or interviews, please provide your contact details and preferred medium of communication.

Logistics Outsourcing in South Africa

The logistics service provider

The questions below relates to logistics services offered to a customer. In this page the "service provider" refers to the logistics company offering the logistics service such as warehousing, long haul transport, secondary distribution and the "customer" refers to any retail, manufacturing, fast moving consumer goods producer etc. which requires these services. Please base the answers to the questions below on the company's largest customer.

27. What type of service provider is the company?

- Asset based service provider (Dedicated logistics services such as long haul services)
- Management based service provider (Logistics management services)
- Integrated vendor (Own assets, multiple customers combined)
- Administration based vendors (Admin management services such as freight forwarding)
- Other (please specify)

28. Please indicate the industry of the company's main customer.

- Forestry and fishing
- Mining and quarrying
- Manufacturing (Food, beverages, fuel etc.)
- Electricity, gas and water supply
- Construction
- Trade (Wholesale, retail etc.)
- Transport, storage and communication
- Activities auxiliary to financial intermediation, real estate and other business services
- Community, social and personal services

29. Which of the following services are offered to customers?

- Warehousing
- Inventory management
- Order processing
- Secondary distribution
- Reverse logistics
- Shipment tracking
- Sales and telesales
- In store merchandising
- Customer services
- Other (please specify)

30. Is serving the customer profitable?

- Yes
- No

31. Rank the relevancy of the following capabilities required to properly serve the customer:

	Most relevant	Medium relevancy	No relevance
Technical expertise	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Extensive distribution footprint (The number of delivery points currently served)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Advanced technological capabilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Economies of scale	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flexibility to adapt to changing market conditions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Infrastructure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Advanced analytical abilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Customized solutions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Low operations cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Agility in meeting expectations on short notice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Project management capabilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Advanced inventory management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sustainable business model	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Resource availability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

32. Which of the following adaptations/ investments has the company made to accommodate customers?

- IT integration
- Expertise development
- Infrastructure such as warehouses
- Resources such as vehicles, material handling equipment and packaging equipment
- Supply chain changes such as changes to accommodate pack sizes?
- Process changes to accommodate customer batch sizes, lead times etc.
- Change/ investments to ensure the safety of staff when handling product
- Network changes, such as changes to normal service delivery to accommodate new route to market strategies
- IT system changes or investments
- Other (please specify)

33. What is the duration of the relationship with the customer? (Years)

34. Rank the relevance of the following elements that make part of the decision to take on a new customer?

	Most relevant	Medium relevancy	No relevance
The fit to existing services offered to existing customers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The level of solution customization needed to accomodate the customer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Additional investment required to accomodate the customer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Complexities of the solution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The customer's objectives in outsourcing such as cost reduction or service level improvement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The profitability of serving the customer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The risks associated with serving the customer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The geographical locations of the end customers/ delivery points	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

35. How was the business aquired?

- Formal tendering process
 Referral
 Industry leaders
 Legacy appointment

36. List 3 key performance measures which govern the customer in the arrangement

KPI 1

KPI 2

KPI 3

37. Is there a form of risk/ gain sharing implemented in the case of the following items?

	Risk/ gain sharing	No risk or gain sharing
Cost savings by means of efficient operations	<input type="radio"/>	<input type="radio"/>
The effect of load shedding	<input type="radio"/>	<input type="radio"/>
The impact of labour strikes	<input type="radio"/>	<input type="radio"/>
Harsh weather conditions impacting operations	<input type="radio"/>	<input type="radio"/>
Market fluctuations	<input type="radio"/>	<input type="radio"/>
Sales force inefficiencies driving logistics cost	<input type="radio"/>	<input type="radio"/>
Special requirements/ emergency requirements from logistics services	<input type="radio"/>	<input type="radio"/>

38. Are there any joint efforts with the customer to develop further or improve the following:

- Market share
- Reduced logistics cost
- Reduced mutual inefficiencies
- Improved service delivery
- Improve communication
- Implement information technology to improve process and reduce cost
- Other (please specify)

39. Does the company make use of sub contractors in order to provide a less expensive service?

40. What are the main reasons that arrangements with customers are terminated?

- Competition
- Lack of shared goals
- Communication
- Vendor exploitation
- Cost
- Level of dependency on the service provider which leaves the customer vulnerable should the service provider exit the agreement
- Levels of required investment
- Service levels
- IT capabilities
- Demands to adapt to market changes
- Client expectations
- Relationship issues
- Sales team requirements

41. If you wish to make yourself available for possible follow up questions in the form of email or interviews, please provide your contact details below.

Appendix C

Detail of the eight case studies

Table 20 Case study detail of KPIs

#	Industry	Type of vendor	Cost model	Logistics functions outsourced	Current KPIs		Complexities
1	FMCG	Integrated vendor	Hybrid: Unit rate & Fixed & variable	<ul style="list-style-type: none"> - Primary transport - Warehousing - Secondary distribution 	<ul style="list-style-type: none"> - Backdoor issues - CO² emissions - Cost - Good stock returns - Monthly savings - On time percentage - Order fill percentage - Pick accuracy - POD management 	<ul style="list-style-type: none"> - Quality of product - Cost per kg - Damaged goods returns percentage - Safety: # of incidents - Short loaded/ delivered orders - Stock accuracy - Vehicle turn-around times 	<ul style="list-style-type: none"> - Perishable product. - National distribution from a single production facility. - Quarantine periods apply to product.
2	FMCG	Asset-based vendor	Unit rate	<ul style="list-style-type: none"> - Warehousing - Secondary distribution 	<ul style="list-style-type: none"> - Inbound volume - Stock accuracy - Warehouse utilization - Orders placed 	<ul style="list-style-type: none"> - On-time despatch - In-full delivery - On-time delivery - POD management 	<ul style="list-style-type: none"> - Kitting process in the warehouse - Product shelf life short - Unknown number of delivery locations
3	FMCG	Asset-based vendor	Fixed & variable	<ul style="list-style-type: none"> - Secondary distribution - Shipment tracking & planning 	<ul style="list-style-type: none"> - Cost per unit - On-time delivery - Late documents 	<ul style="list-style-type: none"> - Damages & shortages - Late reporting 	<ul style="list-style-type: none"> - Perishable product
4	FMCG	Integrated vendor	Unit rate	<ul style="list-style-type: none"> - Secondary distribution - Shipment tracking & planning 	<ul style="list-style-type: none"> - Depot departure times - NDD adherence - Vehicle turn-around times - Returns % - Drops/ vehicle/ day - Kilometres travelled 	<ul style="list-style-type: none"> - Redeliveries - Cost per ton - Drop size - Adherence to order cut off times - Emergency orders 	<ul style="list-style-type: none"> - Geographic location - Product basket size
5	Construction industry: Glass	Asset-based vendor	Fixed & variable	<ul style="list-style-type: none"> - Secondary distribution 	<ul style="list-style-type: none"> - Cost - Cost of additional resources - Kilometres 	<ul style="list-style-type: none"> - Volume moved - Resource utilisation 	<ul style="list-style-type: none"> - Breakable product - Legislation on glass handling - High safety standards - Delivery locations vary as building sites changes

6	Mining	Asset-based vendor	Fixed & variable	- Secondary distribution	<ul style="list-style-type: none"> - Despatch time adherence - Stock accuracy - Supply of collection documentation - POD management - Redeliveries - Customer complaints - Vehicle availability 	<ul style="list-style-type: none"> - Vehicle TAT - Resource availability - Adaptability - Vehicle appearance - Cost - Stock availability - On time delivery - In full delivery 	<ul style="list-style-type: none"> - High value goods - Emergency orders - Delivery locations - Legislation
7	Construction Industry: Concrete and cement	Asset-based vendor	Fixed & variable	<ul style="list-style-type: none"> - Secondary distribution - Shipment tracking & planning 	<ul style="list-style-type: none"> - Resource utilisation - Volume - Kilometres - Redeliveries - On-time delivery - POD management - Accuracy of reporting - Plan adherence - TAT - Adaptability 	<ul style="list-style-type: none"> - Accommodation of emergency orders - Pallets collected per trip - Stock losses/ damages - Response time - Condition of vehicles - Conduct of staff - Communication of incidents - Cost 	<ul style="list-style-type: none"> - Commoditised product - Emergency orders - Delivery locations
8	Construction: Building components	Asset-based vendor	Fixed & variable	- Secondary distribution	<ul style="list-style-type: none"> - Adherence to order process - Product availability - On time picking & accuracy - Plan adjustment percentage - Minimum order quantity - Resource utilisation 	<ul style="list-style-type: none"> - Redeliveries - Customer complaints - POD management - Housekeeping - Cost - Vehicle departure time 	<ul style="list-style-type: none"> - Fragile product - Delivery locations

Appendix D

KPI matrix

Table 21 KPI Matrix

Vendor type		Asset-based Vendor						Integrated vendors							
Services		Secondary distribution		Warehousing		Primary Transport		Secondary distribution		Warehousing		Primary Transport			
Objective	Cost model/ Rate structure	Proposed equation		F&V	Unit rate	F&V	Unit rate	F&V	Unit rate	F&V	Unit rate	F&V	Unit rate		
LSP align to customer objectives	Adaptability	<i>Standard deviation of daily activity</i>		M	M	M	M			D	D	M	M		
	CO2 emissions	$Fuel\ consumption\ \left(\frac{l}{100km}\right) \times 2640\ \left(\frac{g}{l}\right) = g\ CO2/liter$		M	M			M	M	M	M			M	M
	POD management	<i># of outstanding POD's</i>		M	M			M	M	M	M			M	M
	Vehicle appearance	<i>End customer survey feedback</i>		B	B			B	B	B	B			B	B
	Customer care	<i>End customer survey feedback</i>		B	B			B	B	B	B				
	Market growth	<i># of end customers added</i>										A			
Oppose bad behaviour	Compliant to legislation	<i>Audit results</i>		A	A	A	A	A	A	A	A	A	A	A	A
	Product quality	<i># of products rejected due to quality</i>		M	M	M	M	M	M	M	M	M	M	M	M
	Volume moved	$\sum Daily\ volumes$		M	M	M	M	M	M	M	M	M	M	M	M
	Exception management	<i># of special requests completed</i>		M	M	M	M			M	M	M	M		

Good stock returns	$\sum \text{Volume returned}$	M	M	M	M			M	M	M	M		
Resource utilisation	$\frac{\text{Capacity used}}{\text{Available capacity}} \times 100$	M		M		M	M						
Order rule adherence (NOD & NDD)	$\frac{\# \text{ of deliveries out of NDD}}{\text{Total \# of deliveries}}$	M	M	M	M			M	M	M	M		
Stock availability	$\frac{(\text{Volume supplied} - \text{Short supplied volume})}{\text{Volume ordered}}$		M	M	M				M	M	M		
Kilometres per ton payload	$\frac{\sum \text{Total distance travelled}}{\text{Payload} \times \# \text{ of trips}}$		M			M	M		M			M	M
Average load size	$\frac{\sum \text{Volume moved}}{\# \text{ of trips}}$		M			M	M		M			M	M
Picking accuracy	$\frac{\text{Volume picked}}{\text{Available stock volume}}$	M	M	M	M			M	M	M	M		
Percentage cost saving	$\frac{\text{Savings}}{\text{Monthly total cost}}$	M		M		M	M	M		M		M	M
Cost	$\sum \text{Cost incurred}$	M		M		M	M	M		M		M	M
Financial stability	$Z - \text{score}$	A	A	A	A	A	A	A	A	A	A	A	A
Kilometres travelled	$\sum (\text{closing km} - \text{opening km})$	M	M			M	M	M		M		M	M
Resource availability	$\# \text{ of pallet spaces available}$			D		D	D	D	D	D		D	D
Stock losses	$\frac{\text{Volume stock lost}}{\text{Total throughput volume}}$	M	M	M	M	M	M	M	M	M	M		
In full deliveries	$\frac{\text{Volume delivered}}{\text{Volume ordered}}$	M	M			M	M	M	M			M	M

	On-time delivery		M	M			M	M	M	M			M	M
	Delivery window adherence	$\frac{\# \text{ of deliveries delivered on NDD}}{\text{Total number of deliveries} - \text{special deliveries}}$	M	M			M	M	M	M			M	M
	Stock accuracy	$\frac{\text{System stock number}}{\text{Actual stock on hand}}$		M	M	M				M	M	M		
	Planning	$\frac{\text{Actual volume executed}}{\text{Planned volume}}$	D	D	M	M			M	M	M	M	M	M
	Volume returns	$\frac{\text{Good stock returned volume}}{\text{Total volume delivered}}$	M	M	M	M			M	M				
	Additional resource requirements	$\frac{\text{Cost of additional resources used}}{\text{Volume throughput}}$	M		M		M	M						
	Vehicle turn-around time	$\frac{\sum \text{Vehicle standing time at customer backdoors}}{\# \text{ of deliveries}}$	M	M			M	M					M	M
Value added	Innovation	<i>Savings achieved by means of innovations</i>	Q	Q	Q	Q	Q	Q	M		Q	Q	Q	Q
	Reliability	$\frac{\sum \text{If (And(delivery in full, delivery on time), 1,0)}}{\text{Total number of deliveries}}$	M	M	M	M	M	M	M	M	M	M	M	M
	Flow of information	<i># of daily reports not completed</i>	D	D	M	M			M	M	M	M		
	Facility customisation	<i># of resources deicated to the customer</i>			A	A								
	Facility management	<i>Audit results on housekeeping</i>			M	M								

