# AN ANALYSIS OF SOUTH AFRICAN AUTOMOTIVE SUPPLIER PARKS FROM A SUPPLY CHAIN PERSPECTIVE WITH SPECIFIC REFERENCE TO THE ROSSLYN AUTOMOTIVE SUPPLIER PARK

by


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# Declaration

This thesis, unless specifically indicated to the contrary in the text, is my own original work. It has not been submitted for examination to, nor am I registered with any university other than the University of Johannesburg.

Anton C. Nieuwoudt

# Acknowledgements

Foremost, I wish to acknowledge the awesome power and divine grace of Jesus Christ my Lord and Saviour through whom all this was made possible.

> ***'So trust in the Lord (commit yourself to Him, lean on Him, hope confidently in Him) forever; for the Lord God is an everlasting Rock.'***
>
> *- Isaiah 26:4*

My sincerest gratitude goes out to my wife Anneke and my daughter Mieka who have supported me with their love and continuous encouragement throughout this study. A special word of thanks also goes out to our parents, family and friends for their prayers and encouragement.

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***'If I have seen further, it is by standing on the shoulders of giants.'***

*- Sir Isaac Newton*

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# Synopsis

Within the automotive value chain, the relationships between the Original Equipment Manufacturer and its suppliers have changed considerably. The continued focus on core competence has led Original Equipment Manufacturers to foster relationships with their supply chain partners to support increased levels of outsourcing and modular production combined with Just-in-Time deliveries, ultimately leading to an increased demand for logistical coordination of manufacturing processes. Seen in this light, the supplier park allows the concentration of dedicated production, assembly, sequencing and warehousing facilities managed by suppliers or a third party in one location, or at least within close proximity to Original Equipment Manufacturers, in order to achieve synergies. The supplier park thus has the potential to improve the production environment and services, lower costs and exploit the latest advances and practices in the automotive manufacturing chain.

The purpose of this study is to assess the performance of the Rosslyn Automotive Supplier Park concept in terms of the realisation of the value proposition as communicated to its various stakeholders, from a supply chain perspective, and to expand the body of knowledge on supplier parks within the South African business environment.

In order to fulfill this purpose, the study covers the following aspects:

- Clarification of the terms ‘logistics management’ and ‘supply chain management’;
- An illustration of how a supply chain strategy can lead to measurable competitive advantage;
- The economic importance of the automotive industry from both a global and South African perspective;
- Obtaining a clearer understanding of the complexities within the South African automotive supply chain;
- Gaining insight into the global influences and the concepts upon which the Rosslyn Automotive Supplier Park was modelled, and also highlighting the uniqueness of the concept within the South African business environment; and

- The assessment of the Rosslyn Automotive Supplier Park's communicated core value proposition.

Since the early nineties, depending on the definition used, around 40 to 70 supplier parks have been established around the world.

The Rosslyn Automotive Supplier Park is situated in the northwestern part of the Tswane metropolitan area. It is approximately 1.3km from the Rosslyn assembly facilities of Nissan/Renault, 3.3km from BMW, 0.5km from TATA, and 35km from Ford in Silverton. It, in essence, remains true to the definition of being a concentration of dedicated production, assembly, sequencing and/or warehouse facilities run by suppliers and/or a third party in close proximity to the Original Equipment Manufacturer's plant. The Rosslyn Automotive Supplier Park is also unique when compared to the international concept presented, especially when considering the leadership role of the provincial and local governments, and the fact that it serves multiple Original Equipment Manufacturers from a single location.

The development of the Rosslyn Automotive Supplier Park in 2004 was the local automotive industry's response to the recognition of the fact that competition between automotive networks and clusters is becoming paramount to the sustainability of the industry, more specifically from a South African perspective. The uniqueness of the Rosslyn Automotive Supplier Park enables it to promote and benefit, not just one Original Equipment Manufacturer, but the South African automotive industry as a whole.

Considering the research feedback in the assessment of the communicated core value proposition, it is possible to summarise the findings as follows:

- Little or no common benefits were identified across the value chain, but some pockets of benefits have occurred as a result of initiatives taken by various companies. Although certain supplier park supporting principles are being applied there is a significant lack of drive to unlock real supply chain value.

- Highlighted benefits were not derived from the expected sources, as presented in many of the business cases which were used to support the location decisions. The unlocking of unexpected sources of the benefits beyond the business cases provided the actual value. These benefits were more qualitative than quantitative in nature.
- Dovetailing the operational focus of minimising logistics costs and improving logistics effectiveness, with the broader vision of supporting the wider South African automotive industry, will provide a stronger solution to the current challenges. The impact of the Rosslyn Automotive Supplier Park can be further extended by building broader business relationships and looking beyond the political agenda of benefiting specific regions.

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# List of Abbreviations

| | | |
|---|---|---|
| 3PL | – | Third Party Logistics |
| 4PL | – | Fourth Party Logistics |
| AIDC | – | Automotive Industry Development Centre |
| APDP | – | Automotive Production Development Program |
| ASP | – | Automotive Supplier Park |
| BEE | – | Black Economic Empowerment |
| BTO | – | Build-to-order |
| CCA | – | Customs Control Area |
| CEO | – | Chief Executive Officer |
| CKD | – | Completely Knocked Down |
| CSCMP | – | Council of Supply Chain Management Professionals |
| DRP | – | Distribution Requirements Planning |
| DTI | – | South African Department of Trade and Industry |
| EDI | – | Electronic Data Interchange |
| ERP | – | Enterprise Resource Planning |
| EU | – | European Union |
| EXW | – | Ex works |
| FBU | – | Fully Built Up |
| GDP | – | Gross Domestic Product |
| IDZ | – | Industrial Development Zone |
| JIS | – | Just-in-sequence |
| JIT | – | Just-in-time |
| LLP | – | Lead Logistics Provider |
| LSP | – | Logistics Service Provider |
| MIDP | – | Motor Industry Development Program |
| MRP | – | Materials Requirements Planning |

| | | |
|---|---|---|
| NAACAM | – | National Association of Automotive Component and Allied Manufacturers of South Africa |
| NAAMSA | – | National Association of Automotive Manufacturers of South Africa |
| OEM | – | Original Equipment Manufacturer |
| OICA | – | Organisation Internationale des Constructeurs d'Automobiles (International Organisation of Motor Vehicle Manufacturers) |
| P&A | – | Parts and Accessories |
| RASP | – | Rosslyn Automotive Supplier Park |
| SADC | – | Southern African Development Community |
| SCOR | – | Supply Chain Operations Reference Model |
| SKD | – | Semi Knocked Down |
| SMME | – | Small Medium and Micro Enterprises |
| SPDC | – | Supplier Park Development Company |
| SCC | – | Supply Chain Council |
| Tier-1 | – | Tier one supplier |
| Tier-2 | – | Tier two supplier |
| Tier-3 | – | Tier three supplier |
| TQM | – | Total Quality Management |
| UNIDO | – | United Nations Industrial Development Organisation |

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# Chapter 1

## Introduction

*This introduction contains, together with a background to the chosen subject, the problem formulation, study objectives, the research methodology and an outline to the study.*

## Contents

## 1.1 Background

> 'For some, supplier parks represent new experiments in production and logistics management, but for others they are a reversion to the Ford Rouge model of a highly vertically integrated factory except that the ownership is fragmented. Supplier parks are however subject to different interpretations based on political economies and regional development.'

Professor Mari Sako
Oxford Saïd Business School (2003)

The opening of the first dedicated Supplier Park by Seat adjacent to its Abrera assembly facility in 1992, in many ways, marked the beginning of a global trend. Since then, more than forty parks in various configurations have been established around the world. Initially, this trend was mostly confined to Europe but the Supplier Park concept quickly gained momentum in newly industrialised countries like Brazil and, more recently, the USA and South Africa (Reichhart & Holweg, 2007: 52).

The world's automotive industry is a vital part of the workings of the global economy and the wellbeing of the world's citizens (OICA, n.d.). According to the International Organisation of Motor Vehicle Manufacturers (OICA, n.d.), the world's automotive industry manufactured over 66 million cars, vans, trucks and buses in 2005 which is equivalent to a global turnover of close to € 2 trillion. If vehicle manufacturing were a country, it would be the sixth largest economy in the world requiring the direct employment of nearly eight million people in manufacturing the vehicles and the parts that go into them. This is more than 5% of the world's total manufacturing employment. In addition to these direct employees, many more people are employed indirectly in related manufacturing and service provision industries (OICA, n.d.).

The 2008/2009 downturn in the global economy due to the financial crisis, compounded by unstable oil prices, has had a dramatic impact on the global and local automotive landscape. In South Africa alone, passenger car production declined by more than 30% to 222,981 vehicles compared to the 321,124 produced for the period December 2008 to December 2009 (Automotive Export Manual, 2011:17). The biggest impact, however, is in the form of reduced exports of vehicles and related automotive components and services which declined by a similar margin. This, however, does not downplay the importance of the automotive industry globally and locally. On the contrary, when taking the potential and actual losses in global revenue and employment into consideration, it highlights the fact that the global automotive industry is an important and complex driver of many economies. Underscoring a positive recovery outlook is the fact that vehicle production in South Africa alone has increased by more than 12% year-on-year in the 2010/2011 period (OICA, n.d.).

Since 1994, the South African automotive industry has been characterised by extraordinary growth. According to the 2007 Annual report of the National Association of Automobile Manufacturers of South Africa (NAAMSA), vehicle production before the global economic crisis increased from nearly 390,000 units in 1995 to all-time high levels of close to 588,000 units in 2006 – a 51% increase. The two major forces influencing this growth were the government's Motor Industry Development Program (MIDP) which positively impacted the export volumes by balancing import and export credits, and lower inflationary conditions leading to reductions in real interest rates which made owning a new vehicle more affordable.

In 2011, global new vehicle production (passenger and commercial vehicles) surpassed the 80 million-unit mark. South Africa's automotive production (including vehicles produced for export) during that year reached close to 533,000 units. This represents less than 1% of world production but 85% of the African continent's total vehicle production (OICA, n.d.). In spite of South Africa occupying around the 25$^{th}$ position in the international vehicle production rankings (ahead of countries such as Australia, Taiwan and Sweden) (OICA, n.d.), vehicle manufacturers in South Africa have indicated their confidence in the local industry as well as its significance in their global manufacturing networks by investing close to R 17 billion in the local industry since 2006 (Odendaal, 2012).

South African produced vehicles were exported to 77 destinations worldwide in 2010, generating close to R 40 billion in revenue. Exports have grown from 15,764 units exported in 1995 to close to 240,000 units in 2006. In 2008, vehicle exports surpassed 280,000 units (including passenger vehicles, light commercial vehicles and heavy commercial vehicles) (Automotive Export Manual, 2011:17). During 2005, for the first time, all eight passenger vehicle manufacturers announced or implemented export programmes (NAAMSA, 2007).

Similarly, South African manufactured components were exported worldwide to over 130 countries in 2010, generating in excess of R 30 billion in revenue (Automotive Export Manual, 2011:17). South Africa has established itself as major growth point in Africa and is on target to become an increasingly important part of the global automotive industry (NAAMSA, 2007):

> South Africa's track record as a manufacturer and supplier of vehicles and automotive components has been firmly established over recent years. The projected substantial increase in exports of South African produced motor vehicles would boost the industry's total domestic production from around 542,000 vehicles in 2007 to around 620,000 vehicles in 2008. The increase in exports is good news for the local industry as inflationary conditions and a slowing in the economic growth rate is putting the brakes on the growth in consumer spending seen since 2005, which will surely cushion the impact of the slowdown in new vehicle sales.

The South African automotive industry (incorporating the manufacturing, distribution, servicing and maintenance of motor vehicles) plays a vital role in the economy. In 2010, it contributed around 6.17% of the country's R 2,662.8 billion Gross Domestic Product (GDP) and represented the largest manufacturing sector in the South African economy, accounting for close to 21% of manufacturing output (Automotive Export Manual, 2011). Direct employment by Original Equipment Manufacturers (OEMs) are in excess of 37,000 individuals, with close to 321,000 individuals reportedly employed in the industry (including vehicle and component manufacturing, the tyre industry, as well as motor trade, distribution and servicing) (Automotive Export Manual, 2011). Through the gearing effect, work opportunities can be traced to many kinds of basic manufacturing activities, including steel production, paint, rubber, leather, textiles, plastics, petro-chemical industries and component manufacturing. Also, the impact that the industry has on a large proportion of employed South Africans is substantial due to the fact that the industry provides employment by default in many other areas such as civil servants, tax officials and customs and excise personnel. The export of automotive related goods as a percentage of total SA exports is close to 12% and in excess of 17% of total SA imports. This is close to R 70 billion and in excess of R 100 billion respectively (Automotive Export Manual, 2011).

Historical developments have, however, placed the local industry under competitive pressure, forcing both local and international stakeholders to review their business strategies towards concepts such as economies of scale, costing structures and export contracts. A case in point is the decision by Ford to relocate the Focus model production from South Africa to Australia. This means that the production of the Focus model by the Ford Motor Company of South Africa (FMCSA) ceased in 2010. The main reasons given for this decision were the smaller export and production numbers of the current model, stagnating growth figures in this vehicle segment in South Africa, the uncertain future of the South African MIDP program, and major global restructuring by the US giant on the back of dwindling market share and profits (Venter, 2007). Also, the continuing strike actions in the component manufacturing sector are not aiding the future of the local industry. Strike actions by the National Union of Metalworkers of SA (NUMSA) have caused millions of rands of losses in production as well as indeterminate amounts of damage due to the loss of good will and positive sentiment. In 2007, VWSA alone suffered a production loss of around 500 vehicles a day (Fin24, 2007). The company's Uitenhage plant was brought to a standstill and the company was unable to fulfil critical export orders. The export contracts for VW alone were worth 36,000 units for 2008 and beyond. Should these contracts be terminated, about 1,500 jobs at VWSA would be lost together with 3,500 jobs in the service and component industries (Wheels24, 2007).

Logistics management is defined by the Council for Supply Chain Management Professionals (CSCMP, n.d.) as:

> '…that part of supply chain management that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirements.'

The CSCMP (n.d.) also defines supply chain management as that which:

> '…encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies.'

OEM/Supplier relationships have changed considerably in recent years. Assemblers are increasingly focusing on their core competencies (Mondragon, Lyons, Michaelides & Kehoe, 2006: 551). This has led to the development of relationships with their supply chain partners which support the increased levels of outsourcing and modular production that the OEMs are targeting. This ultimately leads to an increased demand for logistical coordination of manufacturing processes when combined with production strategies such as Just-in-Time (JIT). In view of this, the Supplier Park allows the 'concentration of dedicated production, assembly, sequencing and warehousing facilities managed by suppliers or a third party in one location or at least within close proximity to OEMs in order to achieve synergies' (Mondragon et al., 2006: 557). It improves the production environment and services, lowers costs and exploits the latest advances and practices in the automotive manufacturing chain.

Reichhart and Holweg (2007: 52) point out that '[t]he supplier park phenomenon is closely linked to the introduction of modular supply concepts in the industry'. In contrast to motor vehicles being traditionally very integral products assembled by OEMs in their assembly plants from around four thousand parts, modular supply has enabled OEMs to:

- Reduce complexity in the final assembly,
- Increase the speed for product innovation,
- Cope with escalating product variety, and
- Reduce costs.

Ultimately, modular supply has led OEMs to outsource the manufacturing of large modules to suppliers (Reichhart & Holweg 2007: 52).

In South Africa, the Supplier Park concept has been operationalised in the form of three major initiatives since 2002. These are Rosslyn Automotive Supplier Park, the East London Industrial Development Zone and the Nelson Mandela Bay Logistics Park (Moodley, 2007). These initiatives, although varying substantially in strategic objectives and ultimate application, in essence, remain true to the definition of a supplier park which is a cluster of suppliers located adjacent to, or in close proximity of, a final assembly plant. The concept is supported by respected names in the industry which include, among others, entities such as the Department of Trade and Industry, the Council for Scientific and Industrial Research (CSIR), Blue IQ (a Gauteng provincial government initiative), and the Automotive Industry Development Centre (AIDC) (ASP, n.d.; Moodley, 2007).

The primary focus of this study will be on the ASP as a representative concept within the South African automotive industry. What makes the ASP different from other local and similar international interpretations of the concept is that the ASP is managed as an independent entity without any direct relation to OEMs and/or component suppliers. This management approach enables the ASP to provide a truly unique solution to all the local automotive companies without prejudice. This enables the ASP to:

- Provide services to any automotive supplier, irrespective of its OEM customer,
- Increase the percentage of local content in its final product whether it is for local consumption or focused on the export market.

The ASP concept was conceived in order to address two basic challenges identified by the major industry stakeholders. Firstly, South African automotive OEMs and their suppliers are constantly on the back foot in terms of volumes, business case development and competition. Secondly, there is a constant focus by global players on China and India due to their lower total cost in respect of labour, logistics infrastructure, land and resources as well as their beneficial proximity to Europe. The ASP is managed by the Supplier Park Development Company (SPDC) with its main goal being the effective management of the parks and the promotion of the concept to facilitate business development, ultimately delivering the required return-on-investment to their shareholders (ASP, n.d.; Moodley, 2007).

The main objective of the ASP concept is to concentrate automotive component manufacturers and suppliers in one location to achieve synergies between them (ASP, n.d.). In doing so, it improves the production environment and services, lowers costs and takes advantage of the latest advances and logistics in the automotive manufacturing chain in order to assist the various local OEMs and suppliers to be more competitive with their global counterparts. The core value proposition of the ASP is communicated as (ASP, n.d.):

- Customised production buildings and a full service package at a world class standard for automotive component manufacturers and assemblers;
- Office space service providers related to the automotive industry;
- An integrated logistics concept consisting of a common logistics centre and optimised logistics infrastructure with world-class logistics service providers as development partners;
- A central hub incorporating offices and facilities such as conferencing and video conferencing, a restaurant, retail centre and other facilities for tenants and external users; and
- Central facilitation and development of the site, services and the automotive cluster within the ASP.

According to the 2007 annual report of the SPDC, the ASP can also be seen as a 'blueprint' for other similar initiatives in South Africa and has realised significant regional and national macro-economic benefits (ASP, 2007).

## 1.2 Problem Formulation

The researcher's involvement in the feasibility study, initial concept design, and, to a lesser extent, the implementation of the RASP, has led him to a quest for further understanding of the automotive industry and the ASP in particular. The researcher wishes to identify the need for an objective assessment of the ASP as an integral part of the solution to the global logistics and supply chain challenges with which the South African OEMs and their suppliers are faced.

In the process of initial fact finding, it became apparent that research is required to gain additional insight into:

- The factors underlining the unique nature of the South African automotive supply chain;
- The management of the RASP concept in South Africa when compared to similar concepts in other parts of the world; and
- An assessment of the extent to which the various stakeholders have benefitted from the RASP concept since its inception.

## 1.3 Study Objectives

The primary objective of this study is to assess the performance of the Rosslyn Automotive Supplier Park concept in terms of the realisation of the value proposition as communicated to the various stakeholders, from a supply chain perspective.

The secondary objective is to expand the body of knowledge on supplier parks within the South African business environment.

In support of the study objectives, the literature review focused on:

- Clarification of the terms ‘logistics management’ and ‘supply chain management’;
- Illustrating how a supply chain strategy can lead to measurable competitive advantage;
- The economic importance of the automotive industry from a global and South African perspective;
- Obtaining a clearer understanding of the complexities within the South African automotive supply chain;
- Obtaining insight into the global concepts that influenced the ASP and on which they are modelled and highlighting the uniqueness of the concept within the South African business environment; and
- The assessment of the value proposition communicated to stakeholders by the RASP.

## 1.4 Study Demarcation

The study is limited to the assessment of the Rosslyn Automotive Supplier Park concept focusing on its workings within the field of supply management and inbound logistics process, and its benefit realisation within the South African context. The Rosslyn Automotive Supplier Park is utilised as a specific point of reference due to:

a. The undiluted nature of its focus on supporting the South African automotive industry in achieving and maintaining global competitiveness.
b. The uniqueness of the South African approach when compared to similar concepts implemented in other parts of the world.
c. The ground breaking role that the RASP played in introducing the concept to the South African business environment.
d. The findings of the study relative to the RASP which cannot be generalised to all supplier parks in the country due to the unique characteristics of the Rosslyn Automotive Supplier Park.

Semi-structured interviews will be conducted with selected representatives of the ASP stakeholders and will exclude any matters of a socio-political nature.

## 1.5 Research Methodology

Due to the nature of the research problem, this study follows a mixed method research approach defined by Creswell (2003: 18) as an approach that ‘employs strategies of inquiry that involve collecting data either simultaneously or sequentially to best understand research problems’. Data collection in the mixed methods approach involves gathering both numeric and text information so the database contains both quantitative and qualitative information (Creswell, 2003: 20). The approach in this study is dominated by the qualitative research method which is defined by Strauss and Corbin as ‘research that produces findings not arrived at by means of statistical procedures or other means of quantification’ utilising inductive strategies (Flick, 1998: 2; Creswell, 2003: 212).

Primary information will be collected through semi-structured interviews with carefully selected representatives of the various Rosslyn Automotive Supplier Park stakeholder groups. The quantitative and qualitative data will then be linked to identify, select and compare outliers which have three main drivers according to Rossman and Wilson as cited by Miles and Huberman (1994: 41). They firstly enable confirmation of each method through triangulation, secondly, they provide richer detail through elaborate analysis, and, thirdly, they provide a fresh insight through new lines of thinking. So, in an attempt to know more about the identified research problem, the open-ended questions will be complemented by questions with quantifiable results (Flick, 2006: 40).

The stakeholders will include, among others, representatives of OEMs, suppliers, and logistics service providers (LSPs). The semi-structured interview process 'is linked to the expectation that the interviewed subjects' viewpoints are more likely to be expressed in a relatively open designed interview situation than in a standardised interview or a questionnaire' (Flick, 1998: 76). The quantitative and qualitative data will be collected during the physical interview process from a small target group which consists of fifteen representatives. This approach is due to the focused selection criteria and the nature of the study. Increasing the target group will not significantly increase the quality of the data. In fact, increasing the target group will have a negative effect on the data quality as it will require the inclusion of individuals not familiar with the ASP concept and its possible benefits. This will skew the results and ultimately the findings due to the limited contextualisation and insight required from the respondents.

The study will be supported by a comprehensive literature review which includes text books, industry publications and periodicals. It will also be informed by the experiences of the writer and the participating stakeholders.

## 1.6 Study Outline

**Chapter 2** introduces the concepts of logistics management and supply chain management.

The chapter documents the history of supply chain management from the 1960s with its focus on customer service through marketing strategies and the 1970s when the foundation of optimising costs across the total logistics system was laid. It then describes the 1980s when attention was directed to the integration of company supply chain processes in a manner that would ultimately lower supply chain operating costs and reduce supply chain assets, supported by substantial advances in technology. In the 1990s, the focus changed from internal efficiency to external relations between parties in the supply chain. The existence and importance of supply chain management in the new millennium is then addressed with concepts such as effective supply networks or value systems, mutually beneficial supply chain relationships and the focus on reducing costs across the supply chain.

In this chapter, the upstream and downstream networks of the typical automotive company are considered. The upstream networks include the multitude of organisations that provide items ranging from raw material (i.e. steel and plastic), to complex assemblies and sub-assemblies, for instance, transmissions, axles and wiring harnesses. The common grouping of suppliers into tier-one, tier-two and up to tier-n, is also introduced. Downstream networks focus on activities such as vehicle distribution (for local and export markets), internal marketing support, and customer service in the form of after sales servicing and support or the flow of automotive parts and accessories, more commonly referred to as P&A.

Subjects like logistics management activities, integrated logistics management, and the total cost concept, competitive advantage, as well as current and emerging supply chain management challenges are discussed. The strategic supply chain model, and the high level inbound and outbound automotive supply chain processes are examined .

**Chapter 3** explores the importance of logistics management and supply chain management in the modern automotive industry. It touches on the global and local economic importance of the automotive industry and the history of the industry in South Africa. It also examines supply concepts such as Just-in-Time (JIT), Just-in-Sequence (JIS) and Modular Supply within the context of a typical automotive supply chain, as well as insight into local logistics infrastructure challenges and strategic automotive supply chain and logistics concepts.

This chapter introduces the Motor Industry Development Program (MIDP) as instituted in September 1995 which has been described by industry specialists as the catalyst for the growth that the industry has shown the last decade. It also touches on the Automotive Production Development Program which will be implemented in 2013.

Core industry drivers which have a distinct impact on the logistics and supply chain strategy followed by the OEM and its suppliers are highlighted as are the move from a push to a pull supply chain, competitive forces shortening the product lifecycle, mass customisation, the demand for ever higher service offerings, the continued focus on global strategic sourcing and the recent changes in assembler/supplier relationships and collaboration.

**Chapter 4** introduces supplier park support concepts, defines the automotive supplier park concept and explores the contribution of supplier parks to the creation of value and competitive advantage within the South African automotive supply chain and related value networks.

In this chapter, a supplier park is defined as ‘a cluster of suppliers located adjacent to, or in close proximity of, a final assembly plant’ (Sako, 2003:1). It is further defined as nodes in the supply chain from the sub-supplier to the OEM, located next to the plant of an OEM. These nodes consist of suppliers, sub-suppliers and service providers where each company is responsible for processes concentrating on the development and realisation of customer-orientated logistics and assembly processes (Pfohl & Gareis, 2005: 307).

Related concepts such as outsourcing, modularisation, postponement, build-to-order, clustering and location management are presented as the cornerstones of the supplier park concept.

It is argued that, as local supply linkages are replaced by global networks, these supply networks are becoming increasingly important in the automotive industry as assemblers and suppliers develop parallel networks across the globe and supplier parks become increasingly important in enabling and supporting the value adding activities of their tenants.

The traditional automotive value chain is discussed in this chapter. Upstream from the assembler, the tier-one global mega-suppliers require global reach, innovation and design capabilities as well as considerable financial resources similar to the OEM. In the tier-two, global reach is not mandatory even though there are some trends towards internationalisation in this sector. The competences needed in the third-tier are much less, but the returns are also much lower. Downstream from the assembler, the aftermarket sector offers a different route to customers. This sector is very price-competitive, the business is much more fragmented and access is easier (Humphrey & Memedovic, 2003:19). Although the impact of the aftermarket and financing sectors of automotive value chain cannot be overvalued, the complexities are, however, beyond the scope of this particular study and are not addressed in any detail.

In this chapter, the automotive value network is discussed with specific reference to Porter's value chain and, finally, the five levels of activities in the value add continuum are discussed. It is argued that the main, and also most obvious, drivers of how much value add is to be performed inside the supplier park, or close to the assembly plant, are the existence of central manufacturing facilities, economies of scale and logistics considerations.

**Chapter 5** explores the supplier park concept from both an international and a local perspective. It introduces the various implementations of international supplier parks as well as the South African interpretation of the concept.

Differentiation of the application of the supplier park concept is possible along at least three dimensions: firstly, spatial integration in conjunction with dedicated infrastructure, secondly, value chain configuration and, thirdly, based on organisational integration. The concepts in different parts of the world vary substantially based on physical layout, synchronisation between the OEMs' final assembly line and the suppliers' operations, capital investment, employment governance and strategic supplier involvement.

The three major drivers for the establishment of supplier parks (i.e., logistical cost reduction, labour cost reduction and increased efficiency) are discussed. In-depth analysis of other related topics such as outsourcing, modularisation, postponement, built-to-order, clustering and location management is undertaken.

The turbulent business environment many companies find themselves in has necessitated a search for techniques to gain competitive advantage by forging strong business relationships within their supply networks. This is made even more important by the shifts in the global production and sales strategies of leading multinational automotive companies as well as developing countries are becoming more integral to their plans. The South African automotive industry's focus on competitiveness has been fuelled by:

- Low product volumes compared to international standards;
- Assemblers being quite distant from their export markets;
- Long supply lines complicating logistics management;
- Increasing supply chain costs;
- Assemblers facing many newcomers in the form of imported models; and
- Growth in the domestic market remaining essentially limited.

The challenge for supply chain management in the automotive industry in South Africa is to identify strategies that will move the business towards a position of strength based upon differentiation and cost advantage and away from a low productivity advantage and low value advantage position (Christopher, 1998:10).

It is argued that the increasingly large and important role the suppliers play in building an automobile has created various challenges for the assemblers and, in an effort to manage the impact of these issues, the assemblers have taken a more active role in how and where their suppliers conduct their operations (Hill & Szakaly, 2006:1), as well as introducing various concepts to facilitate the effective management of their suppliers and their related workflows.

**Chapter 6** elaborates on the research methodology. The study follows a qualitative dominant mixed method approach to gather, analyse and interpret the collected data. It also discusses the key characteristics of this concurrent transformative strategy.

The chapter also highlights a clear nine step research process consisting of three distinct phases to manage the potential ethical challenges.

Research is focused on the identified stakeholders including, among others, representatives of original equipment manufacturers (OEMs), suppliers and logistic service providers (LSPs).

This chapter also presents the value proposition of ASPs which is grounded on four focus areas – logistics and IT, buildings and infrastructure, shared services, and socio-political factors. This value proposition and the accompanied general and stakeholder group specific benefits are tested with the target group.

**Chapter 7** summarises the study. It also concludes, based on the literature review and semi-structured interviews, whether the Rosslyn Automotive Supplier Park can be considered to have delivered on its communicated benefits.

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# Chapter 2

## Logistics- and Supply Chain Management Defined

*This chapter is an introduction to the concepts of Logistics and Supply Chain Management. It defines the concepts, highlights the importance and formulation of a supply chain strategy and discusses how logistics and supply chain management can assist organisations in achieving competitive advantage.*

## Content

## 2.1 Introduction

> ‘In a future industry where automotive components developed and built in China are just as highly engineered and innovative as those built in Europe, logistics and supply chain management could become one of the most important distinguishing advantages for a company to increase its sales’

John Sobeck
Corporate Head of Logistics and SCM
ZF Friedrichshafen
(Automotive Logistics News, May 2009)

Supply chain management is becoming central to the survival of companies in the global business environment. The increasing complexity of trade and the pace of change have a dramatic impact on the successful management of today’s companies. The competitive edge of yesterday becomes the minimum service requirement of tomorrow. This is mainly due to the sophistication and knowledge of today’s consumers. Consumers are more demanding and informed than ever before. This demands from management a fresh approach to both strategy formulation and execution.

Supply chain management is concerned with more than just the movement of materials from point A to point B. The goal of supply chain management is the creation of value for the supply chain member organisations with a particular emphasis on the end customer in the supply chain (Handfield & Nichols, 2002: 5) thereby turning supply chains into value systems.

According to the American astronomer and astrochemist, Dr Carl Sagan (n.d.), ‘You have to know the past to understand the future’. Therefore, in order to understand the future of supply chain management, it is necessary to track the historical path that led it to what it is today.

In the 1950s and 1960s, the focus of management theory was on marketing and the development of marketing strategies. These strategies were based on segmentation and on communicating with these market segments through, for example, customised promotional strategies. This approach is the foundation of customer service in modern supply chain management thinking.

The 1970s focused on the integration of warehousing and distribution within the company. The emphasis was ultimately on improving the availability of products to customers. A related goal was to optimise inventory investment with reduced inventory holding costs a key focus point. During this period the focus shifted to total logistics costs reduction across the entire logistics system.

During the 1980s, focus shifted to the re-engineering of supply chain cost structures. Manufacturing was undeniably the enabler. Manufacturers experienced pressure to increase their flexibility and also to adapt manufacturing processes more rapidly to ever-changing customer demands. Attention was directed to integrating the company's supply chain processes in a manner that would ultimately lower supply chain operating costs and reduce supply chain assets. In the USA, this led to a decline in total supply chain costs by nearly one-third during the period 1982 to 1990 (Gattorna, 1998: 19). Linked to a booming software and technology industry, this was the period when techniques such as materials requirements planning (MRP), distribution requirements planning (DRP) and enterprise resource planning (ERP) were developed. Buzzwords such as Just-in-Time (JIT), cycle time reduction and total quality management (TQM) were widely used.

The 1990s was the era when businesses experienced dramatic changes and the focus of logistics began to include external relations between supply chain partners rather than only internal efficiency. Companies started to understand that the different logistics activities in the supply chain are interconnected and do not stand independent from each other.

Chandra and Kumar, as quoted by Hugo, Badenhorst-Weiss and van Biljon (2004: 4), state that these changes had a notable impact on the perception and management of the supply chain today and include:

- Increased competition on national and international levels;

- Increased strategic alliances between organisations;
- Process aligned organisational structures;
- Tools such as ERP and MRP that have enhanced manufacturing systems;
- A growing focus on the total cost of ownership;
- A reduction in the number of suppliers;
- Outsourcing of non-core activities;
- Increases in the sharing of information within the supply chain; and
- A shift from mass production to customised products.

Hugo et al. (2004: 4) summarise the impact of the changing business environment on supply chain management as:

- All players in the supply chain have a responsibility to increase their understanding of customer requirements and to satisfying market demands.
- Optimising customer value is the objective of the entire supply chain.
- The only way to meet market demand is to integrate management, processes and infrastructure across organisational borders.
- Establishing an integrated supply chain is enabled by sharing information across the entire supply chain.

Skjoett-Larson (2006: 43-44) points out that, looking to the future, supply chain management is becoming vital to the survival of companies in the global business environment which is characterised by:

- Turbulent and dynamic markets, driven by customers' requirements which change rapidly and unexpectedly;
- Varying customer requirements for products and services, resulting in highly segmented markets;
- Increasing pressure from customers for new innovations and customised products and services;
- Growing customer demand for 'experiences', not merely physical products; and
- Global sourcing and global marketplaces.

The future of business success will be determined by competition between effective supply networks rather than between individual companies (Hugo et al., 2004: 5). Making supply chain management a focus point on board room agendas can boost the profitability of an organisation as well as the value of a company (Skjoett-Larson, 2006: 44; Gattorna, 1998: 18). The focus of supply chain management will be on supply chain expansion, increasing supply chain responsiveness, increasing the emphasis on 'green' supply chains, and further reducing supply chain costs (Wisner, Leong and Tan (2005: 12).

When considering today's automotive industry, the competition between effective and responsive supply networks has never been more evident. At the 2006 National Automotive Supply Chain Conference, Gerald Heüer (2006: 3), Senior Manager: Vehicle Logistics at Nissan South Africa, stated that '[i]n a global environment the competition is not only the local OEM, but also the global manufacturing plants of the same brand'. This level of competition is mainly due to the following factors:

- The European and North American OEMs have the economic benefit of bigger markets.
- OEMs in developing economies such as China and India benefit from cheaper labour.
- The European and North American OEMs benefit from good logistics infrastructure such as ports, roads and rail networks.
- The European, North American and Chinese OEMs are closer to suppliers and global markets.

According to Handfield and Nichols (2002: 8), the demand to create a new system of managing supply chains and the associated risks have become even more apparent since the events of 9/11 (the attack on the USA which destroyed the World Trade Centre in New York on September 11, 2001). These events have reinforced the need for managers to re-assess their company's stance on supply chain relationships in order to improve performance across the entire supply chain. Senior management in industries such as automotive, electronics, transportation and many others, realised that reducing costs across the supply chain should be of paramount importance because simply raising prices is no longer an option, and neither is the possibility of dramatically increasing sales in a flat economy.

## 2.2 Logistics and Supply Chain Management Defined

Handfield and Nichols' (2002: 8) description of the supply chain is that it

> '…spans all organisations and activities associated with the flow and transformation of goods from the raw materials stage, through to the end-user, as well as the associated information flows.'

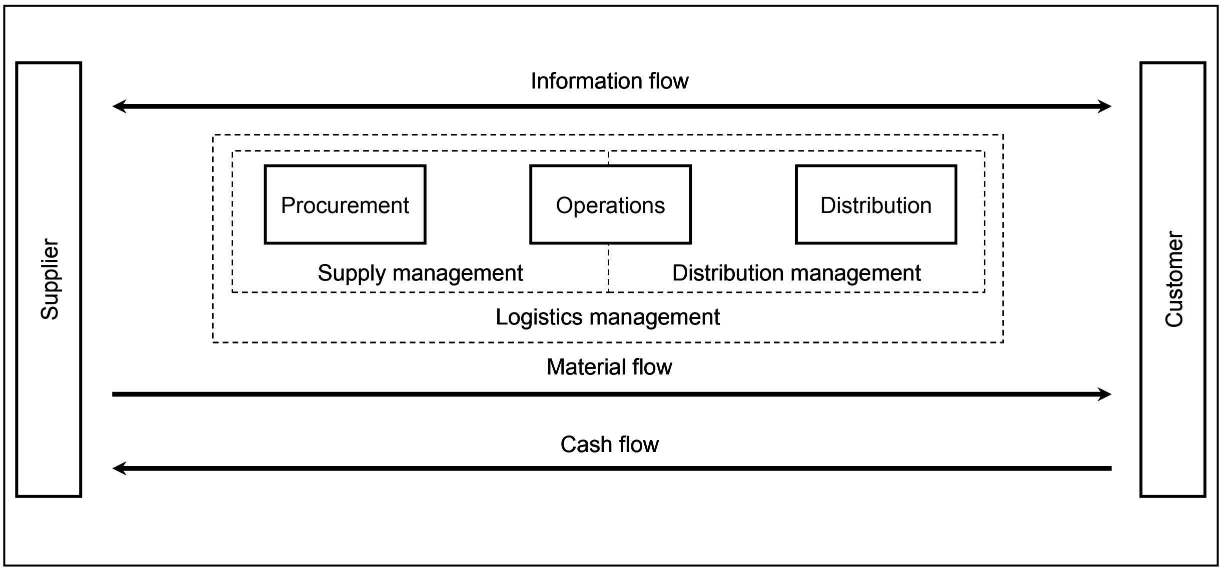
This flow of material and information goes both up and down the supply chain.

In the past, the terms 'logistics management' and 'supply chain management' were used interchangeably but this has changed as supply chains have become more complex. Many authors have defined these terms, but, for the purposes of this study, the definitions supplied by The Council for Supply Chain Management Professionals (CSCMP) will be used. The CSCMP (n.d.) defines logistics management as:

> '…that part of supply chain management that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirements.'

The logistics management process encapsulates various functional activities spanning various functional areas, each of which needs to be managed both independently and interdependently due to its relationships within the company and its impact on ultimate competitive advantage. Figure 2.1 illustrates how the typical logistics management process (in a simplistic form) mainly consists of two parties (the supplier and customer) and three levels of flows. These flows consist of information flowing between the parties (such as order entry data from the customer to the supplier, and order confirmation data from the supplier to the customer), material which is sent to the customer and payment for such material which is made by the customer. These activities are supported by supplier related internal processes such as procurement, operations and distribution.

Figure 2.1 – The logistics management process




Source: Adapted from Christopher (2005: 15) and de Villiers, Nieman and Niemann (2008: 4)

The successful management of the supply chain for competitive advantage has laid the foundation for the supply chain management philosophy and associated practices (Green, McGaughey & Casey, 2006: 407). It can be argued that

> '…even though other functional areas such as finance, operations and marketing management have made an important contribution to the evolution of supply chain management, it is in fact logistics and purchasing which have formed the basis of the supply chain management discipline as it is known today' (De Villiers et al., 2008: 6).

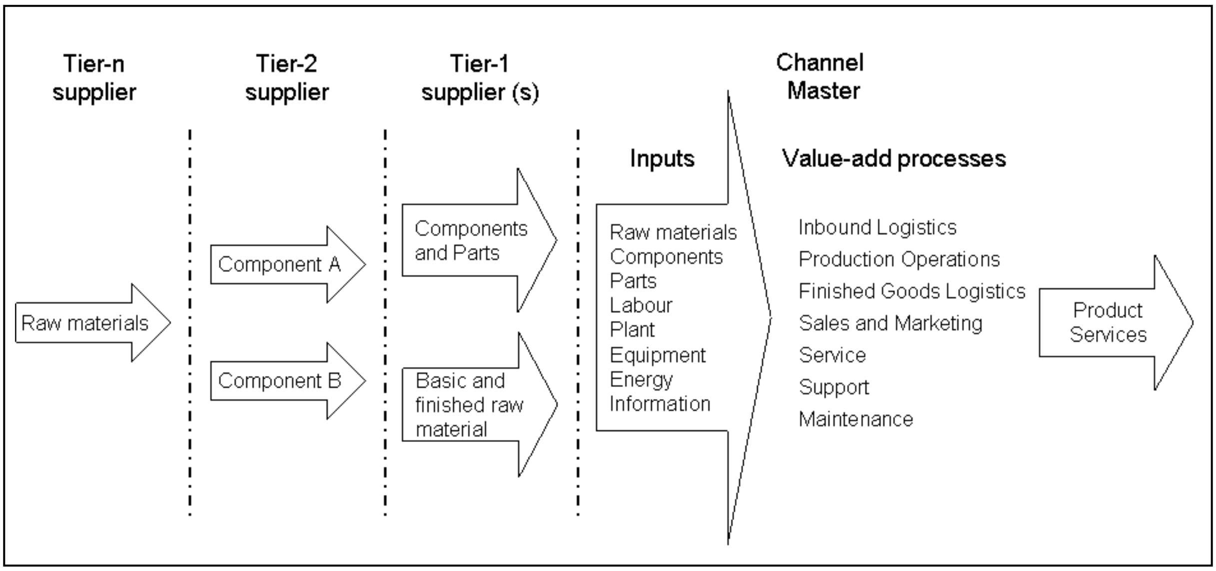
The CSCMP (n.d.) defines supply chain management as that which

> '…encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service

providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies.'

Figure 2.2 illustrates that a supply chain is a series of linked suppliers and customers (individual logistics chains). Every customer is, in turn, a supplier to the next down stream organisation until a finished product reaches the end user (Handfield & Nichols, 2002: 9).

Figure 2.2 – A typical manufacturing supply / value chain




Source: Reddy and Reddy (2001: 19)

Lummus and Vokurka (1999: 15), supported by Shephard and Günter (2006: 242) state that, in its most simplistic form, logistics management is the management of the flow of products, services and information internal to the organisation. Supply chain management, on the other hand, includes processes beyond organisational boundaries focusing on the various relationships within this extended network of organisations and is, therefore, not a standalone process.

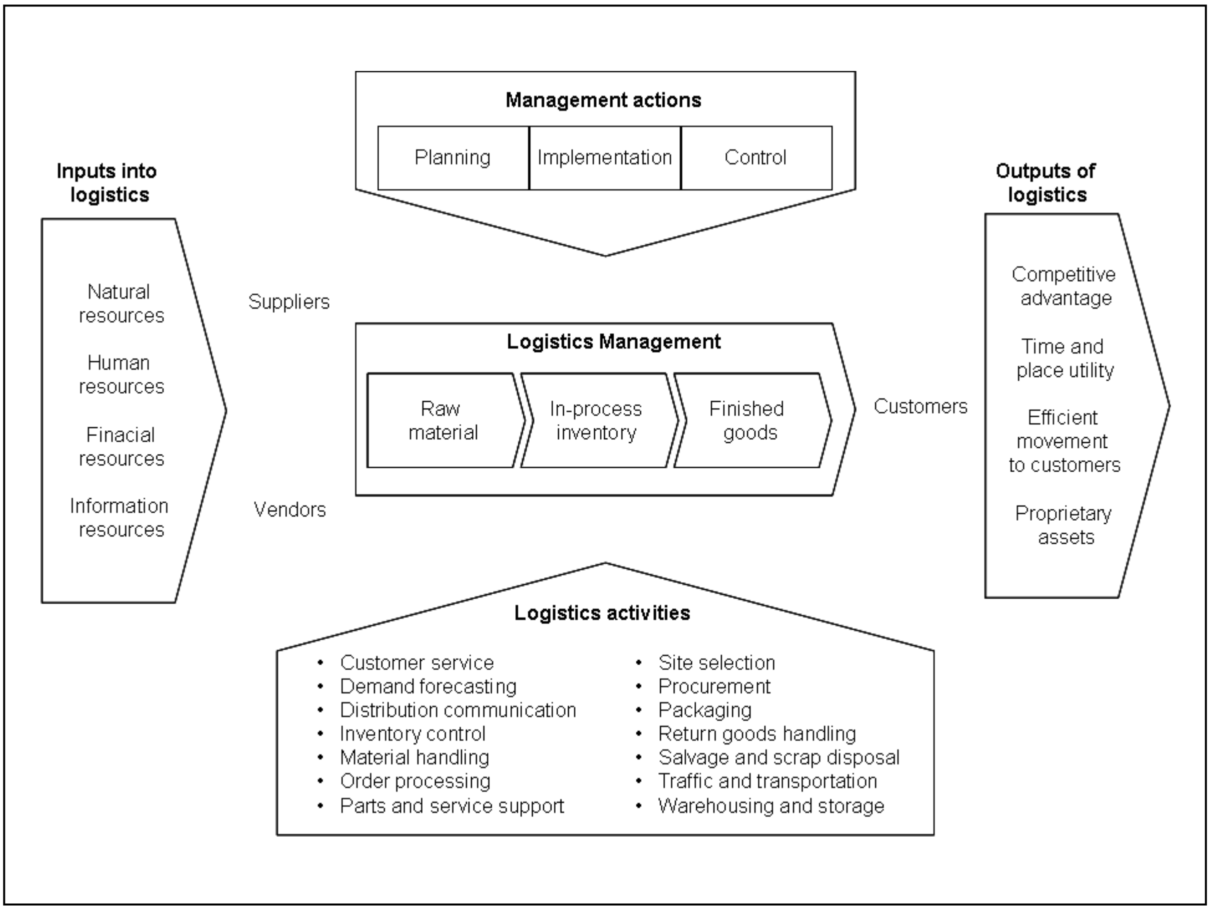
The typical automotive OEM, as a case in point, can clarify the above concepts by considering its upstream and downstream networks. Upstream networks include the supplier network which consists of all organisations that provide input, either directly or indirectly, internally or externally, to the company. From the OEM's perspective, this includes organisations that provide items ranging from raw material (e.g. steel and plastic), to complex assemblies and sub-assemblies (e.g. transmissions, axles and wiring harnesses). Suppliers can commonly be grouped into Tier-one, Tier-two, up to Tier-n (where ‘n’ represents the level of supply furthest away from the OEM). The Tier-one supplier will supply directly to the OEM; the Tier-two supplier provides goods to the supplier; and so forth. A detailed description and illustration of a typical inbound material flow is available in Figure 3.8.

Downstream automotive networks are focused on the movement to the point of final destination of fully built up (FBU) units, sub-assemblies, completely knocked down (CKD) units, and semi knocked down (SKD) units. They include various service providers who are responsible for delivering the vehicle to the final destination, undamaged and on time. In a South African context, vehicle distribution is mainly done via road and rail, with exports relying on rail and sea modes of transport. The focus of this study is predominantly on the upstream or inbound supply networks.

### 2.2.1 Activities included in logistics management

As already defined in this study, logistics management is the management of a process of the flow of material from point-of-origin to point-of-consumption and the flow of information to support this material flow. Logistics also gives place and time utility through making products and services available for purchase or consumption in the right place, and at the right time respectively. In managing this process, the logistics professional will be confronted with various activities to be managed.

Figure 2.3 – The components of logistics management




Source: Lambert and Stock (1993: 5)

Lambert and Stock (1993: 12) state that the activities included in logistics management and depicted in Figure 2.3 can be described as follows:

- *Customer service* – It acts as the unifying force for all the logistics management activities due to its link with both marketing and logistics (also see Figure 2.4) and requires the successful implementation of the integrated logistics management concept to achieve the required level of customer satisfaction at the lowest possible total cost.
- *Order processing* – In order to satisfy order demand, the order triggers the distribution process and directs the actions required. It also links with customer service as the speed and accuracy of a company's order processing has a direct implication on the level of customer service the company provides.
- *Distribution communications* – Accurate and timely communication forms the fundamental link between the company's logistics processes and its customers.

It can be in the form of very sophisticated management information systems (MIS) or as simple as verbal communication between individuals.

- *Inventory control* – Determining the necessary level of inventory to achieve the desired level of customer service while considering the cost of performing other logistics activities.
- *Demand forecasting* – Assessing the amount of product and accompanying service that customers will require at some point in the future. This enables logistics managers to strategise on the allocation of resources to the various activities (e.g. warehousing, transport and inventory placement) that will service the customer demand.
- *Traffic and transportation* – The management of the movement of goods that includes activities such as routing and scheduling, as well as determining the best method of shipments (air, rail, sea, road and pipeline). Transportation is often the single largest cost in the supply chain and must, therefore, be managed effectively.
- *Warehousing and storage* – These are activities which bridge the gap between production and consumption. Warehouse size and associated costs are directly impacted by inventory holding. Generally, the greater the time-lag between production and consumption, the greater the level of inventory required.
- *Plant and warehouse site selection* – The strategic placement of a plant and/or warehouse has a direct impact on customer service, warehousing cost, transportation cost and inventory holding cost.
- *Material handling* – This is concerned with every aspect of the physical movement of raw material, in-process inventory and finished goods within a plant or warehouse. The major objectives are to ensure that the flows are free from bottlenecks and are done with minimum handling, travel distance and losses from breakages, waste and theft. It plays a vital role in reducing inventory, lowering cost and increasing productivity.
- *Procurement* – This can be defined as the acquisition of materials and services to ensure the operational effectiveness of the company's manufacturing and logistics processes. This function has a strategic importance because of the global availability of materials and services required by the company.

- *Parts and service support* – Logistics is also focused on providing the many activities involved in the repair and servicing of products such as the supply of spares and replacement parts to manufacturing equipment.
- *Packaging* – Packing supports two basic agendas: marketing and logistics. From a marketing perspective, packaging acts as a form of promotion and advertising where colour, size and weight are important. From a logistics perspective, packaging protects the product from damage while being stored or transported. Packaging has a direct impact on material handling costs due to its impact on the storing and movement of products.
- *Salvage and scrap disposal* – This relates to the management of waste material and would include the effective and efficient handling, transport, storage and disposal of any material which cannot be used by the company to produce other products.
- *Return goods handling* – This is also known as reverse logistics, and could be in the form of the customer returning products due to defects, overages and/or incorrect items received by the customer.

### 2.2.2 Integrated logistics management concept

Due to the important role logistics management can play in potential cost reduction and revenue generation, it is vital for companies to view logistics management as an integrated system where a cost trade-off in one area can lead to major cost savings in another. An example of this could be the automation of a warehouse put-away and management system which requires considerable amounts of capital investment but will lead to, among other benefits, a reduction in staff costs and processing times while increasing accuracy which will ultimately lead to improved customer satisfaction.

Lambert and Stock (1993: 39) define the foundation of the integrated logistics management concept as

> '…a total cost analysis which is minimizing the total cost of transportation, warehousing, inventory, order processing and information systems, and lot quantity, while achieving a desired customer service level.'

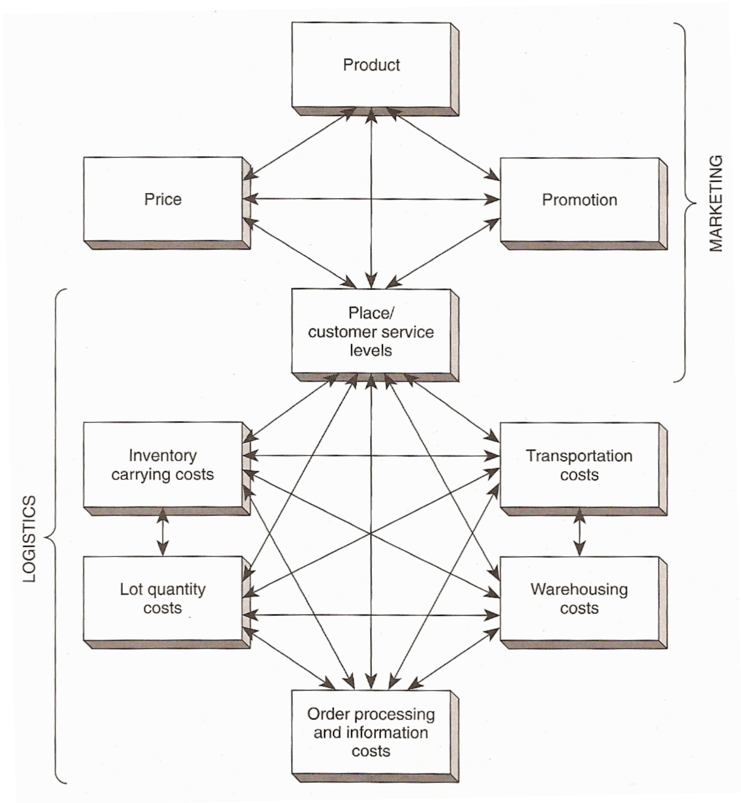
The objective of any marketing orientation is to assign resources to the product, price, promotion, and place components of the marketing mix in a way that will achieve the greatest profit over a period of time (Lambert & Stock, 1993: 41). Figure 2.4 summarises the cost trade-offs which require consideration by management.

When referring to increasing profitability while considering inputs and outputs, the age-old adage, ‘work smarter rather than work harder’ becomes applicable. Working harder implies increasing output by increasing input. Working smarter, on the other hand, results in increasing output by either decreasing input or, at least, maintaining the initial level of input. This is reliant upon the demand for the product in mature and highly competitive industries where the promise of higher profitability through cost containment and reduction has a direct impact on a company’s finances.

### 2.2.3 Total cost concept

Gattorna and Walters (1996: 3) state that when considering logistics cost optimisation, management should strive to optimise the total cost of logistics rather than the cost of each activity in isolation. Attempts to reduce the cost of individual activities may lead to increased total cost. This is confirmed by Lambert and Stock (1993: 45) who point out that effective management and real cost savings can only be accomplished by viewing logistics as an integrated system while considering. the impact upon the company’s customer service objectives. The total cost concept (as depicted in Figure 2.4) thus provides logistics managers with a very effective tool for ensuring that the logistics system of the organisation is a value-adding element in the total supply chain (Hugo et al., 2004: 203).

Figure 2.4 – The cost trade-offs required in marketing and logistics




Source: Lambert and Stock (1993: 42)

According to Lambert and Stock (1993: 46-49) and Hugo et al. (2004: 203), the major logistics cost elements can be defined as:

- *Customer service level* – The cost associated with customer service levels is the cost of lost sales. This is not only the margin lost by not meeting current sales demand, but the present value of all future contributions to profit is forfeited when a customer is lost. It is, however, very difficult, if not impossible, to allocate a monetary value to this loss. The objective is to assess the least total cost method of logistics while keeping customer service targets in mind.
- *Inventory carrying costs* – Those costs that vary with the level of inventory stored such as capital costs, storage space costs, inventory service costs and inventory risk costs.
- *Lot quantity costs* – Production and/or purchasing related costs that will change as a result of a change in the logistics system. For instance, costs

related to batch sizes will typically include production preparation costs, capacity lost due to changeover and materials handling, scheduling and expediting.

- *Order processing and information costs* – This includes the cost of order entry, transmittal and processing, related handling costs and associated internal and external communication costs.
- *Warehousing costs* – Those expenses that can be eliminated or increased depending on the number of warehouse facilities needed. It is important to distinguish between fixed costs (e.g. warehouse rental and security) and variable costs (e.g. contract labour, Material Handeling Equipment, fuel and maintenance). Warehouse costs can be company-owned facilities, contract services, or a combination of both models. In both of these cases, the related warehouse costs can be categorised into costs related to throughput and costs related to storage (e.g. storage space charges in the form of pallet positions used and other administrative charges.
- *Transportation costs* – Expenses necessary to move goods into and out of a facility such as a warehouse or production plant. This can be identified in total or per segment (e.g. inbound, outbound, by vendor, by customer, by mode, by carrier, by product or by channel) associated with changes in the logistics network.

Cost control in the supply chain is aimed at optimising costs over the total supply chain thereby providing the lowest total cost of ownership for the end user. A prerequisite for the control of total costs is cost transparency across all the organisations in the supply chain (Hugo et al., 2004: 11). That is, a holistic view of all the costs in all the logistics networks throughout the complete supply chain.

## 2.3 Strategic Supply Chain Management and Competitive Advantage

Wickham (1998: 192) argues that 'competitive advantage is present if an organisation consistently offers the customer something which is different to what competitors are offering, and that difference represents something valuable to the customer'. Thompson and Strickland (1999: 134) define competitive advantage as 'an edge which one company has over rivals in attracting customers and defending against competitive forces'. They explain that there are many routes to gaining competitive advantage. Some of these advantages are:

- Developing a product which becomes the industry standard;
- Delivering superior customer service;
- Achieving lower costs than rivals;
- Proving buyers with more value for their money; and
- Superior management of the supply chain.

Thompson and Strickland (1999:134) believe that a company's single most dependable contributor to above-average profitability is gained by aggressively targeting the creation of sustainable competitive advantage. The competitive aim is therefore to provide the product that the buyer is looking for and, in doing so, enable the company to earn a competitive advantage and outperform its rivals.

According to Thompson and Strickland (1999: 135), there are five distinct strategies to achieve this:

1. *Low-cost leadership* – Appealing to a comprehensive range of customers based on being the provider of a product or service at the lowest overall cost.
2. *Broad differentiation* – Aiming to differentiate the company's product offering from those of its rivals in ways that will appeal to a comprehensive range of buyers.
3. *Best-cost provider* – Providing customers with more value for their money by combining an emphasis on low cost with upscale differentiation.
4. *Market niche based on lower cost* – Focusing on a lower buyer segment and competing with rivals by serving niche members at a lower cost than the competitors.
5. *Market niche based on differentiation* – Targeting a narrow buyer segment and offering niche members a customised product or service that meets their requirements better than their competitors' offerings.

Michael Porter (1998a: 40) has alerted managers and strategists to the central importance of competitive relativities in achieving success in the marketplace by using the concept of the 'value chain'. Porter said that

> '…competitive advantage stems from the many discrete activities a company performs in designing, producing, marketing, delivering, and supporting its products. Each of these activities can contribute to a company's relative cost position and create a basis for differentiation.'

Christopher (1998: 10) argues that the value chain

> '…disaggregates a company into its strategically relevant activities as well as existing and potential sources of differentiation … a company gains competitive advantage by performing the strategically important activities more cost effectively and/or at a greater level of quality than its competitors.'

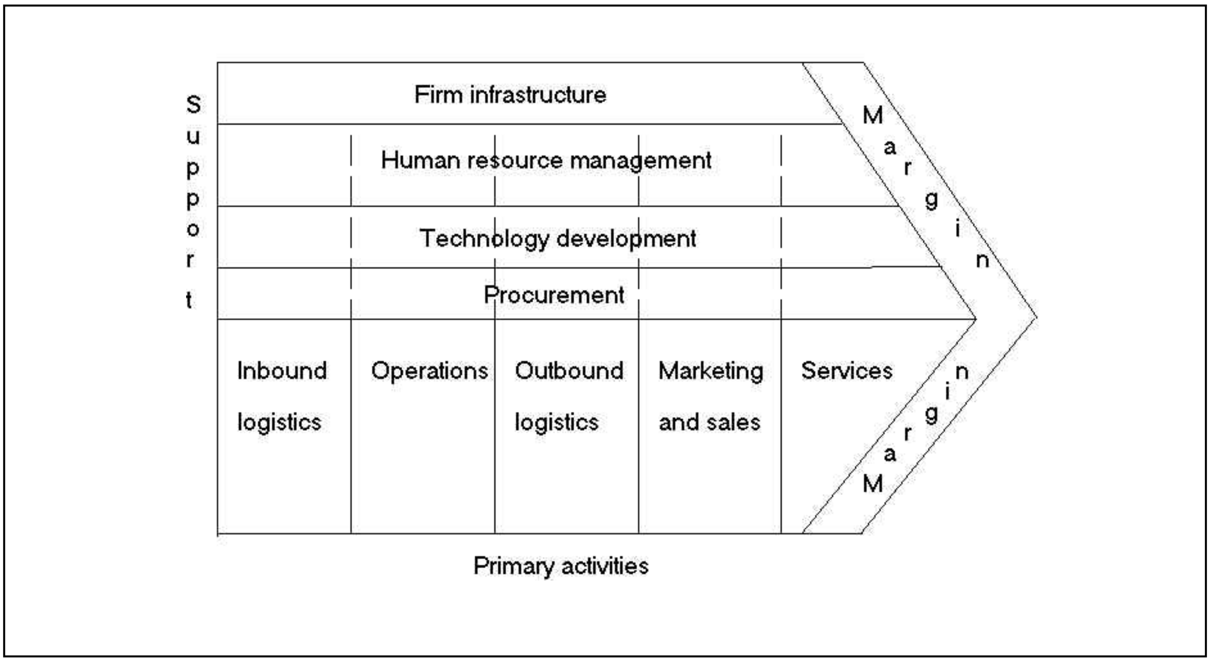
According to Porter (1998b: 77), activities in the value chain can be seperated into primary and support activities which fall into nine generic categories (Figure 2.6). Primary activities are those activities related to the physical creation of the product, its marketing and delivery to the buyers. It also includes the product's support and after sales servicing. Support activities deliver the inputs and infrastructure that allow primary activities to take place.

Lynch (1997: 246) described the primary activities as:

- *Inbound logistics* are those activities associated with the receiving, warehousing and inventory control of raw materials and components.
- *Operations* are those value-creating activities that transform raw materials and components into finished products suitable for selling.
- *Outbound Logistics* are activities related to the placement of goods as close to the end user as possible which includes order fulfilment, warehousing, and transportation.
- *Marketing and sales* are activities related to channel selection, advertising, pricing and sales.

- *Services* are those activities directly related to customer support such as repairs.

Figure 2.6 – Porter's value chain




Source: Porter (1998a: 41)

Secondary or support activities were described by Lynch (1997: 247) as:

- *Firm infrastructure* includes activities related to, for instance, finance and legal issues.
- *Human resources management* includes activities related to recruitment, development, and compensation.
- *Technology development* includes activities related to research and development, process automation and other technological development.
- *Procurement* includes those activities responsible for sourcing and purchasing the necessary goods and services for both the primary and secondary activities.

Competitive advantage can only be understood when looking at a company as a whole (de Villiers et al., 2008: 10). It is derived from the way in which the company organises and performs these activities within the value chain. To gain competitive advantage over its rivals, a company must deliver value to its customers through performing these activities more efficiently than its competitors or by performing the activities in a unique way that creates greater differentiation (Porter, 1998a: 40).

The evolution of strategic supply chain management has, at its core, the fact that it can both drive and enable the business strategy of many organisations, rather then only forming part of the operational strategy (Gattorna, 1998: 23). This is supported by Mishra (2007: 26) who stated that organisations are recognising the potential of going beyond the historical view of supply chain as a cost centre to its emergence as a strategic enabler of increased sales and margins.

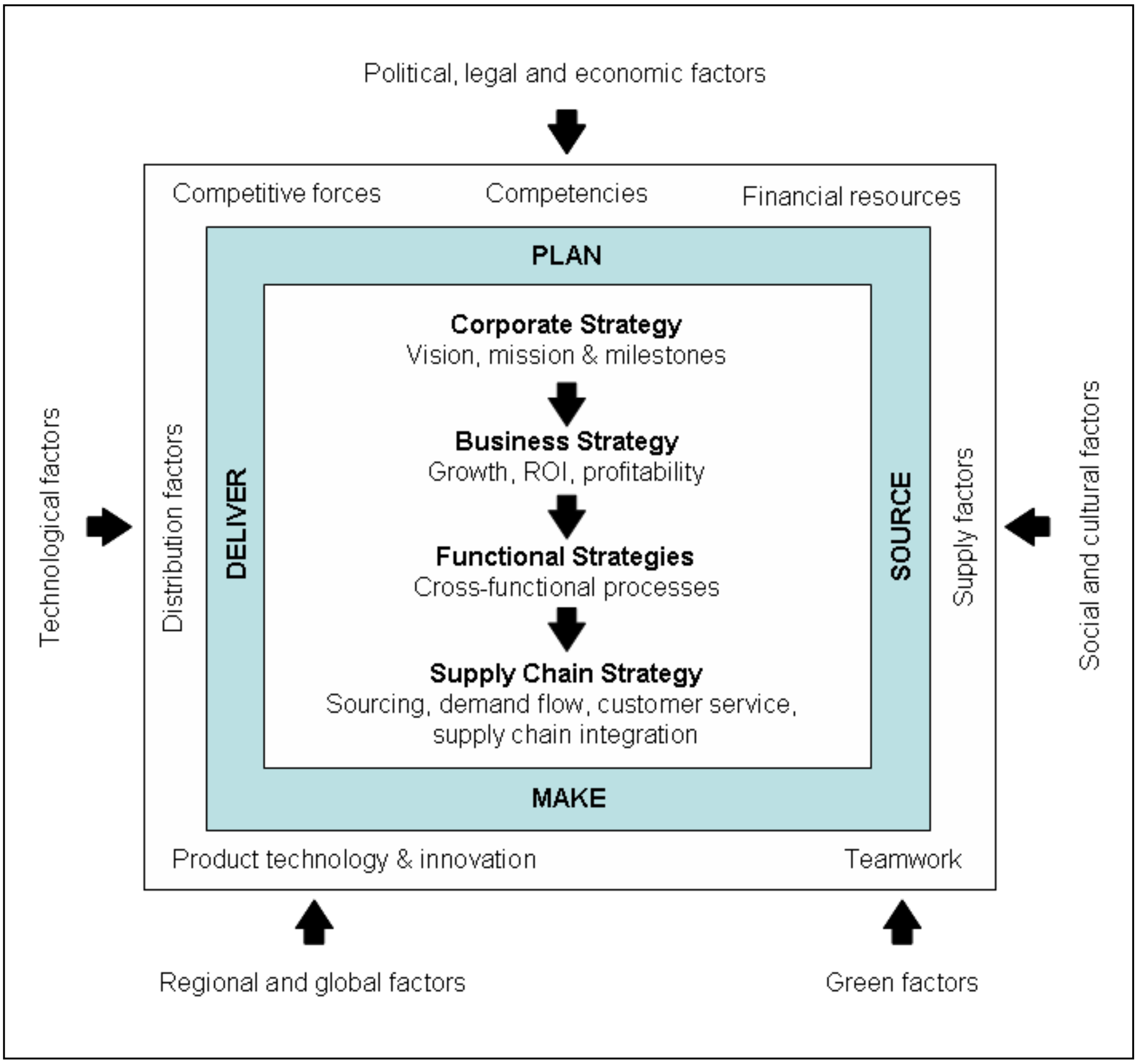
The strategic supply chain model, as depicted in Figure 2.7, provides a critical link between environmental analysis and strategy formulation (Hugo et al., 2004: 29). It is based on the Supply Chain Operations Reference Model (SCOR) developed and endorsed by the Supply Chain Council (SCC) (Supply Chain Council, 2008), and can be used to create a better understanding of the factors that influence the strategic supply chain decisions.

SCOR was designed to enable effective communication, performance measurement and integration of processes between supply chain members (Wisner et al., 2005: 449) and is structured around five distinct management processes (Wisner et al., 2005: 446-447):

- *Plan* is described as demand and supply planning which includes balancing resources with requirements.
- *Source* relates to locating sources of stocked, make-to-order, and engineered-to-order products including scheduling deliveries.
- *Make* focusses on the transformation of raw materials and/or components into final product through make-to-stock, make-to-order, and engineered-to-order production execution strategies and includes scheduling production activies.
- *Deliver* is defined as processes related to order, warehouse, transportation, and installation management for stocked, make-to-order, and engineered to-order product including all order management steps.

- *Return* focuses on the return of purchased material to suppliers and receipt of finished goods returned from customers including authorisation and scheduling returns.

Figure 2.7 – The strategic supply chain management model




Source: Hugo et al. (2004: 30)

The outer perimeter illustrates macro (external) environmental pressures impacting on the business and its strategic processes. According to Hugo et al (2004: 26 – 32) the external factors which supply chain managers should consider are:

- *Technological factors* – For example, the various digital and online information and communication technologies used to manage information which is the key enabler for supply chain integration.
- *Regional and global factors* – For example, the emergence of economic trading blocks (such as the European Union (EU) and the Southern African Development Community (SADC)) which has had a considerable impact on globalisation and international trade and has removed a significant margin of inefficiency in both domestic and global markets.
- *Political, legal and economic factors* – The various factors influenced by governments such as monetary and fiscal policies, labour legislation, health and safety legislation, tax incentives, business development and export schemes (e.g. the Motor Industry Development Program [MIDP]) and political policies.
- *Social and cultural factors* – Changing customer expectations of customised products, services and solutions (mass customisation). Also the renewed focus on customer service which is an intrinsic focal point for logistics and supply chain management.
- *'Green' factors* – A focus on environmental accountability, with supply chain management adopting practices which conserve natural resources, minimise waste, promote sustainability, facilitate recycling and protect human health.

The micro (internal) environment requires the assessment and management of factors internal to the organisation, particularly strengths and weaknesses. This can be supported by continuous improvements to systems and strategies to reinforce the strengths or distinctive competencies of the organisation.
The supply chain environment consists of:

- *Supply network factors* – Factors such as supply volatility of raw materials, product design problems, lead time challenges, cost inefficiencies and quality problems which form part of the total pipeline.
- *Distribution network factors* – Such as the development of efficient and rapid market information flows essential to the streamlining of the supply chain.
- *Competitive forces* – Such as the ability to respond to market changes more rapidly than the competition in order to gain competitive advantage.

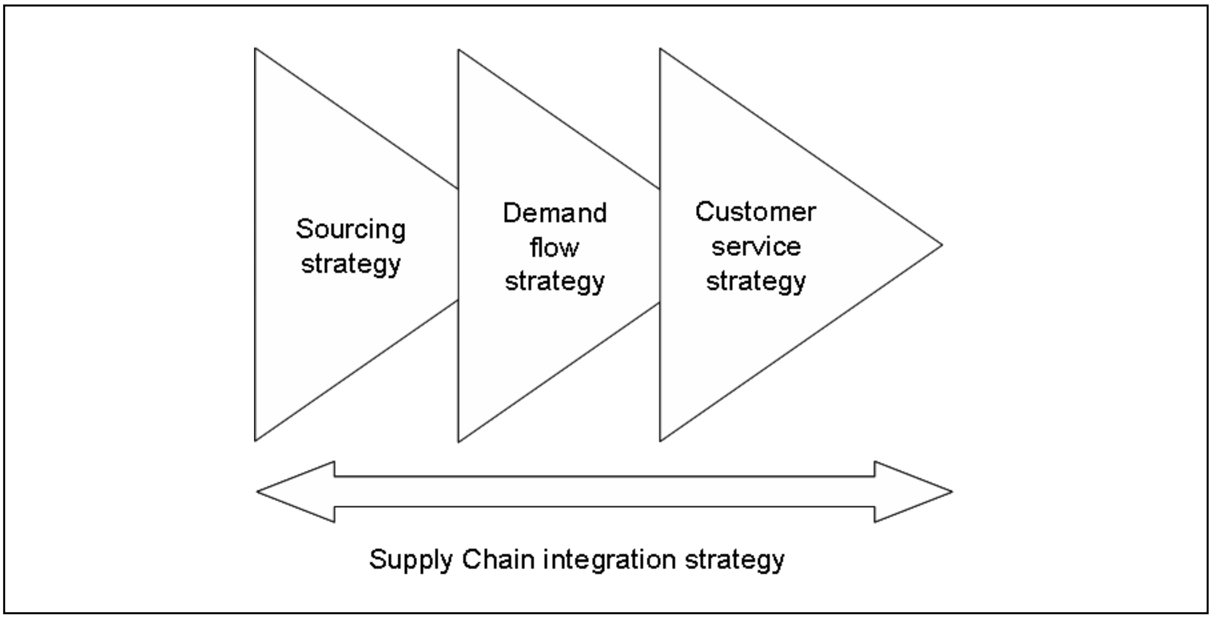
The impact of these external and internal pressures has to be considered by all organisations in order to design their business models around the four strategic processes of plan, source, make and deliver.
The square in the centre of Figure 2.7 shows the sequence of the strategy development process which commences with the formulation of a corporate strategy.

Gattorna (1998: 23), supported by Lummus and Vokurka (1999: 16), says that the supply chain strategy is formed by integrating the activities and processes of each individual functional unit in the company with those of suppliers and customers. This is done by focusing on integrating partner activities and processes by designing appropriate strategies for sourcing, demand flow, customer service and pipeline integration. These are routed in the overall corporate strategy which, in turn, provides the core platform from which all business strategies are launched. Aligning the supply chain strategy with the business strategy entails defining the key business processes involved in producing a company's products and/or services (Lummus & Vokurka, 1999: 16).

The four key dimensions of formulating a supply chain strategy are illustrated in Figure 2.8.

According to Gattorna (1998: 23), the supply chain strategy starts with the customer or end-user. The *customer service strategy* deals with how the organisation responds to the needs and expectations of the customers in a manner that maximises profitability. The *demand flow strategy* defines the linkage between the organisation's customers and the sources of the products and services which the organisation provides to the market. *Sourcing strategy* influences where and how the organisation produces, and has a significant impact on, product and service cost structure and associated risk. *Supply chain integration* establishes the degree of integration of an organisation's information, finances, operations and decision making with those of the participants in the organisation's supply chain.

Figure 2.8 – Four dimensions of strategic supply chain management

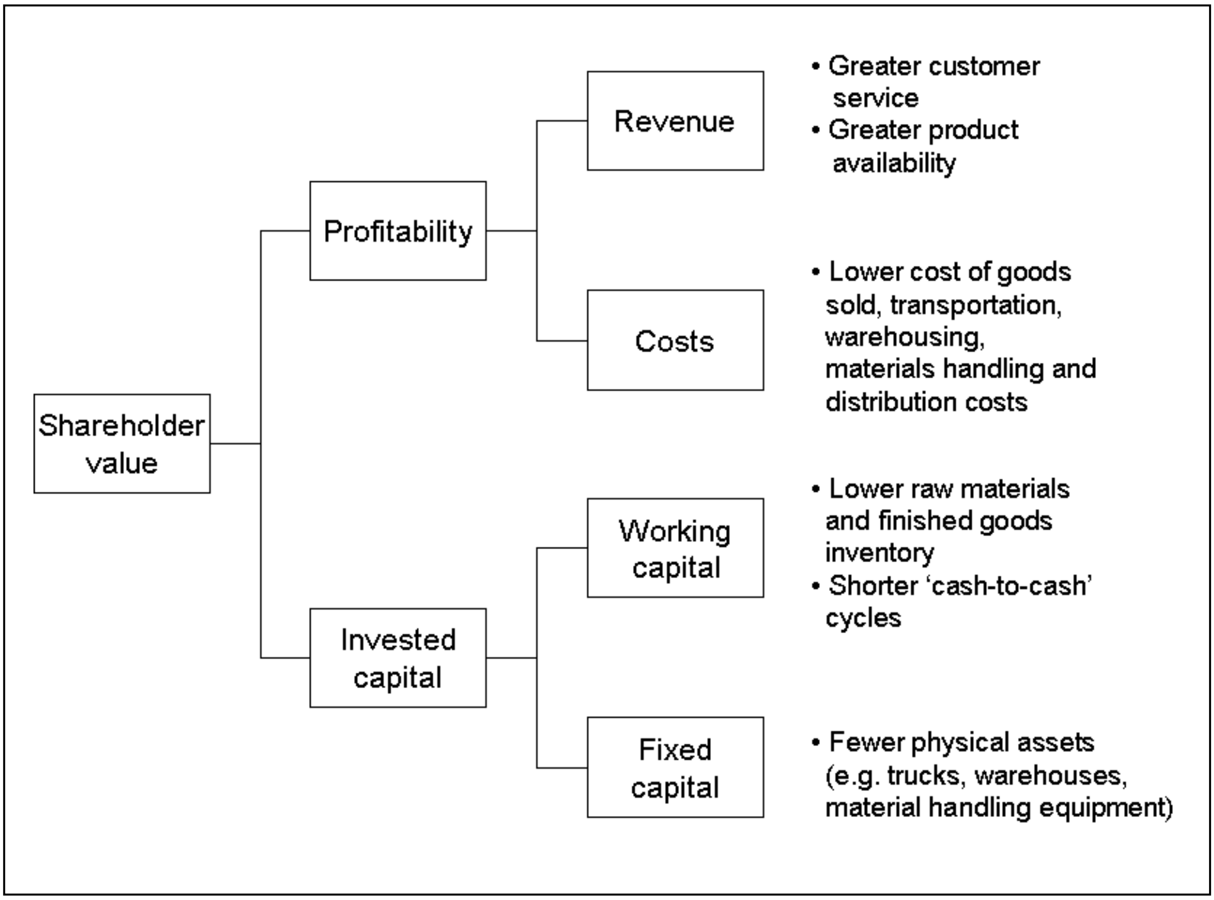



Source: Gattorna (1998: 23)

To illustrate the impact of cash earnings on supply chain management, Gattorna (1998: 26) points out that, in order to determine the financial benefit of an aligned supply chain strategy, the value theory maintains that, to increase the value of a company, cash earnings must be increased over-and-above the company's full cost of capital, in a sustainable fashion. He concludes that supply chain management is able to directly influence both profitability and invested capital (Figure 2.9).

*Revenue growth* is achieved through improved customer service and product availability while *operating costs* can be dramatically reduced through efficient logistics operations. *Inventory* and *working capital* requirements are reduced through leaner operations and shortened lead times while network optimisation and outsourcing can decrease the need for physical assets and thus the amount of *fixed capital* invested.

Figure 2.9 – The impact of supply chain management on cash earnings



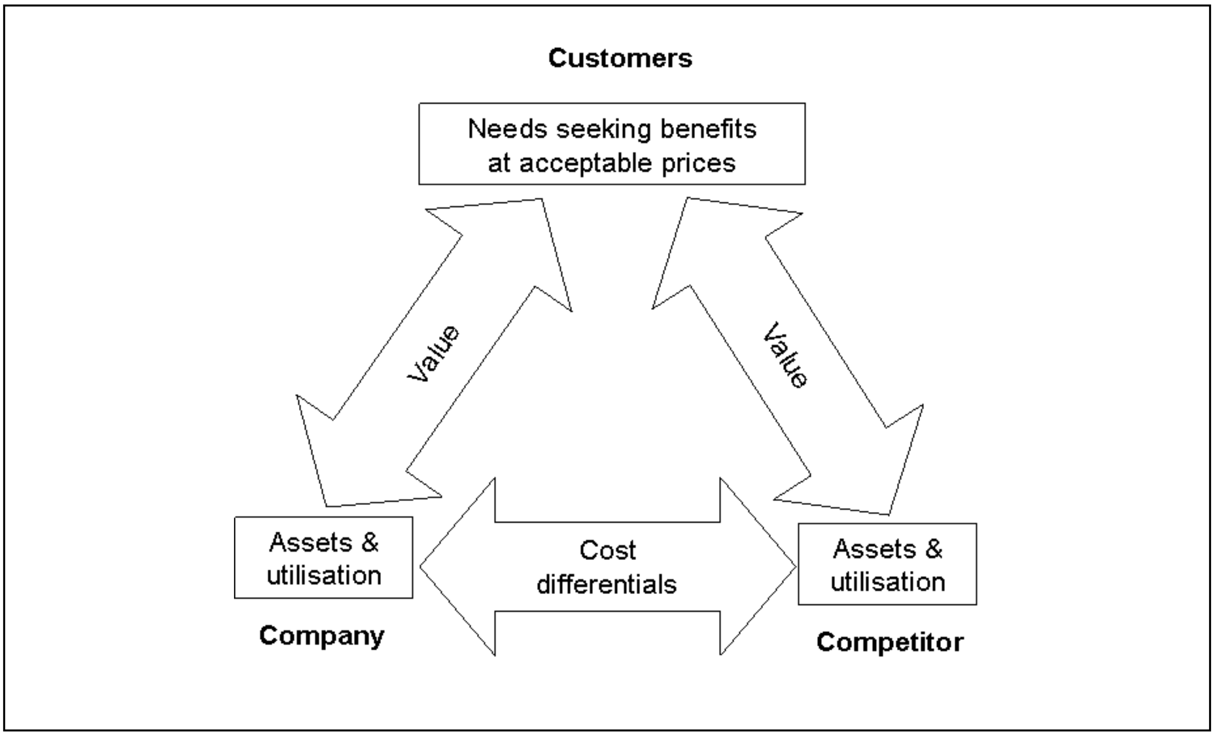

Source: Adapted from Christopher (1998: 79)

Competitive strategy is driven by a need for an organisation to find a unique position in a global marketplace that will secure its continued success. Hugo et al. (2004: 23) remarks that supply chain management can add to this competitive strategy and the creation of competitive advantage by creating a cost advantage, focusing on adding value, delivering superior customer service, flexibility, striving for innovation and creating productivity and efficiency advantage.

Lummus and Vokurka (1999: 11) argue that it is difficult for companies in today's competitive environment to effectively compete if they do not take into account their suppliers and the other entities in the supply chain. As depicted in figure 2.10, a major source of competitive advantage can be found in effective logistics management, with the triangular linkage of the company, its customers and its competitors forming the basis (Christopher, 1998: 4; Lummus and Vokurka, 1999: 15).

Christopher (1998: 5), supported by de Villiers et al. (2008: 13), states that the source of competitive advantage is found, firstly, through a *value advantage* which is the ability of the company to differentiate itself, in the eyes of the customer from its competitors, and, secondly, through a *productivity advantage* by operating at a lower cost and hence at a greater profit to the customer.

Figure 2.10 – The three Cs of competitive advantage



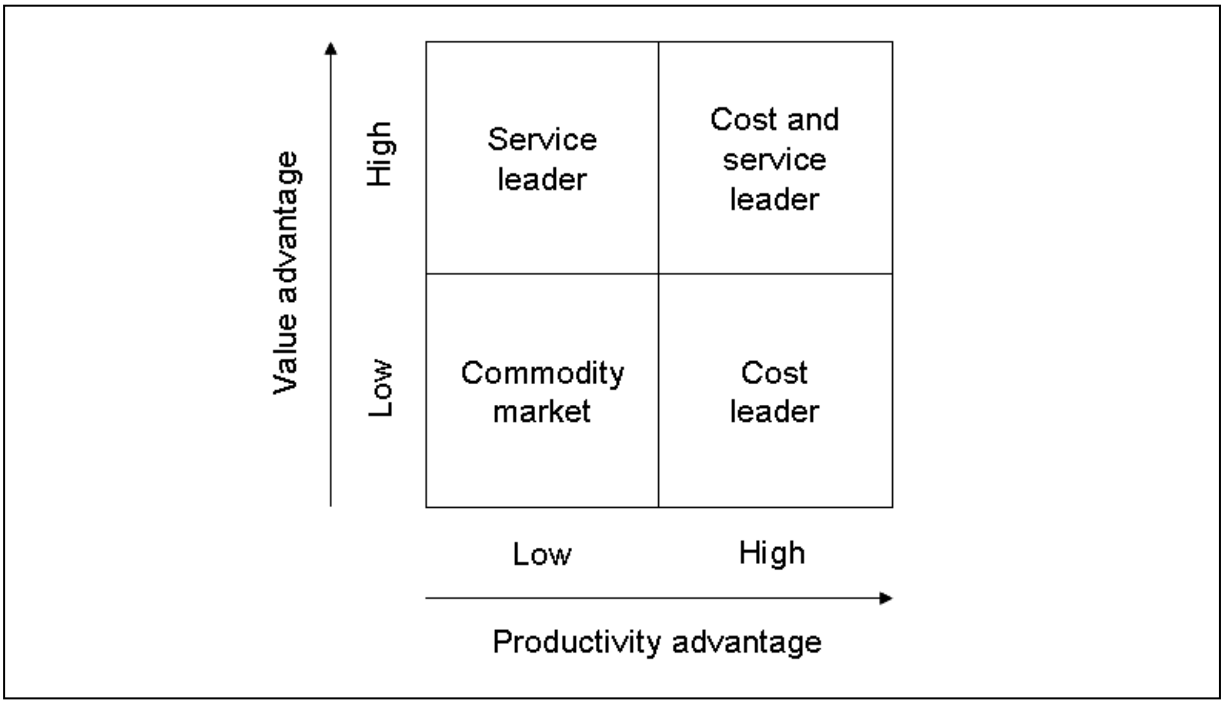

Source: Ohmae as depicted in Christopher (1998: 5)

The *value advantage* is based on the fact that the company would rather add additional value to their offering to justify a premium price, than does compete on a ‘cheapest offering’ basis. The additional value can either be of a tangible nature (i.e. better features) or of a non-tangible nature (i.e. better after-sales service, technical support, etc.) when compared to their competitors.

The *productivity advantage* is partly due to the economies of scale which enable the spread of fixed costs over a greater volume. The experience curve however, has the biggest impact. The experience curve has, at its core, the researched and proven fact that all costs, not just production costs, will decline at a given rate as volumes increase. This is due to the fact that the rate of output increases as workers become more skilled in carrying out the processes and tasks assigned to them. Logistics management can provide a multitude of ways to increase efficiency and productivity and hence contribute significantly to the reduction of unit costs.

According to Christopher (1998: 8), what is found in practice is that the successful companies will often seek to achieve a position based on both a productivity and value advantage, with the matrix depicted in Figure 2.11 explaining the available options.

Figure 2.11 – Logistics and competitive advantage




Source: Christopher (1998: 8)

The main characteristics of the *commodity market* are indistinguishable products from the competitors with no cost advantage, and ultimately the only strategy is either to move towards cost leadership or towards service leadership on the matrix. In many cases, cost leadership is just not possible due to technologies which are available to all the players in the particular market. Economies of scale have traditionally been the basis for cost leadership which demonstrates their importance in many industries. In other words, the higher your market share relative to your competitors, the lower your costs should be.

Christopher (1998: 10) argues that the challenge for logistics and supply chain management is to seek out strategies that will move the business towards a sustainable position of strength based upon differentiation and cost advantage. An increasingly powerful route to achieving a cost advantage comes, not necessarily through volumes and the economies of scale, but instead through logistics management. The basis for this argument is that logistics costs represent a significant proportion of total costs in many industries and that it is possible to make major cost reductions through fundamentally re-engineering logistics processes. An alternative to the ‘commodity’ quadrant of the matrix is to seek a strategy of differentiation through service excellence. Companies in all industries are seeking greater responsiveness and reliability from their suppliers; their aim is to achieve reduced lead-times, just-in-time (JIT) and/or just-in-sequence (JIS) deliveries and value added services that enable them to serve their customers better.

Logistics management and, more specifically, the integrative perspective of supply chain management provide the tools to target the coordination of materials and information flow from origin to destination ultimately satisfying the needs of the customers. Traditionally, each of the logistics activities (refer to Figure 2.3) on both inbound and outbound sides of the supply chain, addressed in isolation, results in a suboptimal supply chain. De Villiers et al. (2008: 13) points out that gaining competitive advantage through supply chain management is only possible when individual activities are optimised through an integrated approach where the focus is on total logistics costs and not individual costs.

Gaining competitive advantage through supply chain management will remain an unattainable goal unless management understands the current and emerging challenges in this field. It has been argued that competitive advantage requires the organisation to continuously re-think and re-evaluate its current business model and business environment. This approach is based mainly on high-velocity, rapidly-changing market conditions evident in many economic sectors. Companies need to respond more quickly and accurately to consumer demands, or risk losing market share to competitors who are able to do this. Knowing the challenges in supply chain management and managing those challenges by incorporating them into strategic planning 'is treated as key to building a sustainable competitive edge through improved inter and intra-firm relationships' (Shepard & Günter, 2006: 242).

## 2.4 Logistics and Supply Chain Management Challenges

Numerous challenges and trends facing logistics and supply chain professionals today have been extensively debated, discussed and documented. One such research initiative was undertaken by Nuzum and Johnson from the University of Denver, USA.

Nuzum and Johnson (2005) conducted in-depth interviews with senior supply chain executives at more than thirty major companies where all but one are on Business Week's list of the Global 1,000 companies. The findings revealed ten major themes:

1. *Key competitive advantage* – Many companies consider their supply chains as one of the central elements of their overall competitive strategy. The research made it clear that companies are redesigning, restructuring, and totally overhauling their supply chains and not merely optimising them.
2. *Network re-designs* – Because networks are so costly and filled with risk, network re-designs are the number one challenge reported by supply chain executives.
3. *Outsourcing to off-shore manufacturing facilities* – Outsourcing to offshore facilities in order to cut operating costs is still a key component of manufacturers' strategies. The downside, however, is stretched lead-times for delivery and the associated risks of non-delivery.
4. *Increasing customer service requirements* – Meeting the customer's demand for greater service standards inevitably leads to higher costs which the customers today are not prepared to accept. In this lies the challenge for suppliers to improve customer services while remaining cost competitive.

5. *Growing alliance on supply chain software applications* – New technology and software applications are all designed to improve a company's visibility and control throughout its supply chain and the Internet is fast becoming the medium of choice for supply chain partners to share information.
6. *Aggregation evolving into a key supply chain strategy* – Companies have learned how to create supply chain synergies and efficiencies by combining product flows and then channelling them through a common network of facilities, transportation lanes and customers. This may also lead to companies forming collaborative ventures with other companies in the supply chain.
7. *Distribution centres getting bigger* – Mega-sized facilities based on the latest innovations in warehouse design, warehouse layout and warehouse management systems have eliminated the need (to some degree) for costly automated materials handling systems.
8. *Heightened emphasis on cash-flow* – The reduction of the cash-to-cash cycle time has become a key factor today in designing and managing supply chains. Examples are (1) faster inventory-turns resulting in lower inventory investment, (2) If a company sends orders 'on time in-full error and damage free' it will result in fewer days of receivables and (3) negotiating extended terms from suppliers will move inventory costs upstream and reduce cash requirements.
9. *Manufacturing and distribution networks are merging* – Operating synergies and efficiencies are targeted by many companies through merging their manufacturing and distribution networks via strategies such as geographic-based manufacturing, customisation and/or postponement. The automotive industry, in particular, is using customisation as a differentiating factor in its products.
10. *Striving for external visibility* – Companies are striving to implement value-added services designed to distinguish them from their competitors or to build customer loyalty, by concentrating on teaming up with their supply chain partners.

Many of these findings were also echoed in the 2008 Supply Chain Foresight study which has as one of its goals ‘to provide an essential trend and benchmark service for the South African supply chain and logistics industry.’ (2008: 1)

The study highlighted the five highest objectives and challenges of the South African automotive industry in order of priority (see table 2.1). Although the objectives and challenges highlighted in table 2.1 are specific to the local automotive industry, the trends discussed are neither new to supply chain professionals, nor are they unique to only certain industries. In order to create and maintain competitive advantage, it is critical to understand the impact of these trends on the strategies of today’s automotive companies.

Table 2.1 – South African automotive industry objectives and challenges

| **Domestic Automotive Industry Objectives** | **Domestic Automotive Industry Challenges** |
|---|---|
| Lower procurement costs | Planning and forecasting capabilities |
| Lower inbound transportation costs | Increased supply chain complexity |
| Improved service to the customer | Sourcing and procurement practices |
| Reduced investment in inventory | Skills and capabilities of supply chain staff |
| Lower manufacturing costs | Diverse needs and requirements of customers |

Source: 2008 Supply Chain Foresight – Automotive Report

## 2.5 Summary

The disciplines of both logistics and supply chain management have come a long way from their humble beginnings in the 1950s and 1960s to what is today considered by many business leaders as a source of strategic direction with competitive advantage as the ultimate prize.

In this chapter, logistics management is defined as part of the supply chain, concerned with those activities related to the flow of goods, services and information from point of origin to point of consumption with the fulfilling of the end customer requirements as its main focus. Supply chain management encompasses a broader scope of activities to ultimately integrate supply and demand management across companies, focusing on the various relationships within this extended network of organisations. Even though other functional areas such as finance, operations and marketing management have made important contributions to the evolution of supply chain management, it is, in fact, logistics and purchasing which have formed the backbone of the supply chain management discipline as it is known today.

On an operational level, logistics management provides the organisation with the tool to realise substantial cost reduction and efficiency improvement objectives. The key to attaining these objectives is by way of the integrated logistics and total cost concepts whereby the optimisation of logistics activities are viewed from a holistic perspective due to their interrelationship, rather than optimising the individual logistics activities in isolation. Here, the focus should be on minimising the total cost of transportation, warehousing, inventory, order processing, information systems and lot quantity while achieving a desired customer service level.

Strategically, supply chain management is concerned with more than just the movement of goods from point A to point B. It is about the creation of value for the supply chain member organisations with a particular emphasis on the end customer in the supply chain. In other words, turning supply chains into value systems.

The typical automotive supply chain was briefly introduced as consisting of both upstream and downstream networks, with the focus of this study being predominantly on the upstream or inbound supply portion.

The increasing complexity and pace of change have had a dramatic impact on the successful management of today's companies, where the competitive edge of yesterday becomes the minimum service requirement of tomorrow. The main driver being the sophistication, knowledge and expectations of today's consumers who require customised products, services and solutions. It is this increased and continuous change in the business environment, which highlights the importance of having (like any general business, finance and marketing strategy) a clearly defined logistics and supply chain strategy. Any company without such a strategy will fall prey to an aimless search for supply chain alignment and optimisation. An effective supply chain strategy, combined with operational excellence which supports the execution of such a strategy, can ensure success for the company, its stakeholders and its customers.

Investing aggressively in creating sustainable competitive advantage is a company's single most dependable contributor to above-average profitability. In a borderless world with global citizens, global competitors, global customers, global suppliers and global distributors, logistics and supply chain management can add value to a competitive strategy and the creation of competitive advantage. Supply chain management can drive the creation of competitive advantage by delivering a cost advantage, focusing on adding value, delivering superior customer service, creating flexibility, striving for innovation and creating an efficiency advantage.

The numerous objectives, challenges and trends facing logistics and supply chain professionals today have been highlighted in this chapter by two major research studies. The ProLogis Supply Chain Review revealed ten themes identified by senior supply chain executives that drive their supply chain strategies and decision processes. This was echoed by the local Supply Chain Foresight study of 2008 which brought five major objectives and five major challenges identified by the local automotive industry as its supply chain drivers. Both studies underlined the importance of supply chain management on the containment of cost and the improvement of processes to maximise customer service and ultimately deliver sustainable competitive advantage and subsequent profitability.

It can be concluded that supply chain management, supported by various other functional activities with logistics management as its backbone, has the ability (when managed effectively) to provide the organisation with the required sustainable competitive edge it requires to compete in an ever-changing business environment. This is specifically true for the domestic automotive industry where supply chains and not companies are competing on a global scale. In chapter 3, the importance of logistics and supply chain management in the automotive industry will be further detailed and the concepts and complexity of the global and domestic industry are discussed.

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# Chapter 3

## Inbound Automotive Logistics- and Supply Chain Management

*This chapter explores the importance of logistics and supply chain management in the automotive industry. It touches on the global and the domestic economic importance of the automotive industry as well as the history of the industry in South Africa. It focuses on supply management and examines inbound material flow concepts within a typical automotive supply chain.*

## Content

## 3.1 Introduction

For many motor vehicle customers, the automotive industry revolves around their local vehicle showroom that represents the pinnacle of all the various activities and processes that go into the shiny new vehicles seen through the showroom window.

Since 2000, the South African automotive industry has experienced a substantial growth phase, with local vehicle production in 2006 reaching a record high of close to 588,000 units (NAAMSA, 2007). This can be mainly attributed to the government's economic growth plans that have led to lower interest rates. This culminated in higher disposable incomes in the middle to higher income groups that has made it financially easier for the average customer to buy a new vehicle.

What many customers overlook are the numerous functions and processes that have to be managed and coordinated before vehicles are made available for purchase. Holweg and Phil (2004: 29) point out that the average vehicle contains up to 15,000 part numbers, representing between 2,000 and 4,000 individual components. These components are typically manufactured by more than one hundred Tier-one suppliers (Doran 2004: 103) and are delivered to the production facility in various forms (see 3.4.4.1 and 3.4.4.2). This process may be managed and coordinated by hundreds of people from across the globe. In many companies (original equipment manufacturers and suppliers alike), the responsibilities span over functional areas such as research and development, production, marketing, purchasing and logistics that add considerable complexity to processes and reporting lines. Taking cognisance of this complexity, it is clear that the local showrooms are only the proverbial tip of the automotive iceberg.

## 3.2 The Economic Importance of the Automotive Industry

Since the dawn of the industrial revolution in the late 1800s, the automotive industry has been one of the industries that has set the pace of change, directed foreign investment, engineering, technological advancement, design and manufacturing processes all across the globe. The importance of an industry in an economy (developed or developing) can be established by assessing economic facts and statistics.

### 3.2.1 A global perspective

According to the International Organisation of Motor Vehicle Manufacturers (OICA, 2009), the world's automotive industry manufactured more than 66 million cars, vans, trucks and buses in 2005. This is equivalent to a global turnover of close to € 2 trillion. If vehicle manufacturing were a country, it would be the sixth largest economy in the world. Close to nine million people are directly employed in manufacturing 70 million vehicles and the parts that go into them. This is more than 5% of the world's total employment in manufacturing. In addition to these direct employees, it is estimated that each direct automotive job supports close to 5 indirect jobs in the community, resulting in more than 50 million jobs owed to the automotive industry. The automotive industry is also a major innovator, investing over € 84 billion in research, development and production. This plays a key role in the technology levels of other industries. Vehicle manufacturers are also major contributors to government revenues around the world, contributing more than € 400 billion.

In 2011, global new vehicle production (passenger and commercial vehicles) surpassed the 80 million-unit mark. South Africa's automotive production (including vehicles produced for export) during that year reached close to 533,000 units. This represents less than 1% of world production but 85% of the African continent's total vehicle production (OICA, 2011) (Table 3.1).

Table 3.1: Global top 30 automotive manufacturing countries in 2011

| Ranking | Country | 2011 Manufacturing Passenger vehicles | Commercial vehicles | Total | Contribution |
|---|---|---|---|---|---|
| 1 | China | 14,485,326 | 3,933,550 | 18,418,876 | 22.87% |
| 2 | USA | 2,966,133 | 5,687,427 | 8,653,560 | 10.74% |
| 3 | Japan | 7,158,525 | 1,240,129 | 8,398,654 | 10.43% |
| 4 | Germany | 5,871,918 | 439,400 | 6,311,318 | 7.84% |
| 5 | South Korea | 4,221,617 | 435,477 | 4,657,094 | 5.78% |
| 6 | India | 3,053,871 | 882,577 | 3,936,448 | 4.89% |
| 7 | Brazil | 2,534,534 | 871,616 | 3,406,150 | 4.23% |
| 8 | Mexico | 1,657,080 | 1,022,957 | 2,680,037 | 3.33% |
| 9 | Spain | 1,819,453 | 534,229 | 2,353,682 | 2.92% |
| 10 | France | 1,931,030 | 363,859 | 2,294,889 | 2.85% |
| 11 | Canada | 990,483 | 1,144,410 | 2,134,893 | 2.65% |
| 12 | Russia | 1,738,163 | 249,873 | 1,988,036 | 2.47% |
| 13 | Iran | 1,413,276 | 235,229 | 1,648,505 | 2.05% |
| 14 | Thailand | 549,770 | 928,690 | 1,478,460 | 1.84% |
| 15 | UK | 1,343,810 | 120,189 | 1,463,999 | 1.82% |
| 16 | Czech Rep. | 1,191,968 | 7,866 | 1,199,834 | 1.49% |
| 17 | Turkey | 639,734 | 549,397 | 1,189,131 | 1.48% |
| 18 | Indonesia | 561,863 | 276,085 | 837,948 | 1.04% |
| 19 | Poland | 740,000 | 97,132 | 837,132 | 1.04% |
| 20 | Argentina | 577,233 | 251,538 | 828,771 | 1.03% |
| 21 | Italy | 485,606 | 304,742 | 790,348 | 0.98% |
| 22 | Slovakia | 639,763 | 0 | 639,763 | 0.79% |
| 23 | Belgium | 562,386 | 0 | 562,386 | 0.70% |
| 24 | Malaysia | 496,440 | 43,610 | 540,050 | 0.67% |
| **25** | **South Africa** | **312,265** | **220,280** | **532,545** | **0.66%** |
| 26 | Taiwan | 288,523 | 54,773 | 343,296 | 0.43% |
| 27 | Romania | 310,243 | 24,989 | 335,232 | 0.42% |
| 28 | Australia | 189,503 | 34,690 | 224,193 | 0.28% |
| 29 | Hungary | 200,000 | 2,800 | 202,800 | 0.25% |
| 30 | Portugal | 141,779 | 50,463 | 192,242 | 0.24% |

Source: Compiled from 2011 OICA data

The 2008/2009 global economic slowdown had a significant impact on the global automotive industry with challenges such as production overcapacity, high inventory and low profitability. Global production declined from close to 70 million units in 2006 to 61 million units in 2009, a decline of nearly 13%. From a South African perspective, this downward trend was even greater as production output declined by 35% from close to 588,000 units in 2006 to 380,000 units in 2009 (OICA, 2009). Industry analysts are, however, expecting a recovery in sales growth supported by the global economic recovery, improving consumer confidence and increasing the demand for smaller, fuel-efficient cars, especially in emerging markets. Again, South African is expected to follow this positive trend with NAAMSA projecting production recovery to the 595,000 units mark by the end of 2012 (NAAMSA, 2012).

### 3.2.2 A South African perspective

From a South African economic perspective, the contribution is just as significant. The domestic automotive industry incorporates the manufacturing, distribution, servicing and maintenance of motor vehicles and plays a vital role in the South African economy. New vehicle sales for 2011 totalled in excess of 571,000 units (NAAMSA, 2012).

In spite of South Africa occupying around the 25$^{th}$ position in the international vehicle production rankings (ahead of countries such as Australia, Taiwan and Sweden) (OICA, 2009), vehicle manufacturers in South Africa have indicated their confidence in the local industry as well as its significance in their global manufacturing networks by investing close to R 17 billion in the local industry since 2006. (Odendaal, 2012). All of the major vehicle manufacturers, eight of the world's top ten automotive component manufacturers and also three of the world’s four largest tyre manufacturers are represented in South Africa (South Africa’s Automotive Industry, September 2008).

In 2010, the motor vehicle industry contributed around 6.17% of South Africa’s R 2,662.8 billion Gross Domestic Product (GDP) and represented the largest manufacturing sector in the South African economy, accounting for close to 21% of manufacturing output (NAAMSA, 2012). Direct employment by Original Equipment Manufacturers (OEMs) is in excess of 37,000 individuals, with close to 321,000 individuals reportedly employed in the industry (including vehicle and component manufacturing, the tyre industry, as well as the motor trade, distribution and servicing) (NAAMSA, 2012). Through the gearing effect, work opportunities can be traced to many kinds of basic manufacturing activities, including steel production, paint and rubber, leather, textiles, plastics, petro-chemical industries and component manufacturing. Also, because the industry provides employment by default in many other areas (i.e. civil servants, tax officials and customs and excise personnel), the industry has a substantial influence on employment in South Africa. Automotive exports, as a percentage of total SA exports, are close to 12% and in excess of 17% of total SA imports. This is close to R 70 billion and in excess of R 100 billion respectively (Automotive Export Manual, 2011).

In 2010, exports of South African produced vehicles generated close to R 38 billion in revenue and were exported to 77 destinations, mainly to the USA (35%), Germany (22%), Japan (8%) and Australia (7%) (Automotive Export Manual, 2011: 49). Exports have grown from 15,764 units exported in 1995 to 108,293 units exported in 2001 to close to 180,000 units in 2006 and to record levels of more than 280,000 units in 2008 (including passenger vehicles, light commercial vehicles and heavy commercial vehicles) (Automotive Export Manual, 2011: 49). Due to the economic downturn, vehicle exports fell sharply to around 174,000 units in 2009, but showed good signs of recovery by reaching in excess of 238,000 units in 2010 (Automotive Export Manual, 2011: 49).

There are more than 200 automotive component manufacturers in South Africa, with a combined turnover of around R 50 billion, or approximately 2% of the country's GDP (South Africa's Automotive Industry, September 2008). According to the Department of Trade and Industry:

> 'The South African automotive components industry has become a major exporter of manufactured products over the course of the last few years and is widely regarded as a key success story in South Africa's transition from an inward oriented to export focused economy' (Department of Trade and Industry South Africa, 2002: 9).

Automotive components to the value of close to R 31 billion were exported in 2010 (mainly to Germany, Spain, the UK, the USA, France and sub-Saharan Africa) (Automotive Export Manual, 2011: 51). At 48%, catalytic converters are by far the biggest contributor to the total R 31 billion export basket. Stitched leather seat parts

(9%), exhaust components (6%), engine parts (5%) and tyres (4%) complete the list of top automotive export commodities (Automotive Export Manual, 2011: 51).

The importance of export contracts to local automotive companies as well as collaboration between these companies to gain these contracts was underlined by a 2008 VWSA/Eberspächer SA export agreement. The agreement, whereby the local VW subsidiary will supply the VW Group with diesel particulate filters for the next five years, totals an estimated R 12 billion. It also requires the partners to invest around R 55 million in tooling and equipment to manufacture the parts. Additional investments in the national supplier base should amount to approximately R 26 million, with 80% supplied by suppliers located in the local region (Wheels24, 2008).

The 2010 aggregate employment in the vehicle production industry amounted to around 28,000 with close to another 65,000 individuals reportedly employed in the component manufacturing industry. Around 200,000 people are employed in the trade area (i.e. in the fields of vehicle sales and vehicle maintenance and servicing) (Automotive Export Manual, 2011: 77). In economic terms, although employment ratios vary from country to country, the general rule is that for every worker in the motor vehicle manufacturing industry, there are at least two or more employed in the areas of used vehicle sales, servicing and repair (Automotive Export Manual, 2011: 77). Also, because the industry provides employment by default in many other areas, the influence that the industry has on a large proportion of employed South Africans is substantial.

## 3.3 The Automotive Industry in South Africa

### 3.3.1 An overview – past, present and future

The automotive industry has had a long and chequered history in South Africa. The history of the industry can be traced back to 1896 when imported vehicles ruled the roads. In 1924, the Ford Motor Company (Ford) opened the first South African assembly plant in Port Elizabeth to build Model Ts from complete-knocked-down

(CKD) kits (Ford in South Africa, n.d.). Two years later, in 1926, the General Motors Company (GM) followed with its assembly plant also situated in Port Elizabeth.

For the next twenty five years, Ford and GM dominated the industry. Cars designed in America suited the South African tastes and coped well with the poor infrastructure at that time. In the mid 1950s, the South African customers started turning to European designs as the American cars became larger and fell out of favour. The Ford and GM plants met the challenge and provided the customers with vehicles based on their European ranges. These vehicles were, in essence, identical to the European ranges, although some were localised with different engines and modified bodywork.

The first Volkswagen (VW) Beetle in South Africa was assembled in 1951. VW took a controlling interest in 1956 and subsequently became one of the country's leading manufacturers.

Domestic content rules were introduced to encourage manufactures to invest in South Africa and, by 1974, a total of 14 manufacturers were producing domestic vehicles.

Over the years up to the early 1990s, the lack of imported vehicles, technology and skills led to the formation of a non-competitive industry with less and less choice, high prices and average quality. The industry was put under even further pressure when economic sanctions were imposed on the pre-1994 government and many manufacturers including Ford, GM, Alfa Romeo and Renault withdrew from the country. This had a disastrous impact on employment and domestic economies as factories closed their doors.

The post-1994 industry saw the introduction of export credits that allowed a healthy stream of vehicle imports. The government's Motor Industry Development Program (MIDP) is working together with auto manufacturers, component suppliers, the retail sector and trade unions to fulfil its goal of turning the South African automotive industry into an important global manufacturing location. Original equipment manufacturers (OEMs) like BMW SA, who assemble vehicles in Rosslyn, Pretoria for export to countries such as the United States, Japan, the United Kingdom and Australia, are able to competitively import other models in their range of vehicles by off-setting the import duties against the export credits earned. The same goes for component manufacturers (manufacturing for both domestic and international consumption), who are allowed to sell their export credits to other automotive players, such as independent vehicle importers (not manufacturing in and exporting from South Africa), in order to competitively import their range of vehicles.

The changes have opened up the market to such an extent that the South African customer can now enjoy as large a selection of vehicles as anywhere in the world.

Table 3.2 – South African new vehicle sales from 1950 to 2011

| Year | New Passenger Vehicle Sales | New Commercial Vehicle Sales | Total New Vehicle Sales | Year-on-Year change |
|---|---|---|---|---|
| 1950 | 36,758 | 7,676 | 44,434 | - |
| 1960 | 98,779 | 20,385 | 119,164 | - |
| 1970 | 201,854 | 95,719 | 297,573 | - |
| 1980 | 277,058 | 127,708 | 404,766 | - |
| 1981 | 301,528 | 152,013 | 453,541 | 10.75% |
| 1990 | 209,636 | 125,143 | 334,779 | - |
| 2000 | 234,122 | 120,510 | 354,632 | - |
| 2001 | 251,560 | 130,969 | 382,529 | 7.29% |
| 2002 | 241,602 | 121,582 | 363,184 | -5.33% |
| 2003 | 258,259 | 124,341 | 382,600 | 5.07% |
| 2004 | 327,651 | 153,869 | 481,520 | 20.54% |
| 2005 | 419,868 | 197,538 | 617,406 | 22.01% |
| 2006 | 481,558 | 232,757 | 714,315 | 13.57% |
| 2007 | 434,653 | 241,455 | 676,108 | -5.65% |
| 2008 | 329,262 | 204,125 | 533,387 | -26.76% |
| 2009 | 258,129 | 137,093 | 395,222 | -34.96% |
| 2010 | 337,130 | 155,777 | 492,907 | 19.82% |
| 2011 | 396,292 | 175,949 | 572,241 | 13.86% |

Source: Compiled from NAAMSA data (NAAMSA, 2012)

The statistics in table 3.2 highlight the growth performance in new vehicle sales from the 1950s to 2011. The 1950 to 1960 growth was due to stable economic conditions, while 1981 is highlighted as the first year when sales peaked at over 450,000 units. The 1990 slump was a reflection of the economic downturn due to political instability and economic sanctions, contrasted by the post-1994 era that saw growth due to economic upturn. The economic downturn is also clearly visible in the 2008/2009 figures.

During his opening address at the 2007 Annual National Automotive Conference, the then Gauteng MEC for finance, Mr Paul Mashatile, said that the South African automotive industry can rightly be described as one of our country's success stories and that it has been identified as a key growth sector by government. Mr Tshebiso Matona, Director General of the South African Department of Trade and Industry, echoed this when he said that the automotive industry is seen as a critical priority sector of the department and currently the sector that receives the most support from government. Mr Brand Pretorius, a respected automotive industry specialist and former CEO of McCarthy Limited, concluded in his address that the long term future of the South African automotive industry is optimistic and promises growth.

It is safe to conclude that the automotive industry is one of the most important in terms of revenue, employment and investment generation in the South African economy, with a high long term growth potential. It is therefore imperative that the government continues investing in creating a sustainable growth environment for the industry by providing support initiatives such as MIDP, Blue IQ and the Automotive Industry Development Centre (AIDC).

### 3.3.2 Automotive industry support initiatives

It is not the objective of this study to critically evaluate the success and/or failure of the MIDP, Blue IQ and the AIDC. Referring to these specific initiatives does not imply that they are the only government initiatives related to the automotive industry. It merely serves to provide the reader with supporting information for a clear understanding of the underlying factors influencing the domestic automobile industry and its relation to the South African supplier park concept.

Many industry observers and specialists have described the MIDP as the catalyst for the growth that the industry has shown the last decade. It was implemented with effect from 1st of September 1995 to reshape the future direction of the South African automotive and associated industries (i.e. Tier-one to Tier-n suppliers and service providers). The MIDP was developed to address competitive challenges facing the industry in South Africa such as trade liberalisation, globalisation of markets against the background of rapid and continuous change, rising end user expectations as well as markets which were becoming increasingly demanding and fast moving in terms of fashion and trends.

In September 2000, Mr Alec Irwin (the then South African Minister of Trade and Industry), said the following about the MIDP:

> 'The South African automotive industry has not only accepted the challenges posed by global integration but, in a relatively short period of time, succeeded in many of the objectives of the MIDP. In this regard, the significant growth in exports and foreign investments, the declining trade deficit, productivity improvements and price increase below the customer price index, speak for itself. Although relatively small in world terms, a number of first world production facilities indicated that they can compete with the best in the world and can add substantial value to their overseas parent companies and their global strategies. The Department has also partially funded the CSIR's Automotive Industry Development Centre (AIDC) to address the needs of the automotive industry in order to develop technology locally' (Irwin, 2000).

NAAMSA (2007: 24) states that the key objectives set out by the government for the MIDP were to:

- Increase the global competitiveness of the South African automotive manufacturing and associated industries;
- Improve vehicle affordability in the domestic market;
- Encourage growth in the vehicle market and in the component manufacturing industry particularly with regard to exports;
- Stabilise employment in the industry; and
- Provide a greater balance between the industry's foreign exchange usage and foreign exchange earnings.

The MIDP concept is, however, scheduled to be replaced by the Automotive Production and Development Program (APDP) in 2013. Dr Hansgeorg Niefer, chairperson of the board of management of the then DaimlerChrysler South Africa (DCSA), highlighted the fact that an initiative such as the MIDP, which aims to stimulate exports, is imperative as the domestic market alone is too small to sustain a domestic manufacturing plant and that it is also important to support domestic manufacturing operations as the distance to markets from South Africa places it at a competitive disadvantage (Venter, 2006). According to VWSA MD, David Powels, the South African automotive industry has an approximate 20% lag in terms of cost competitiveness compared to manufacturers in Western Europe and that this gap widens to between 30% and 40% when compared to cost structures with emerging automotive production industries such as India and China (Venter, 2008).

The APDP is structured around four key elements, namely, tariffs, local assembly allowance, production incentives and automotive investment allowance. It aims to stimulate growth in the South African automotive vehicle production industry to 1.2 million vehicles per annum by 2020 with an associated expansion in the automotive components industry (Makapela, 2008).

The APDP follows a review of the MIDP started in 2005 (Venter, 2008) that highlighted the follow industry challenges (Makapela, 2008):

- South Africa and the sub-Sahara region has remained a relatively small market in global terms which is isolated from larger markets and shipping routes;
- The industry is faced with major domestic infrastructure challenges and logistical inefficiencies; and
- The revised programme needs to be comparable with major competitors and with World Trade Organisation (WTO) guidelines.

Blue IQ is a Gauteng Provincial Government initiative that aims to invest in and commercialise strategic economic infrastructure to drive and support sustainable economic growth with private and public partners. It focuses on four growth sectors, business tourism, high value-added manufacturing, logistics and information and communication technology. It was established in 2003 as a provincial public entity operating as a limited private company. Blue IQ is currently involved in eleven projects: the Gautrain, Dinokeng, the Cradle of Humankind, the Wadeville Alrode Industrial Corridor, the City Deep Roads Infrastructure, the Johannesburg International Airport Industrial Development Zone (JIA IDZ), The Innovation Hub, Gauteng Automotive Cluster, Kliptown, Newtown and Constitution Hill (BlueIQ, 2006).

The AIDC is a provider of strategic solutions and government projects to the South African automotive industry. It was launched in 2000 as a government owned private service provider company to assist in

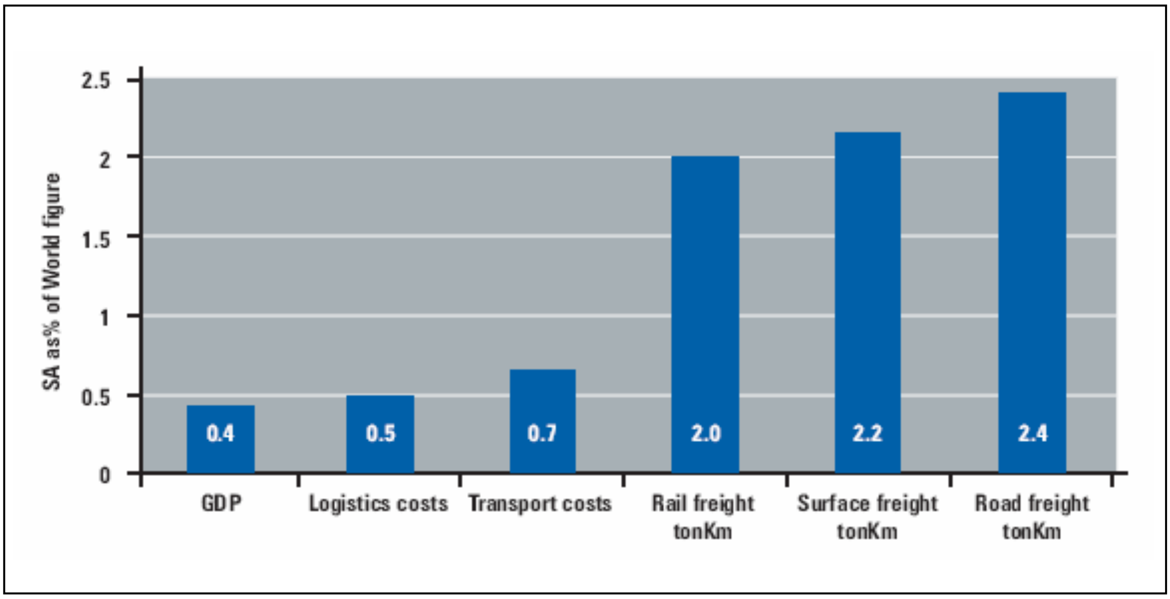
- Increasing the global competitiveness of the South African automotive industry by focusing on skills development;
- Competitiveness challenges facing component manufacturers (with reference to cost, quality and delivery requirements);
- High logistical costs resulting from large distances to export and import markets; and
- A sub-optimal logistics infrastructure within South Africa (AIDC, 2010)

### 3.3.3 Domestic logistics infrastructure challenges

The fact that South Africa is not ideally located in terms of global logistics flows and also in terms of logistics infrastructure, compounds the challenges facing the domestic automotive supply chain. This has been clearly documented in the First and Second Annual State of Logistics Survey for South Africa conducted by the Council for Scientific and Industrial Research (CSIR) in collaboration with the Department of Logistics, University of Stellenbosch and other industry role players (CSIR, 2005).

The Second Annual State of Logistics Survey for South Africa (2005) documents the fact that developing countries produce 37% of the world's Gross Domestic Product (GDP), but take responsibility for 48% of the logistics costs. The top developed economies have achieved logistics costs of lower than 10% of GDP, while the worst could pay as much as 30% with an average of between 11% and 16%. South Africa, in comparison (figure 3.1), contributes less than 0.5% to the world's production, bears 0.5% of the logistics costs and contributes nearly 2.5% of the world’s road tonkilometers. According to the study, 'South Africa requires 4.4 times the tonkilometers for each dollar of production moved, compared to the rest of the world, and engineered a rail and highway system that does not impact costs as much as it could.'

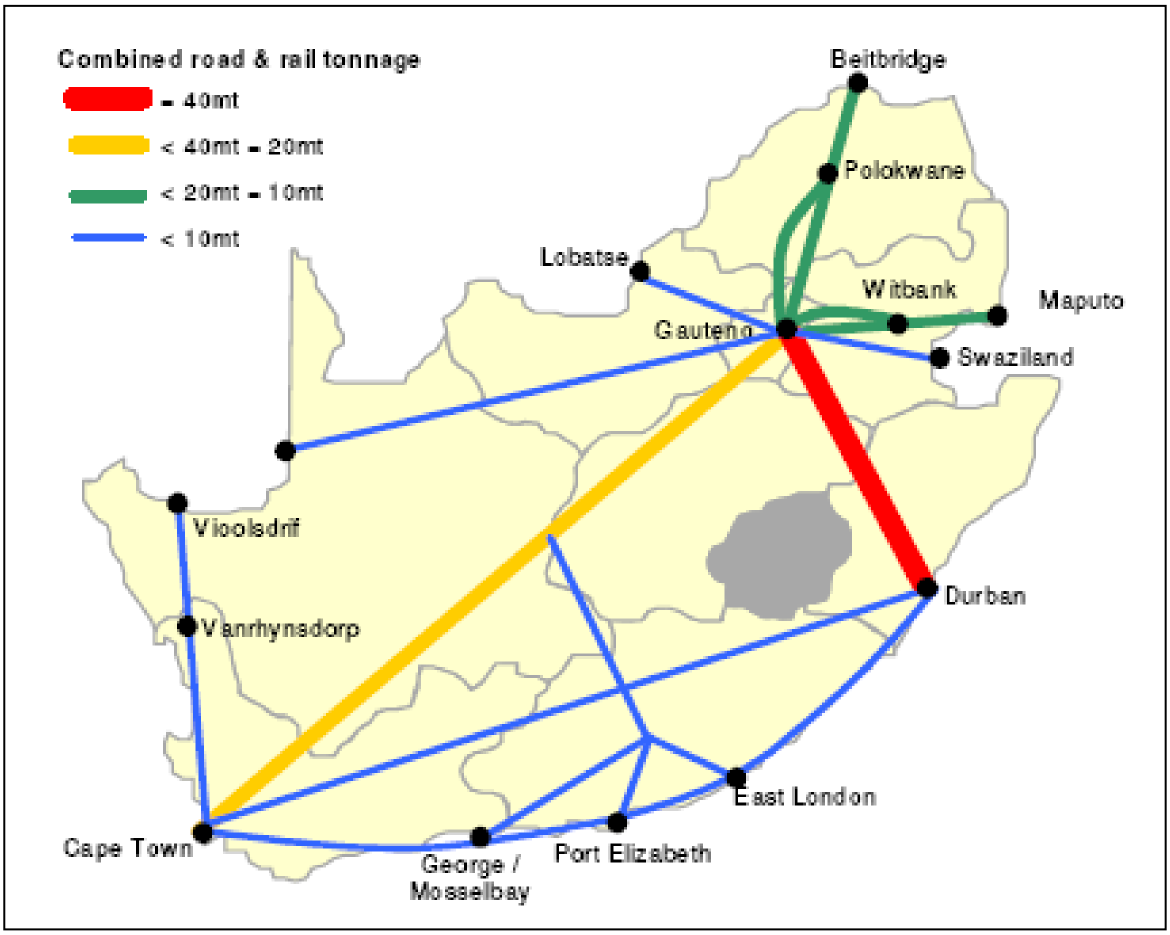
Figure 3.1 – South Africa's GDP as a percentage of the world's combined production and logistics characteristics




Source: The Second Annual State of Logistics Survey for South Africa (CSIR, 2005)

The First State of Logistics Survey for South Africa, conducted in 2004 (CSIR, 2004), presented both government and business with a clear picture of modal imbalance. It highlighted this fact by finding that the majority of corridor traffic is concentrated on two corridors, namely, Gauteng-Durban and Gauteng-Cape Town (see figure 3.2). The 2004 study concluded that what was most disconcerting was the fact that increasing tonnages are shipped over long-haul, densely populated road corridors.

Figure 3.2 – Freight flows per corridor (2003)

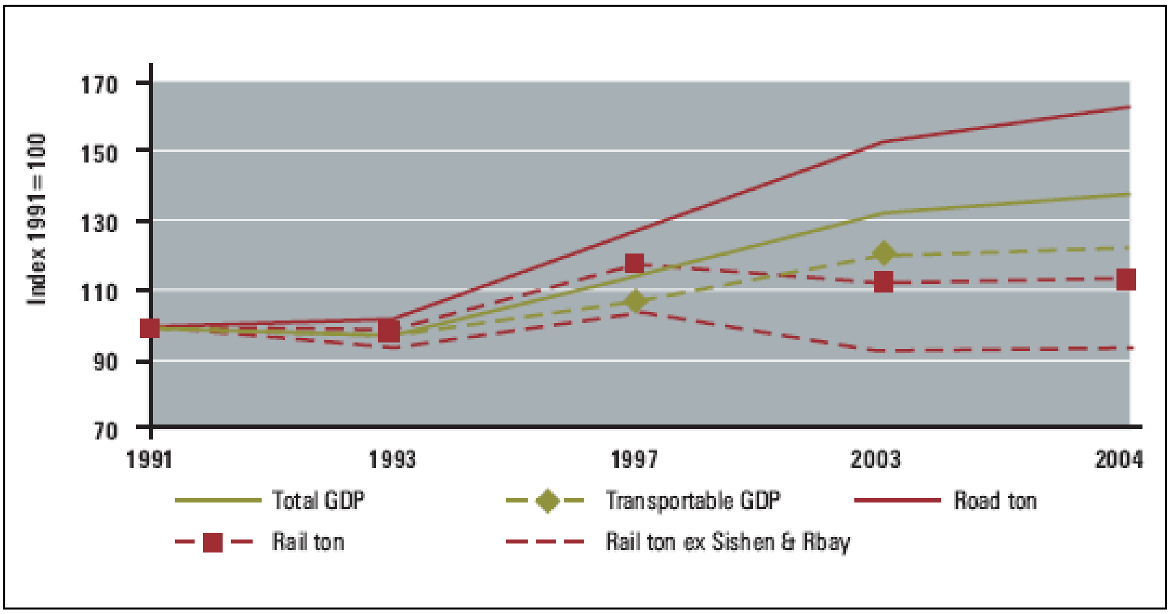



Source: The First State of Logistics Survey for South Africa (CSIR, 2004)

An alarming trend is that road traffic is increasingly becoming the preferred mode of transport as depicted in figure 3.3, while figure 3.4 depicts the increased market share of road traffic from 1990 until 2004 which further supports the trend. This, in effect, means that, for every ton (1,000 kilograms) of freight moved in South Africa, 750 kilograms are moved via road and, in 2004, South Africa's production and imports required the movement of about 830 million tons. That equates to around 623 million tons being moved via South Africa's road infrastructure.

Figure 3.3 depicts the correlated growth of road tonnage with the growth in total and transportable GDP in contrast with the decline of rail tonnage since 1997.

Figure 3.3 – Structural changes in freight transportation

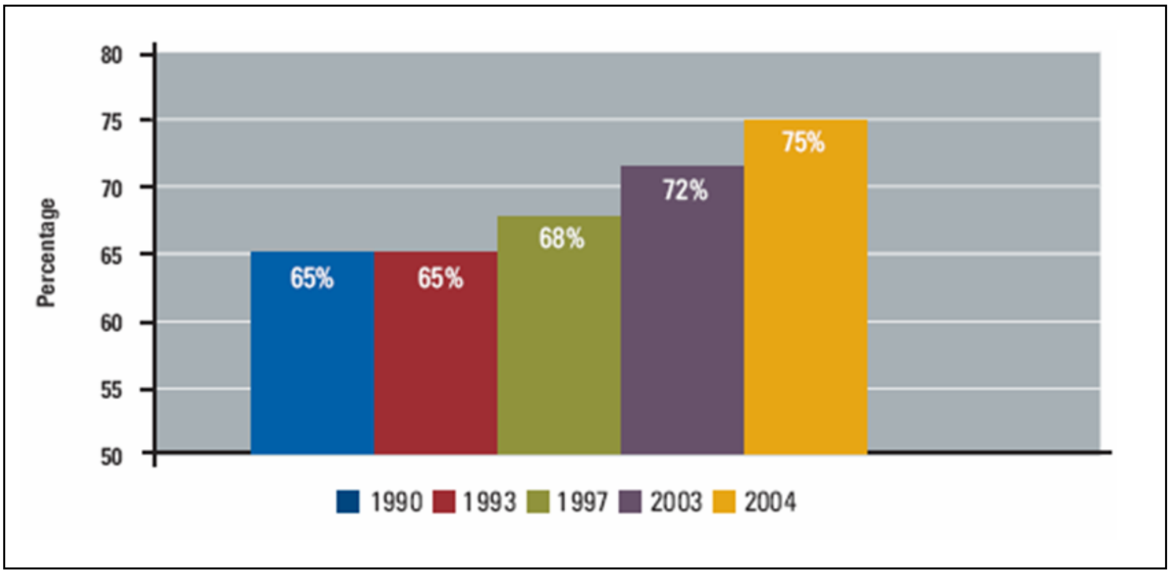



Source: The Second Annual State of Logistics Survey for South Africa (CSIR, 2005)

The 2004 survey also managed to answer the question of why the shift to road has taken place. This is due to the user:

- Benefiting from speed and its contribution to greater carrying cost efficiency;
- Ensuring timely delivery in accordance with contracts;
- Improving through-put efficiency by reducing double handling; and
- Reducing pilferage, damages and losses.

Figure 3.4 – Road traffic market share



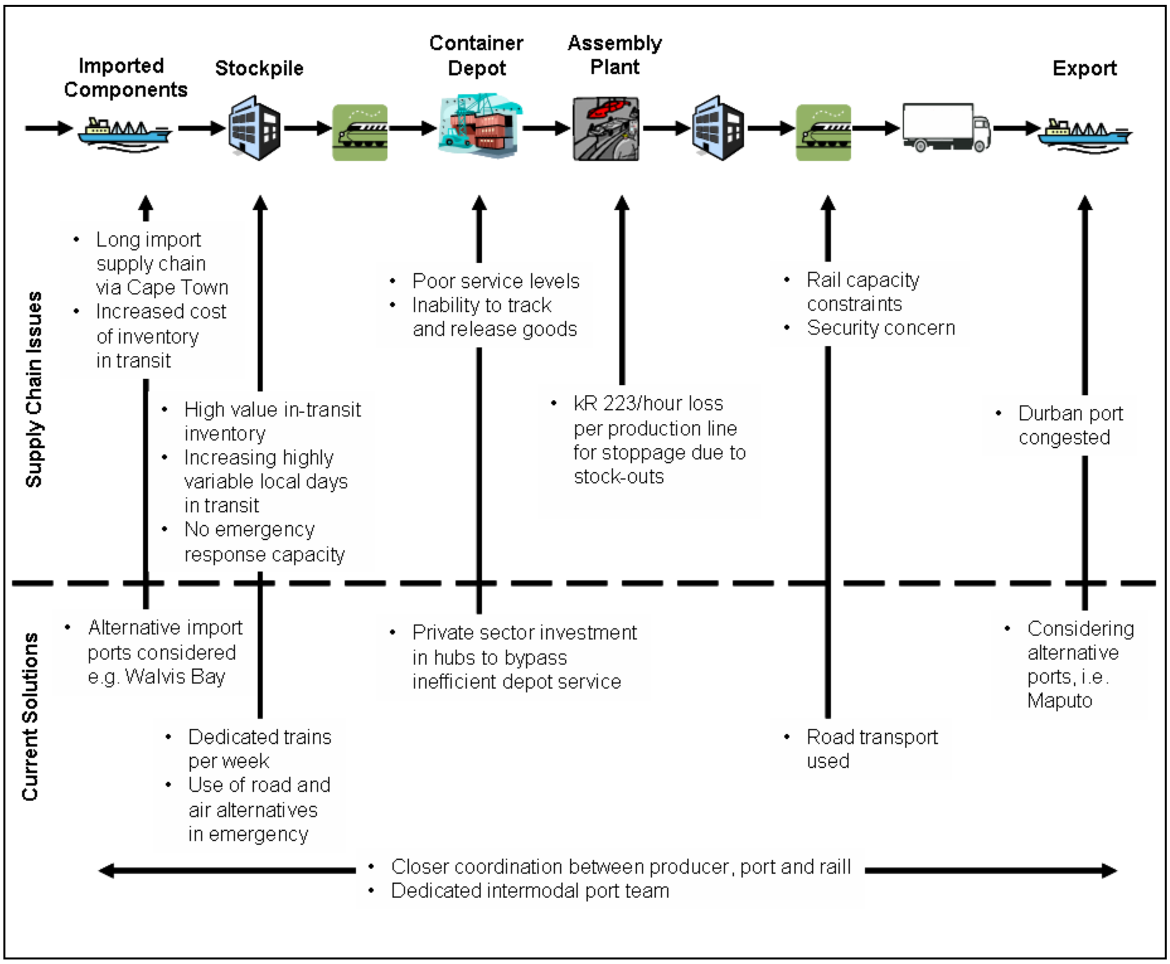

Source: The Second Annual State of Logistics Survey for South Africa (CSIR, 2005)

The key challenges, from an automotive industry perspective (figure 3.5), are to produce at a globally competitive cost while having the ability to respond timeously and reliably to sophisticated first-world market demands.

The survey also identifies high reliability and high responsiveness to the demands of the customer-driven production processes as the key supply chain challenges. These challenges centre on the capability of the industry to meet the demands of its specific supply chains by negotiating agreements with logistics service providers.

Although not pinpointing the exact issues and solutions, the 2004 survey does, however, give insight into the views of the practitioners. One of these views is that supply chain bottlenecks are typically caused by the lack of adequate rail capacity and efficiency, port congestion, border post delays and customs clearance. In linking these concerns with the continuous aim of the automotive industry to be highly reliable and highly responsive to equal the demands of the customer-driven production process, it is clear that the current logistics infrastructure is not conducive to enabling the industry to achieve those goals.

Figure 3.5 – Challenges in the automotive supply chain




Source: Adapted from the Second Annual State of Logistics Survey for South Africa (CSIR, 2005)

Government has committed in excess of R 480 billion for infrastructural investment in the areas of electricity generation, airports expansion, roads, rail and harbour development and the provision of water and sanitation (NAAMSA 2007: 20). Projects in these areas are driven by the National Freight Logistics Strategy and the National Land Transport Strategic Framework to ensure that the country increases its competitiveness (CSIR, 2006). It is, however, government's service delivery that will be the only way of actually assessing what impact these initiatives will have on productivity and cost. Until then, industry stakeholders have to adopt a proactive approach to these challenges.

The various incarnations of the supplier park concept around the country have provided the domestic OEMs and their suppliers with a potential solution to mitigate these limiting factors by providing an environment where world class systems, processes and infrastructure are made available. The OEMs and suppliers can now enjoy the benefits of JIS, JIT and Modular supply more widely. Supplier parks should be able to bridge the gap between supply and demand, especially where customers demanding flexibility and customisation compound the complexities of the automotive supply chains.

## 3.4 The Typical Automotive Supply Chain – A Complex Network

The supply chain is a network of organisations involved, through upstream and downstream relations, in the different processes and activities that create value for the end customer in the form of products and/or services (Christopher 1998: 15; De Villiers, Nieman & Niemann, 2008: 6; Hugo, Badenhorst-Weiss & van Biljon, 2004: 5). For example, the OEM is part of a supply chain that extends upstream through the seat manufacturers (Tier-one) to the leather tannery (Tier-two) and the cattle farmer (Tier-n), and downstream through mainly its dealer network to the final customer in the form of vehicles, parts and accessory sales, as well as vehicle service and maintenance.

The focus of many OEMs has shifted from making their own components to only assembling the finished vehicle, and, in doing so, they focus all their efforts on their ‘core business’ that is the design and assembly of motor vehicles. This trend provides the logistics and supply chain professional with challenges of integrating and co-ordinating the flow of materials from a multitude of domestic and global suppliers, managing the internal flow to ensure optimal production, as well as managing the flow of the finished product through its domestic and international networks. The management of these globalised upstream and downstream relationships contribute to the success of this industry.

The Oxford – A Dictionary of Economics (2002) defines globalisation as:

> 'The process by which the whole world becomes a single market. This means that goods and services, capital and labour are traded on a worldwide basis, and information and the results of research flow readily between countries. The rise of cheap sea transport and the telegram contributed to this process in the 19th century. Cheap air travel, the telephone, and the computer, together with the rising importance of multinational companies and general relaxation of controls on trade and international investment, continued the process in the 20th century. It is possible that the rise of the Internet and the start that has been made on liberalizing international trade in services will continue this movement in the 21st century. The world has still a very long way to go, however, before its economy is fully globalised. In particular, international mobility of labour is tightly restricted and poor transport and communications in most less developed countries mean that only the economies of the richer and more advanced countries are at all seriously globalised' (Black, June 2002).

In his book, *The World Is Flat* (2006), Thomas L. Friedman explains how drastically the world has changed since Columbus proved that the world was round and, in the process, discovered the New World – America. He explains that, from 1492 until around 1800, it was about countries and muscle, an era where countries and governments led the way in breaking down walls and joining the world together. This he named Globalisation 1.0. Between 1800 and 2000, the key agent of change was multinational companies which went global in search of markets and labour. The first half of this era was driven by decreasing transportation costs (thanks to the steam engine and the railroad) and, in the second half, by decreasing telecommunication costs (the telegraph, telephones, PCs, satellites and the Internet). Friedman named this era Globalisation 2.0. Friedman defines the new era, Globalisation 3.0, as 'the dynamic force [which] is the newfound power for individuals to collaborate and compete globally'. Technology has enabled individuals and companies to harness the power of knowledge sharing and collaboration to form knowledge networks within organisations (Friedman, 2006: 9-12).

More and more countries, industries, companies and individuals are seeing, hearing and feeling the effects of globalisation in the economies of the world. The automotive industry, however, has been at the forefront of these challenges and changes by manufacturing products *for* the global market by utilising raw material, knowledge and skills acquired *from* the global market since the early 1970s.

It is a well-known fact that the only thing that ever stays constant is change. Change, from a supply chain perspective, is an immanent eventuality which professionals in this industry have to face and manage accordingly. It has, however, become increasingly difficult for the supply chain professional to manage change due to the pace at which changes occur in the modern business environment.

For the marketing professional, change represents innovation, product improvement, being ahead of the competition and, ultimately, having the biggest market penetration and revenue. Marketing's drive to achieve competitive advantage is carried out through the use of variety, high levels of customer service and regular production changes (Christopher 1998: 14). For production, change is the ultimate enemy. The production professional would like to build as much of the same thing for as long as possible without any interference. This keeps the output stable and yields the best economies of scale. Manufacturing has 'typically been focused on operating efficiency, achieved through long production runs, minimized set-up and change-overs and product standardisation' (Christopher 1998: 14).

The logistics and supply chain professional is caught in the middle. The marketer demands many customised products (specific to the target markets' needs and desires) to be made available to the market as quickly as possible. Production, on the other hand, demands a steady flow of the same raw materials to the production line, because a sudden change in material will result in re-tooling which would influence down-time and generate waste. Logistics can, therefore, be seen as a cross-functional integrative concept that pursues a system-wide view, bridging the gap between the competitive strategies of marketing and production (Morash, Dröge & Vickery, 1996: 59). It seeks to create a framework through which the requirements of the market can be converted into a production strategy and plan, which, in turn, links into a procurement strategy and plan.

In the automotive industry, some of the biggest drivers of change for many OEMs are those of decreasing product life cycles, mass customisation and build-to-order (Von Corsvant & Frederiksson, 2002: 742; Holweg & Pil, 2004: 5). To stay competitive, the modern OEM and its suppliers need to focus on continuous product innovation and improvement, while making those value-adding products available to the market in the shortest possible time.

Assembling a vehicle to the exact requirements and specifications of the customer timeously is one of the main focuses of OEM operations. This adds considerable complexity to the supply chain, for what, in essence, has been a push concept for decades now needs to transform into a pull concept, as Holweg and Pil (2004: 5) state '[b]uilding vehicles to forecasts (Push) must give way to building them to order (Pull)'. This will have two substantial benefits, firstly to reduce costly finished inventories and eliminate the need for many types of incentives, and secondly, to ensure that the options that customers demand is sold as it is an important source of profits.

'Push' logistics can be described as inventory-based logistics, manufacture-to-supply or Built-to-Supply (BTS). This is the concept of maintaining inventories aimed at satisfying possible demands for products. The order is pushed in the direction of the added value, without the need for customer influence or a definite customer order (Schönsleben, 2003: 141). 'Pull' logistics, on the other hand, focus on matching supply with demand via the use of a comprehensive data collection system. It can be better described as replenishment-based logistics, manufacture-to-order or Built-to-Order (BTO). Value-adding only takes place on customer demand and each customer, through coordination with the supplier, 'pulls' the order up through the process levels (Schönsleben, 2003: 141). According to Long (2004: 51), 'these systems are inherently more efficient because there is no doubt about the demand for the product'.

In a South African automotive context, 'Push' logistics were still evident in the production processes of many OEMs up to the early 1990s. Up to this time, the political environment did not support unlimited trade between South Africa and the rest of the world, sanctions were still at their peak and severely limited the choices of the South African automotive customer.

During this period, the OEMs where forced to manufacture a range of vehicles in suboptimal quantities for the domestic customer only. A specific German OEM had to manufacture four different models of its product range on the same production line to fulfil domestic customer demand. That equated to four different body styles, each requiring the use of different tooling, different expertise, different parts and even different suppliers according to C. Kotze (personal communication, 20 May 2009).

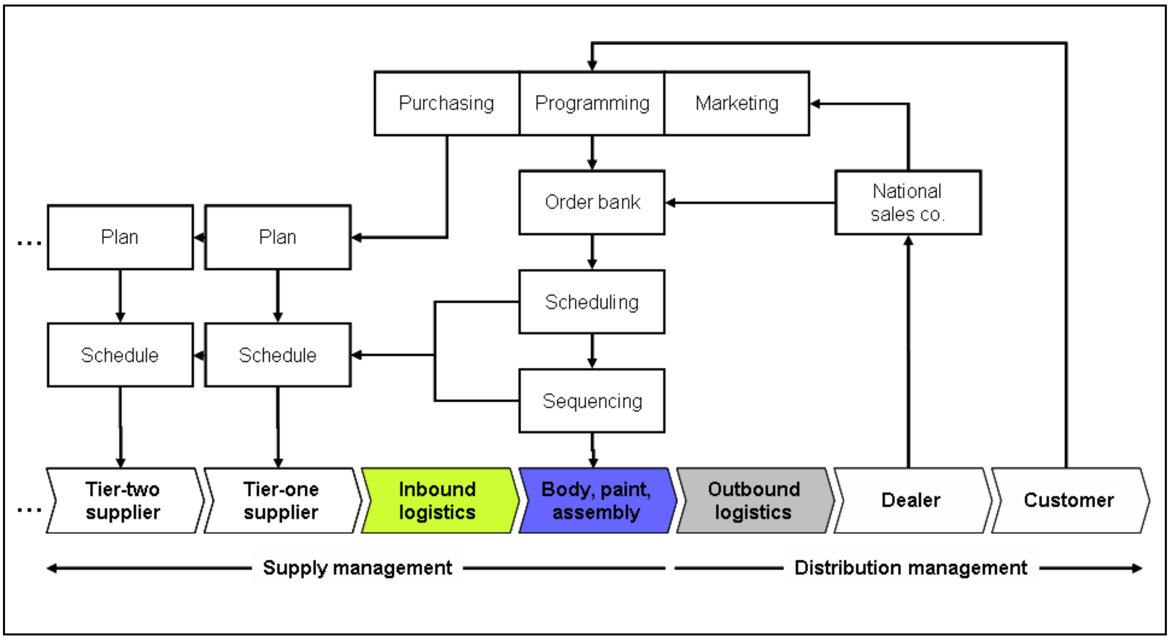
Today, the same German OEM is part of a globally integrated assembly network focusing on the assembly of one model range and the delivery of it to the South African, US, UK, Japanese and Australian markets. Its other model ranges are imported from other assembly plants all over the world to satisfy domestic demand. The import duties are offset against the import credits which they earn (as per the MIDP) for the models they export.

Logistics processes accelerate the shift from push to pull and systems that better integrate transport modes and inventory. While a push logistics system is based on a limited level of integration between suppliers, manufacturers and distributors, a pull logistics system tries to attain a higher level of efficiency through integration. In a pull logistics system, goods moving within the supply chain tend to be more frequent and in smaller batches. Also, the sharing of demand dependant data (i.e. sales data) supports a greater balance between supply and demand.

In the automotive supply chain, these two polarised views are applicable to both the inbound (from Tier-n supplier up to assembly) and outbound (from assembly up to final consumption) flows, each of which has its own complexities. Although the focus of this study is primarily on the inbound flow of material to the production facility, it is beneficial to understand the automotive supply chain in its totality (due to the interrelationship of the various concepts) before detailed analysis of the inbound processes and complexities can be appreciated.

The typical automotive supply chain can be described as 'an assembly operation with three broad internal processes, inbound logistics, assembly and outbound logistics' (Holweg & Pil, 2004: 20). Upstream activities (including assembly operations) are typically defined as supply management, while downstream activities (from assembly onwards) are generally referred to as distribution management (figure 3.6).

Figure 3.6 – Typical automotive order-to-delivery process




Source: Adapted from Holweg and Pil (2004: 20)

The OEM serves two broad markets, namely, the domestic and the export market. The domestic market typically consists of a network of franchised dealerships, with strong collaboration and integration characterising the assembler's multiple tier supply market operations. The Tier-one suppliers are mainly component manufacturers and suppliers of sub-assemblies. Value creation in the supply chain of the assembler occurs typically in its supply network and its own operations. The dealer network mainly creates time and place value to the product (Hugo, et al., 2004: 75).

The typical order-to-delivery (OTD) (figure 3.6) provides a good basis for an understanding of how the various production and supply chain stages and processes interlink with each other. These stages and processes that 'represent the building blocks most manufacturers rely on to manage the order-to-delivery process' are as follows (Holweg & Pil, 2004:20-21):

- *Sales forecasting* – aggregation of various source level forecasts (e.g. dealers, national sales companies, importers, customer orders, etc.) as input for production planning;
- *Production programming* – maps the consolidated forecasted demand into available production capacity. The output is a framework that defines the quantity of vehicles to be built in each factory, their specifications, and the market to which they will be delivered;
- *Order entry* – Checking and entering of orders into an order database to await production scheduling;
- *Production scheduling and sequencing* – Combines orders from the order database with production schedules, which are, in turn, used to determine the sequence of cars to be built on the scheduled date(s);
- *Supplier scheduling* – The process where suppliers receive forecasts at various intervals, actual schedules and daily call-offs (refer to figure 3.3);
- *Inbound logistics* – The process by which logistics service providers collect and consolidate parts or modules from suppliers and deliver them to the assembly plants at the prescribed time and, in some cases, in the prescribed sequence;
- *Vehicle production* – The physical welding and painting of the various body panels and assembling the vehicle; and
- *Vehicle distribution* – The stage at which the plant transports the finished vehicle to the dealer.

Henry Ford created what is one of the best examples of a controlled supply chain. He started with a car assembly factory. He then required car components and established a component factory to manufacture them. The components were manufactured from smaller parts, so he established more factories to manufacture all these smaller pieces. These pieces required steel, so the Ford Motor Company included a steel foundry. In fact, Ford was so committed to self-efficiency that he bought 2.5 million acres in Brazil to develop a rubber plantation and also grew soybeans used in the manufacture of paint. Each of these companies supplied the other in a long chain that went from the mining of iron ore to the final assembly of cars. Ford went beyond controlling the inbound supply chain by also controlling the retailers who sold his cars (Long 2004: 43).

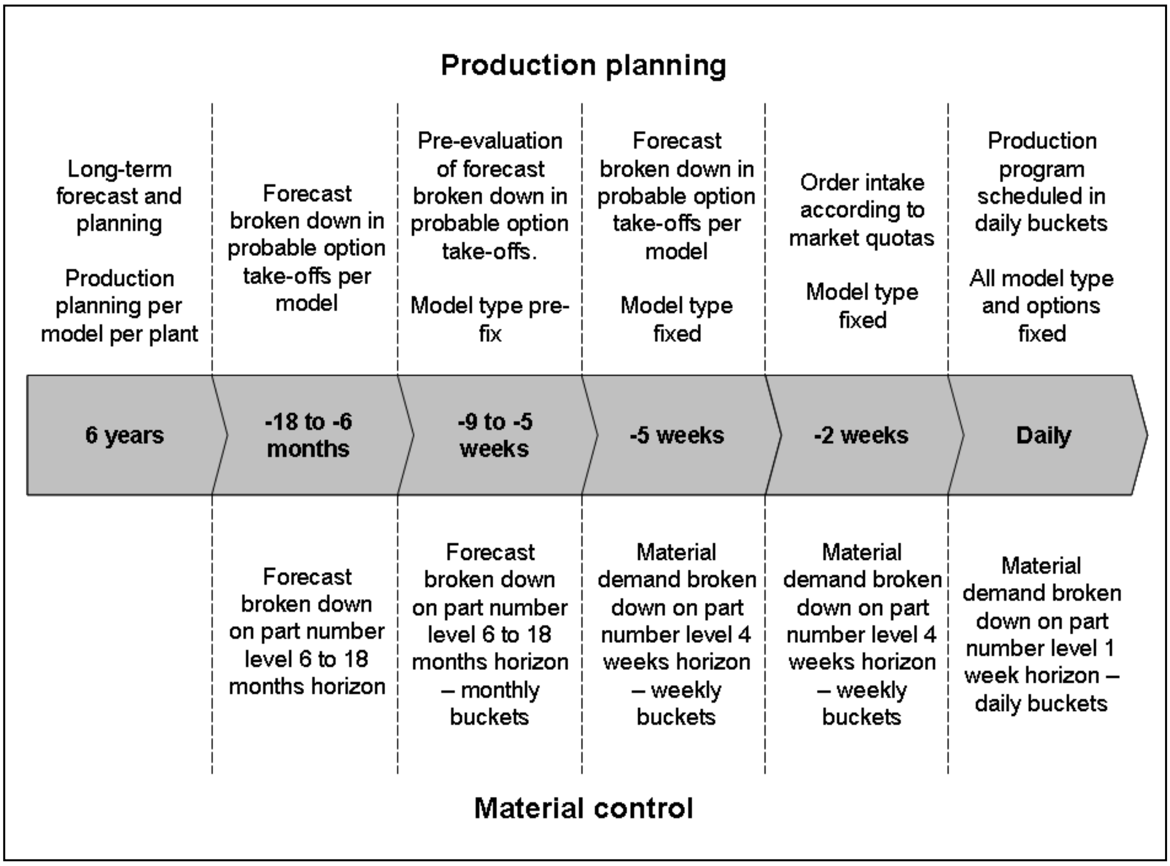
Ford's revolutionary way of utilising a production line in order to manufacture more vehicles in a shorter space of time was based purely on the principles of production management and engineering. 'You can have any colour you want, as long as it's black' was the philosophy of automotive manufacturing up to the late 1980s. However, by this time vehicles could be had in various colours and in various trim but the fact still remained that production was driven predominantly by forecasts and that these forecasts were done by an over-eager sales force – a typical 'Push' logistics scenario.

The typical automotive supply chain is separated into supply and distribution management processes (figure 3.6). The supply management (inbound) processes refer to the flow of information and parts into the assembly plant and the assembly logistics that are the physical logistics in the plant. The distribution management (outbound) processes refer to the flow of information and the finished vehicles from the assembly plant to their final destination.

### 3.4.1 Supply management process

The supply management or inbound process is initiated primarily by the forecasted demand (roughly 65 per cent) as well as customer orders (roughly 35 per cent) (Holweg & Pil, 2004: 14). As depicted in figure 3.7, forecasted demands are of a long-term (the projected total production of a specific model over its product life cycle), medium-term (usually broken down in yearly buckets) and short-term (again broken down in monthly, weekly and even daily buckets) nature (Holweg & Pil 2004: 34).

Figure 3.7 – A typical demand timeline for automotive production planning and material control




Source: Compiled for the purposes of this study based on data from a German OEM and supported by Holweg and Pil (2004: 34).

In the case of a local German OEM, the total demand is captured into a central database which allows the planning division at the corporate head office to allocate production volumes to the various assembly plants. According to C. Kotze (personal communication, 20 May 2009), the allocations of these volumes are based mainly on each plant's designated production model, plant capacity and, ultimately, the market it serves. The Material Requirements Planning (MRP) data is relayed to the various suppliers (mainly Tier-one and Tier-two) via a complex set of information systems (mainly EDI and Internet) which enables them to also do long, medium and short-term demand planning. All of this information is then made available up to the Tier-n level of the supply chain.

The responsibilities of production planning would typically be:

- Optimisation of production planning;
- Measurement of volume and on-time delivery target achievement;
- Data keeping and information distribution.

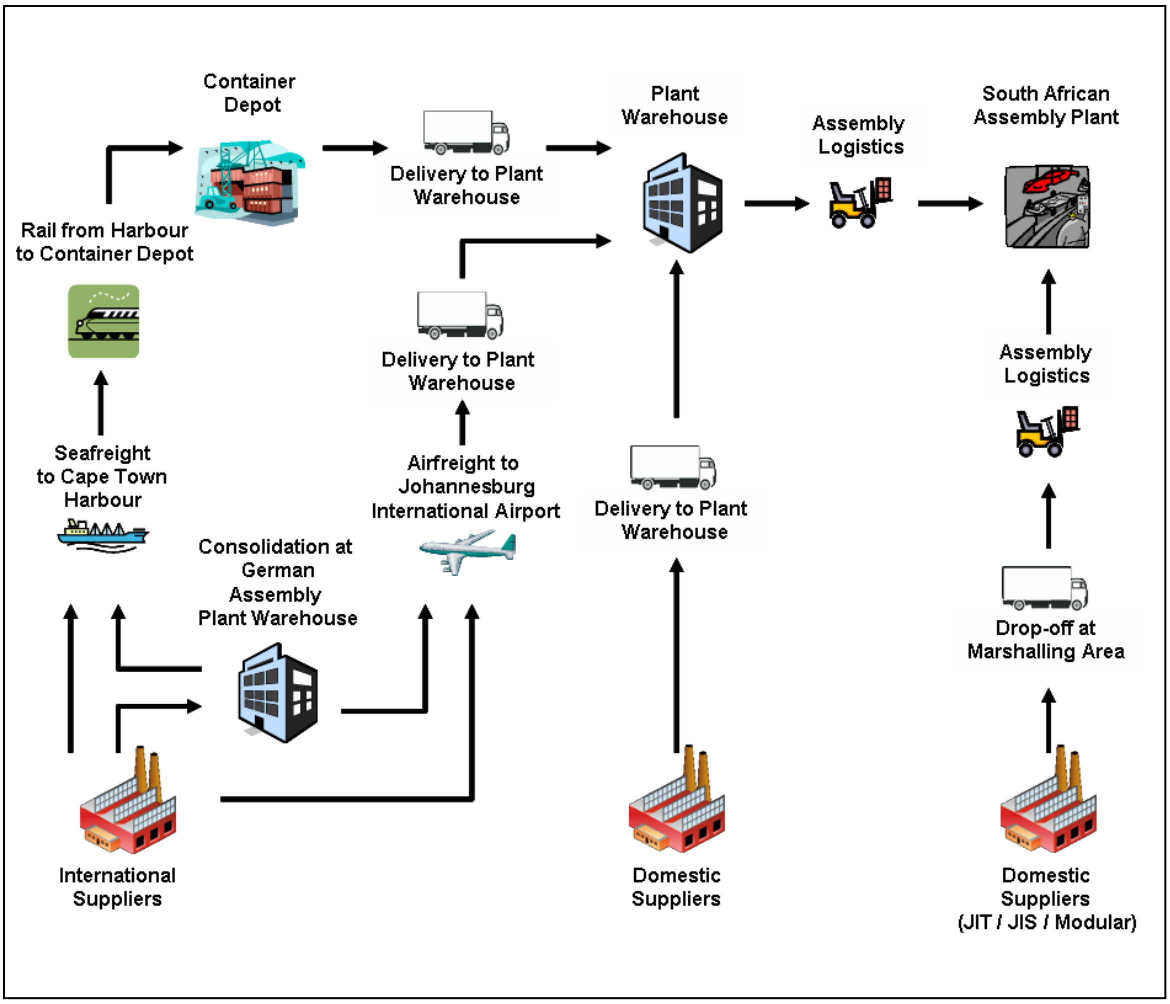
The responsibilities of material control would typically be:

- Planning of material necessary to support production;
- Order placement on suppliers and shipping in order to meet planned volumes;
- Inventory control;
- Quality logistical supply from Tier-one and Tier-two suppliers;
- Minimising supply deviation and auditing supplier's performance.

The inbound material flow (figure 3.8) can be separated into domestic and international supply (Holweg & Pil, 2004: 34).

In the case of the German OEM, domestic supply can then be subdivided into Just-in-time (JIT), Just-in-sequence (JIS), modular suppliers and suppliers who deliver to stock. All domestic suppliers deliver via road freight. International supply is consolidated at one of the vehicle manufacturer's German assembly plants for Full Container Load (FCL) sea freight shipments. Scheduled airfreight of high-value-low-volume parts is also done via the German consolidation centre. Due to lead time and demand variations, emergency airfreight is also undertaken in both cases to prevent possible stock-out and subsequent line stoppage. Stock-outs and line stoppage situations are the biggest risk factors in the automotive supply chain and are avoided at all costs as they have severe financial and productivity implications. The cost of a line stoppage can be anything in excess of eight thousand rand per minute, according to N. Rudolph (personal communication, 19 July 2007).

Figure 3.8 – Inbound material flow to the assembly plant of an automotive OEM in South Africa

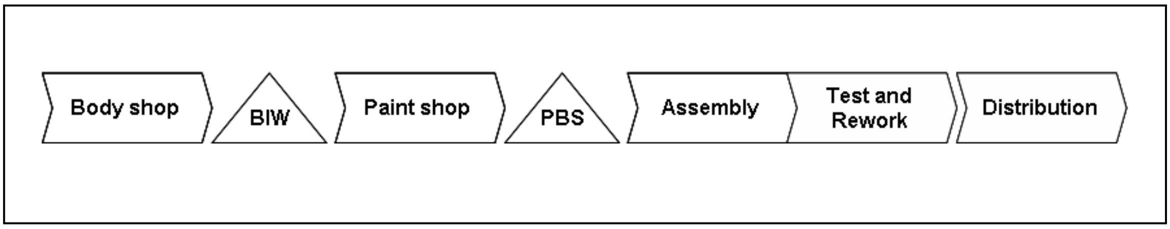



Source: Compiled for the purposes of this study based on data from a German OEM and supported by Holweg and Pil (2004: 36)

The logistics departments (sometimes referred to as physical logistics or materials handling departments) are responsible for the delivery of inbound parts to the fitment points or points of consumption, mainly via the warehouse or sequencing centres. It is vital that these deliveries are frequent and on-time in order to prevent unnecessary inventory build-up (too much inventory on the line) or line stoppage (too little inventory on the line). Due to the time pressures and various build sequences, sequencing centres are commissioned to assist with the delivery of mainly imported parts to the line in the sequence that they are required for fitment. An example of sequenced parts is the external vehicle trim which is imported in the various body colours. The trim needs to be delivered to the line in the sequence dictated by the colour of the next vehicle which requires the parts to avoid time wasting by the assembler, according the C. Kotze (personal communication, 20 May 2009).

The typical automotive manufacturing process (as depicted in figure 3.9) has three major stages (body shop, paint shop and final assembly) and two between-stage inventory buffers (Body-in-white [BIW] and painted-body store [PBS]).

Figure 3.9 – A typical vehicle manufacturing process




Source: Holweg and Pil (2004: 40)

The inbound supply chain of the typical OEM can contain up to 15,000 part numbers, representing 2,000 to 4,000 individual components (Holweg & Pil, 2004: 29), which are manufactured by more than one hundred Tier-one suppliers (Doran 2004: 103). Because, in only exceptional cases does an OEM have insights and control over its supply chain beyond the Tier-two suppliers and service providers, this reveals the complex series of interrelated tasks that the various individuals managing this chain have to perform.

Apart from the inbound flow into the assembly plant, there is also the P&A division which is tasked with the management of parts and accessories required by the dealer network responsible for the servicing and maintenance of the vehicles. Clearly, this is a completely different material flow with different rules and measurements, but a critical part nonetheless of the complete supply chain of any OEM.

From the perspective of the component supplier who not only supply inbound material to the assembly plant but also to the after market parts and accessories (P&A) division, the relationship with the assembler has undergone significant changes leading to changes in the business models of both entities.

### 3.4.2 Assembler-Supplier relationships and collaboration

In the 1980s and 1990s, relationships between assemblers and suppliers changed significantly leading to changes in the business models of both entities. As Western firms fought to match the competitiveness of manufacturers from Japan and imitate their production and supplier strategies, they decreased their in-house production volumes and also started transferring design functions to their leading suppliers (Humphrey & Memedovic, 2003: 20).

The components industries in the three major automotive economies (Europe, North America and Asia) were noticeably reorganised during the 1990s. This was mainly due to a combination of changes in the relationships between the suppliers and assemblers, compounded by the increasing global reach of the assemblers. In their United Nations Industrial Development Organisation (UNIDO) report, Humphrey and Memedovic identified three significant changes that took place. These changes are summarised in table 3.3.

Table 3.3 – Changes in assembler-supplier relationships

| Change identified | Description |
| --- | --- |
| Shift in design activities from assemblers to suppliers as well as increased interaction around design between the two parties. | Suppliers started focusing on greater customisation by adapting their products to the needs of specific companies and moving away from providing ready-designed parts for many different companies in the period of mass production. Likewise, many of the subcontracting companies who traditionally worked to the assemblers' designs, started offering their own design solutions. In both instances, the assembler |

| | |
|---|---|
| | provides the overall performance specifications and information about the interface with the rest of the vehicle while the supplier is tasked to design a solution utilising its own technology. |
| Shift towards the supply of systems, sub-assemblies and/or modules rather than individual components. | This is part of the process of the increasing outsourcing to suppliers. The responsibility of Tier-one suppliers goes beyond that of producing parts into complete units (e.g. dashboards, brake-axle-suspension, seats, and cockpit assemblies), to also include the management of second-tier suppliers. The assembler, who previously would produce modules or systems in-house from parts supplied by many different component companies, now collaborates with companies able to design and supply the complete seat, or even a seating system (e.g. including headrest, seat belts and pre-tensioners). |
| Assemblers became increasingly concerned with the specification of the production and quality systems of their suppliers. | With the increasing importance of just-in-time (JIT) production systems (Howard, 2006: 94) and the obligation of ‘quality-at-source’, assemblers are investing in longer-term relationships with fewer suppliers. |

Source: Humphrey and Memedovic (2003: 20)

The changes in the components industry have led to considerable restructuring. In the 1990s, mergers and acquisitions created global ‘mega-suppliers’ (also referred to as Tier-0.5 suppliers) who became responsible for designing systems for vehicles and delivering them to widely dispersed locations. These suppliers also typically assumed responsibility for organising the rest of the value chain, managing the second-tier suppliers and developing supply systems in many different locations (Humphrey & Memedovic, 2003: 22). The automotive components industry is now increasingly concentrated on companies that can design and provide systems and sub-assembled or modular formats (discussed in Chapter 4) across different markets. The shift took place at the same time that the assemblers were standardising platforms and models across their companies and divisions in order to reduce development costs, obtain economies of scale and facilitate trade between regions.

Further, Humphrey and Memedovic (2003: 22-23) note that there are three main trends that are being followed. Firstly, the in-house component activities of the major assemblers are given distinct identities and encouraged to compete for business, not only with other assemblers but also for the business of their parent companies (i.e. Delphi/GM and Visteon/Ford). Secondly, a wave of mergers and acquisitions affected even the large component suppliers. Thirdly, new global companies were created through the union of smaller manufacturers (e.g. Autoliv AB and the Automotive Safety Products Group). These new Tier-one component companies were then increasingly expected to follow their assembler customers who began to invest heavily in the emerging markets. Thus, the component manufacturers with a vision to be the lead suppliers in the industry had to extend their operations rapidly through a mixture of acquisitions and foreign direct investments or face severe penalties for not following the assemblers to new markets.

For an OEM starting up production and/or introducing a new model in an emerging market, the clearly preferred option for locally manufactured parts would be to use the same supplier as in the core location for the production of that model (Humphrey & Memedovic, 2003: 23). This would ensure that the component would be identical to that used in other markets. More importantly, the “follow-source” supplier then takes responsibility for ensuring that the rest of the supply chain conforms to the assembler’s standards. Thus, instead of doing business with a large number of domestic suppliers whose designs and prototypes have to be tested and approved for use, and whose production and quality systems have to be audited and improved, the assembler deals with a limited number of follow sources providing parts or sub-assemblies.

When the globally preferred supplier is unable or unwilling to establish a domestic production facility, the assembler’s second preference is to use another of its global suppliers. This supplier will either make the part under licence from the globally preferred supplier or provide its own design. This alternative supplier will typically have experience in supplying parts to the assembler and should also have the mandatory level of management and quality expertise. The least preferred option is for a domestic company to produce the part, either under licence or using its own design. In this case, the assembler has increased responsibilities with reference to the monitoring of production processes and quality systems of the domestic supplier.

This means that developing countries such as China, India, Brazil and South Africa were increasingly considered less as isolated national markets and more as potential members of global production networks which constituted a significant change in assemblers' strategies. With model changes and production allocations being forwarded to these developing locations, suppliers are also following the trend. These new companies entering the domestic production market require the necessary infrastructure in order to align with their OEM customers. The supplier park is in the position to address these companies' requirements through customised solutions in the form of production facilities and logistics infrastructure, enabling easier entry and exit strategies and ultimately aligning with their OEM customers' focus on competitiveness through addressing concepts like cost reduction and flexibility. Kanter (1994: 96) confirms this by saying that

> '[a]lliances between companies, whether they are from different parts of the world or different ends of the supply chain, are a fact of life in business today. Whatever the duration and objective of business alliances, being a good partner has become a key corporate asset – I call it a company's collaborative advantage. In the global economy a well developed ability to create and sustain fruitful collaborations gives companies a significant leg up.'

Since Kanter wrote the above in the Harvard Business Review (Kantor 1994: 96), collaborations between suppliers and assemblers have been extensively publicised, deliberated, conferenced and researched.

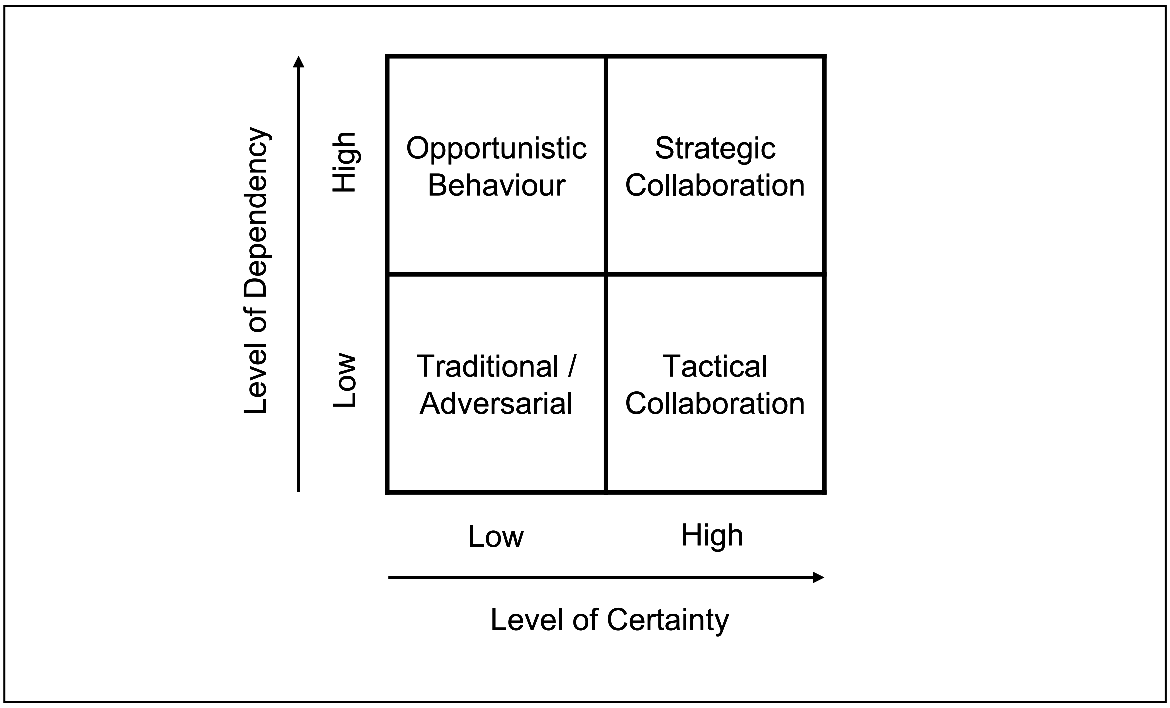
Information sharing, collaboration, cross-organisational team development and strategic partnering have been identified as the foundations on which supply chain design and integration are achieved (Hugo, et al., 2004: 82). Hugo, et al. (2004: 82) further state that it cannot be easy to collaborate and develop relationships in supply chains that are characterised by power plays, non-transparent process management and limited cross-organisational problem solving. Research published by the IBM Business Consulting Services in 2004 highlights just such issues and concludes that 'current relations between assemblers and suppliers are not yielding significant collaborative gains for the supply chain' (Belzowski, Flynn, Edwards, Ban & Martin 2004: 27). Having said that, many suppliers view their dealings with manufacturers as a relationship of convenience, with assemblers being generally very satisfied with supplier performance.

In the face of increased global demands, both the OEMs and their suppliers have an active role to play. Assemblers who find ways of driving true collaboration within their supply chain may not only be able to overcome excess costs in the system, but also may be able to harness energy and skills to the mutual benefit of their suppliers, themselves, and their customers (Belzowski, et al., 2004: 27). Suppliers will also have to 'break free from their traditional reactive role and leverage their knowledge, expertise and innovation capabilities to form more collaborative supply chain relationships with both their customers and their own supply base' (Belzowski, et al., 2004: 28).

According to Kanter's research, there are three fundamental aspects of business relationships. Firstly, business relationships must generate instantaneous short-term benefits for the partners and they should also cover the identification of future new and unforeseen opportunities for both parties. Secondly, successful engagements involve creating new values together (collaboration), rather than simply an exchange of input to the arrangement. Finally, the relationship cannot be regulated by formal systems but requires an intricate arrangement of interpersonal connections that supports enhanced learning (1994: 97).

Cousins' relationship transition model (figure 3.10) gives some insight into the various levels of assembler-supplier relationships and how collaboration interlocks with them. This model is based on the level of knowledge that buyers and suppliers have of each other, in relation to the level of dependency or interdependency within the relationship. According to Cousins (in Taylor, 1997: 93), ‘the greater the dependency and certainty within the relationship the more likely the parties are to form true collaboration’.

Figure 3.10 – Relationship transition model




Source: Cousins, P.D. in Taylor (1997: 93)

In creating collaborative advantage, it is important for the first-tier automotive supplier to play a key role in facilitating upstream and downstream collaboration.

Upstream collaboration would be with the assemblers. According to the IBM study, suppliers reported that collaborative efforts with assemblers are almost exclusively one way with assemblers demanding ‘just-in-case’ inventories which pose significant timing challenges and add significantly to suppliers’ costs models. Firstly, it forces suppliers to build distribution centres or factories near assembly facilities, secondly, it requires the creation of unique processes instead of the development of wide standards, and, thirdly, it forces late design changes that require testing before they can be released (Belzowski, et al., 2004: 18). At the same time, suppliers also reported that questions of trust are one of the main obstacles to investing in collaborative efforts with assemblers beyond what is absolutely required. They also cite reasons such as short-term assembler relationships, shifting assembler strategies and assemblers’ lack of supplier business understanding which negatively impacts new initiatives (such as co-location and supplier parks) driven by the assemblers, due to the ‘what’s-in-it-for-me’ attitude from both parties (Belzowski et al., 2004: 18).

Downstream collaboration would be with the second and third-tier suppliers. Here suppliers confront a number of barriers to collaborating with their own supply base. The IBM study firstly states that first-tier suppliers noted that some rationalisation must take place in their supply base to allow them to improve communications and develop better relationships with fewer suppliers. Another barrier to supply base collaboration is that the assembler who is assigned downstream may not participate in supplier improvement programs designed by first-tier suppliers. This situation makes it problematic for first-tier suppliers to develop and manage their own supply chains. Assembler-assigned suppliers often make changes to parts based on direct communication with the manufacturer rather than through the first-tier supplier which prevents the first-tier suppliers from coordinating changes in their own product development system (Belzowski, et al., 2004: 19).

In conclusion, collaboration between supply chain partners has the ability to reduce risk and greatly improve the efficiency of the overall pipeline while the sharing of information and joint planning will reduce risks associated with inventory holding, allow for quick response to demand patterns and improve overall pipeline visibility. Hugo, et. al. (2004: 82) states that ‘third generation supply chains require that the material flow and product delivery be synchronised and lean, and that the information, knowledge, and financial flows be fully integrated and instantaneous’. Although the value of this cannot be downplayed, the increased complexities brought about by component suppliers spanning the globe, have to be carefully considered and managed.

### 3.4.3 Global sourcing and logistics

Although government is promoting domestic content in vehicles, global sourcing will always be required to bridge the gap between domestic engineering and manufacturing expertise and global design and engineering requirements.

The sourcing and procurement of components on a global scale further complicate the modern automotive supply chains. Leenders and Fearon (1997: 515) state that logistics have challenges for buyers involved in international sourcing as driven by the trend of integrated logistics (see Chapter 2). Christopher (1998: 127) presents these challenges as, firstly, world markets which are not homogeneous and therefore domestic variation in many product categories exists. Secondly, unless high levels of coordination exist, the complex logistics and managing of global supply chains may result in higher costs. The logistics manager will achieve overall cost competitiveness with the use of integrated logistics and by successfully adopting the total cost concept because, for example, sourcing raw material from China due to lower unit cost without taking longer lead times and possible higher import costs into account, will lead to higher landing costs. The total cost of the raw material will therefore be higher than sourcing it from a domestic supplier at a marginally higher unit cost but with considerable savings in flexibility and transport and handling costs.

According to Christopher (1998: 129), international and multi-national businesses are different from global businesses. A classic example of global businesses are the domestic automotive OEMs and suppliers which participate in the global marketplace through the importing of raw material and parts from global sources and the exporting of their vehicles and parts to global destinations. Their objective is clear: they seek to grow their businesses by extending their markets whilst at the same time seeking cost reduction through scale economies in purchasing and production and through focused manufacturing and/or assembly operations (Christopher, 1998: 127).

Global sourcing is defined by Trent and Monczka (2003: 607) as:

> '…the worldwide integration of engineering, operations, logistics, procurement, and even marketing within the upstream portion of a firm's supply chain. This differs from a more narrow international approach to purchasing.'

Although every company has its own reason for going international (global, according to Christopher's definition) there are general trends that push companies into the global marketplace (Long 2004: 23). These global trends are:

- If a company's customers are international there is a strong incentive to follow them into foreign markets, i.e. where a Tier-one supplier supplies technologically advanced items (such as cockpits) which were designed in collaboration with the OEM;
- If a company's competitors are globally active;
- Where difficulty exists due to domestic regulations for the manufacture of an item, it would need to be sourced internationally;
- Opportunities in foreign markets due to the reduction in trade barriers and the development of global transportation infrastructure; and
- A company can gain greater economies of scale by producing more while supplying foreign markets.

In order to illustrate these trends, a classic case for having international customers is the Faurecia/BMW case. Faurecia supplied BMW with the cockpits (dashboards) and front-ends (headlight and cooling systems) for the E90 3 Series. This partnership was formed in Germany when Faurecia was awarded the global contract for supplying these modular units in a JIS format to the various BMW assembly plants where the 3 Series is assembled. BMW assembled the E90 3 Series in four plants around the world, two in Germany (Munich and Regensburg), one in China (Shenyang) and one in South African (Rosslyn) (http://www.bmwgroup.com). Faurecia thus had to ensure a competitive set-up in South Africa to supply BMW with these units. The company decided to utilise the infrastructure at the Rosslyn Automotive Supplier Park where they have been a tenant since 2005. BMW South Africa is also a classic example of production based on economies of scale, producing the 3 Series in left hand and right hand variants for both domestic and foreign customers.

Leenders and Fearon (1997: 25) explain that, in a global context, companies need to achieve continuous process improvement to produce their products more efficiently, enabling them to give their customers better value. One of the keys to accomplishing this is by means of working with key suppliers (see Faurecia/BMW example above) to assist them in providing higher quality, faster and more reliable delivery, innovative design, production and distribution ideas and a lower total product cost. This kind of supply chain management must be pushed back to the Tier-one suppliers who, in turn, must drive it back to their suppliers in order to achieve these goals.

As the barriers of global trade came down, so the sources of global competition have increased which has resulted in an over-capacity in virtually every industry. So, to remain competitive in this global environment, companies have to continually seek ways in which costs can be lowered and service enhanced. This is leading to the ever increasing importance of focusing on supply chain efficiency and effectiveness (Christopher, 1998: 130).

Christopher (1998: 137) identifies that the management of globally dispersed network flows is not only more complicated than the management of a purely national logistics system, but it also involves four challenges of global logistics which are:

- Increased supply lead times;
- Increased and undependable transit times;
- A multitude of consolidation and break bulk options; and
- A multitude of freight mode and cost options.

It is safe to conclude that successful global relationships between automotive OEMs and their suppliers, without collaboration by all the stakeholders in the automotive supply chain, will be very difficult. The trend towards global organisations is highlighting the critical importance of logistics and supply chain management as the key to profitability. The complexity of doing business in the ‘global village’ (where an interdependence exists between suppliers, manufacturers and customers) is influenced by factors such as the increasing range of products, shorter product life cycles, marketplace growth and the number of supply/marketing channels (Christopher, 1998: 128).

### 3.4.4 Inbound automotive logistics and supply chain concepts

The complex nature of the modern automotive supply chain necessitated the introduction of various other concepts and methods to alleviate the pressure on material planners and logistics managers. Concepts such as JIT, JIS and Modular-supply are some of the building blocks of the inbound material flow where collaboration and supplier integration has become the rule rather than the exception.

Holweg and Pil (2004: 20) state that the inbound process is a complex network of forecasting, planning, sourcing, ordering, scheduling and time management, all of which, in today's automotive industry, would be impossible without management information systems (MIS) as the enabler.

A definite risk of inventory build-up exists at each of the points depicted in figure 3.8. Managing this risk (also referred to in the industry as the 'bullwhip effect') is the responsibility and the goal of the logistics department. The bullwhip effect is described by Long (2004: 53) and Hugo, et al. (2002: 66) as the effect of changes in demand which causes increasingly greater changes upwards in the supply chain. Hugo, et al. (2002: 66) go further by stating that, in a mass production business environment, the bullwhip effect is normally driven by the lack of supply chain-wide information, ultimately leading to poor customer service.

Using the automotive industry as an example, Long explains the bullwhip effect using the example of a vehicle manufacturer who compensates for uncertainty in the expected demand by slightly increasing the orders to its Tier-one supplier. The Tier-one supplier requires parts from its supplier (Tier-two), so it also increases the orders slightly, and so on, up the chain. As one goes up the supply chain, these slight increases grows alarmingly larger. If the vehicle manufacturer's demand is lower than expected and it reduces the initial order quantity, the effect it creates upwards in the supply chain can be enormous.

Although eliminating this effect entirely is almost impossible, Long (2004: 53) presents some ways to control it:

- *Accurate demand forecast information* from the source (or even orders on the supplier based on the original order from the end customer), is the most effective method;
- The more *information sharing* that exists between stakeholders in the supply chain, the better they can make decisions;
- *Reduced lead times* provide more flexibility by allowing production to be based on the most current information;
- *Reduced batch sizes and more frequent orders* makes it easier and faster to accommodate demand changes; and
- *Limiting price fluctuations* which triggers changes in demand will facilitate a smooth supply chain.

Today's automotive companies (OEMs and suppliers alike) have spent considerable time and funds in order to implement the above controls. Demand forecasts are increasingly based on firm orders, enabled by the postponement of production to the very last minute. Information is shared via various electronic mediums such as Electronic Data Interchange (EDI), and is made available to the $n^{th}$ Tier in the supply chain via complex modelling of the Bill-of-Material (BOM). Lead times are shortened through the JIT/JIS/Modular delivery of goods to the point of use on the assembly line, which also facilitates the reduction in batch sizes and more frequent order deliveries. Skilled accounting and foreign exchange management limits Price fluctuations.

As depicted in figure 3.6, the generic inbound material flow for most OEMs (which can also be applicable to many automotive suppliers) can be divided into three broad flows, inbound from international suppliers delivered to the plant warehouse via either sea-freight or air-freight, inbound from domestic suppliers also delivered to the plant warehouse, and inbound from domestic suppliers delivered to predetermined points or marshalling areas.

One of the theoretical success factors of supplier parks is their close proximity to the point of final consumption, as is the case with the Rosslyn Automotive Supplier Park where many suppliers are located close to Rosslyn (BMW, Nissan and Fiat) and greater Pretoria (Ford) OEMs. The theory is that, in being in close proximity, these suppliers can implement more sophisticated supply strategies such as Just-in-time, Just-in-sequence and modular supply. These strategies have great value in improving flexibility, responsiveness and overall delivery cost optimisation.

#### 3.4.4.1 Just-in-Time, Just-in-Time II and Just-in-Sequence

Just-in-time (JIT) has been described by Matson and Matson (2007: 432) as a process to

> 'produce and deliver goods just in time to be sold, subassemblies just in time to be assembled into finished goods, fabricated parts just in time to go into subassemblies, and purchased materials just in time to be transformed into fabricated parts.'

JIT, as a strategic part of the automotive industry and JIT-procurement and production systems, continues to grow in number and importance. It is, in essence, a Japanese management philosophy applied to manufacturing which involves having the right items of the right quality and quantity in the right place at the right time. It was first developed and perfected in the 1960s by Taiichi Ohno. It has been documented by Cheng and Podolsky (1993: 1) that the proper use of JIT manufacturing has resulted in increases in quality, productivity and efficiency, improved communication and decreases in costs and waste. This view is supported by Greenberg (2002) who states that JIT is a way to cut the costs of storing and delivering products by ten to twelve per cent annually while increasing product quality. Long (2003: 53) points out that JIT is an outgrowth from the Kanban system, also known as the Toyota Production System (TPS) and was originally an inventory and operations management system. It has become more relevant to the supply chain due to its main goal being to have supplies delivered only when needed leading to zero inventory and waste reduction. JIT is driven by the master production schedule (MPS) of the OEM that requires a great deal of trust and co-orporation by all players in the supply chain (Hugo, et al., 2004: 80).

The JIT system co-ordinates purchasing with manufacturing, the manufacturing process internally, and manufacturing with customer demand, so that inventories of raw materials, work in progress and final products are eliminated. It is dependent on short and reliable delivery times, short adjustment times for equipment, high quality standards and extremely reliable employees and suppliers (Hugo, et al., 2004: 157). It is also highly reliant on information sharing and has been accepted as a company-wide philosophy since the development of IT systems such as EDI (Electronic Data Interchange) (Gattorna & Walters, 1996: 160). A survey showed that 71% of senior manufacturing executives used JIT in some form in their processes (Broyles, Beims, Franko & Bergman, 2005). From an OEM perspective, JIT is commonly related to practices such as single sourcing, close supplier location, long-term relationships, schedule co-ordination and sharing, frequent deliveries of small lot sizes and stable supply-chain pipelines (Das & Handfield, 1999: 246). The positive influence of JIT on reducing inventory levels as an insurance buffer within the supply chain have been documented extensively (Gattorna & Walters, 1996: 122).

Two major extensions of the JIT concept are Just-in-Time II (JIT II) and Just-in-Sequence (JIS). JIT II empowers suppliers to accept additional responsibility for some of the supply activities, leading ultimately to enhanced customer-supplier relationships (Hugo, et al., 2004: 112). In many cases, this leads to the personnel of the supplier operating on the premises of the buyer. An example of this would be the presence of a Tier-one supplier’s co-ordinator at the assembly line of the OEM being responsible for stock replenishment and/or sequencing of delivered parts. JIS integrates domestic suppliers with the assembly plant that allows them to supply parts in exactly the same sequence as the sequence of manufacturing orders or master production schedule.

Although JIT solves problems, it also creates others such as more complex production schedules, difficult co-ordination of suppliers not in close proximity, inventory which may be shifted up the supply chain to the supplier which does not necessarily lead to less inventory in the complete supply chain but requires good supplier cooperation and interdependence. It also may put pressure on logistics operations as the warehousing function shifts from storage to consolidation (Long, 2003: 54; Broyles, et al., 2005).

There are two main management views in the JIT inventory philosophy. Firstly, and contrary to traditional thinking, inventory is seen as incurring costs instead of adding value. In this approach, businesses are encouraged to remove inventory that does not add value to the product. Secondly, it sees inventory as a sign of sub-standard management as it is there simply to conceal issues within the production system. These can include, among others, issues such as backups at work stations, lack of flexibility for employees and equipment and inadequate capacity.

Although JIT is strongly rooted in manufacturing processes and inventory management, its strength lies in its ability to streamline the supply chain by focusing management's attention on information flow systems, collaborative networks and pipeline visibility. Das and Handfield (1997: 245) point out that JIT is a company-wide management philosophy with an overall strategic focus on lean manufacturing, increased quality and continuous investigation into innovative ways to solve problems and increase the quality of suppliers.

The partnerships that are vital to a successful JIT system and the effect JIT has on reduced inventory levels are probably the effects of JIT that have the most relevance to supply chain management (Matson & Matson, 2007: 438). A firm cannot implement a JIT system on its own without the absolute collaboration of its entire supply chain. The sheer amount of information that is needed for a JIT system to operate well demands partnerships within the supply chain to a level where an entire supply chain operates as one firm. Fazel (1997: 496-498) highlights the fact that even though the successful implementation of JIT has the potential to significantly reduce purchased inventory levels, the cost trade-offs between transport costs and inventory holding costs should not be ignored and that the former can be reduced by having the suppliers locate near the assembler's plant. This supports the proposed business case of the supplier park concept.

#### 3.4.4.2 Modular and integrated supply

It has been clearly documented in the previous sections and in other literature that the OEM-Supplier relationship is of critical importance for establishing and managing the complex world of the automotive supply chain. This relationship has gone beyond the JIT and JIS realms of manufacturing and supply into a closer partnership between the various role players in the supply chain. This is due to OEMs recognising that they do not necessarily have the knowledge and expertise to construct modern vehicles on their own. Modularisation has had the impact of fusing together OEMs, suppliers and logistics service providers.

Doran (2004: 102) describes modularisation as 'the process of building a complex product or process from smaller subsystems that can be designed independently yet function together as a whole'. This view is supported by Frederiksson (2006: 352) who defines modularity as 'a system that is divided into less complex parts or modules with specified interfaces with the possibility of each module being designed and/or produced in isolation from the others'.

In a modular environment, components can only be combined with each other into a working system when adhering to the interface specifications. Thus, modular supply occurs when companies shift their product architecture (design) towards increased modularity and outsource the production of these modules to (key) suppliers.

One of the most well known representations of modularisation is not found in the automotive industry but in the computer industry. Dell Inc. built its reputation as the maker of customer designed machines because its modular system design can accept a wide range of component combinations such as memory chips, hard drives, processors, input devices and numerous other options. Like its systems, Dell's supply chain is made up of a series of substitutable components. Because of the modular nature of its systems, Dell's suppliers are typically interchangeable and can be found all around the world. The alignment of Dell's production and supply chain architecture is critical to the company's commitment to a built-to-order (BTO) philosophy (Fine, 2005: 6).

The modular approach, used by Mercedes-Benz in the assembly of the M-Class in the USA, is a very good automotive example of modularisation (Doran, 2004: 102) as is the assembly of the Mercedes-Benz C-Class in East London and the BMW 3-Series in Rosslyn. In all these cases, production modules, which include modules for the driver's cockpit containing airbags, climate control systems, the instrument cluster, steering column and wiring harnesses, are all delivered, tested and supplied as a single unit to the assembly line.

Reichhart and Holweg (2004: 7) argue that the key drivers for a modular approach can be found in the concept of core competence and in the increasing use of built-to-order strategies. They state that entities in the automotive industry agree that modular supply can increase an OEM's responsiveness to customer orders and market changes due to reduced complexity in both manufacturing and in sourcing. Modular supply also reduces the number of direct suppliers, reducing the number of parts to be installed which simplifies the final assembly process. Reducing complexity is particularly important when considering the increase in product variety, which is one of the key drivers in the modern automotive industry.

It is essential for potential module suppliers to explore the strategic issues associated with value reorganisation (Doran, 2004: 105). Doran describes a modular strategy as 'a strategy that leverages the advantages of modular architecture' and says that there are two distinct strategic approaches in dealing with modularity. These are the 'modulariser' role where the OEM transfers control to Tier-one suppliers that have the capabilities to provide modular solutions, and the 'integrator' role where the OEM retains control. One of the major risks involved in committing to a modular manufacturing philosophy is that if suppliers involved in such a business relationship go insolvent, 'the manufacturing process is seriously impaired until a new supplier can be found and its engineers can build working relationships with their counterparts in the manufacturing company and other key suppliers' (Fine, 2005: 5).

In order to differentiate between 'normal' Tier-one suppliers and modular suppliers, the latter have recently been referred to as 'Tier 0.5' suppliers due to the close business relationship with the OEM and the extended role it plays in terms of product

R&D, engineering and manufacturing (Morris, Donnelly & Donnelly, 2004: 129). Doran (2003: 319) says that the key players in the modular environment will be those suppliers who develop the competencies required to accommodate modularity and the subsequent shift in value creation that it generates. Doran (2003: 325) calls into question the definition of Tier-one suppliers of the modular supply concept by what he terms the continuum of Tier-one suppliers. The objective of this is to provide a greater understanding of the term and to determine the role of different types of Tier-one suppliers within the modular environment.

The transfer of value from Tier-one suppliers to Tier-two suppliers results in what Doran refers to as ‘value added second-tier’ (VAST) suppliers. This is due to the requirement that modular Tier-one suppliers focus on key modular activities and transfer low value adding labour intensive activities to the second and even third tier of their supply chains.

Doran’s continuum consists of three levels of Tier-one suppliers:

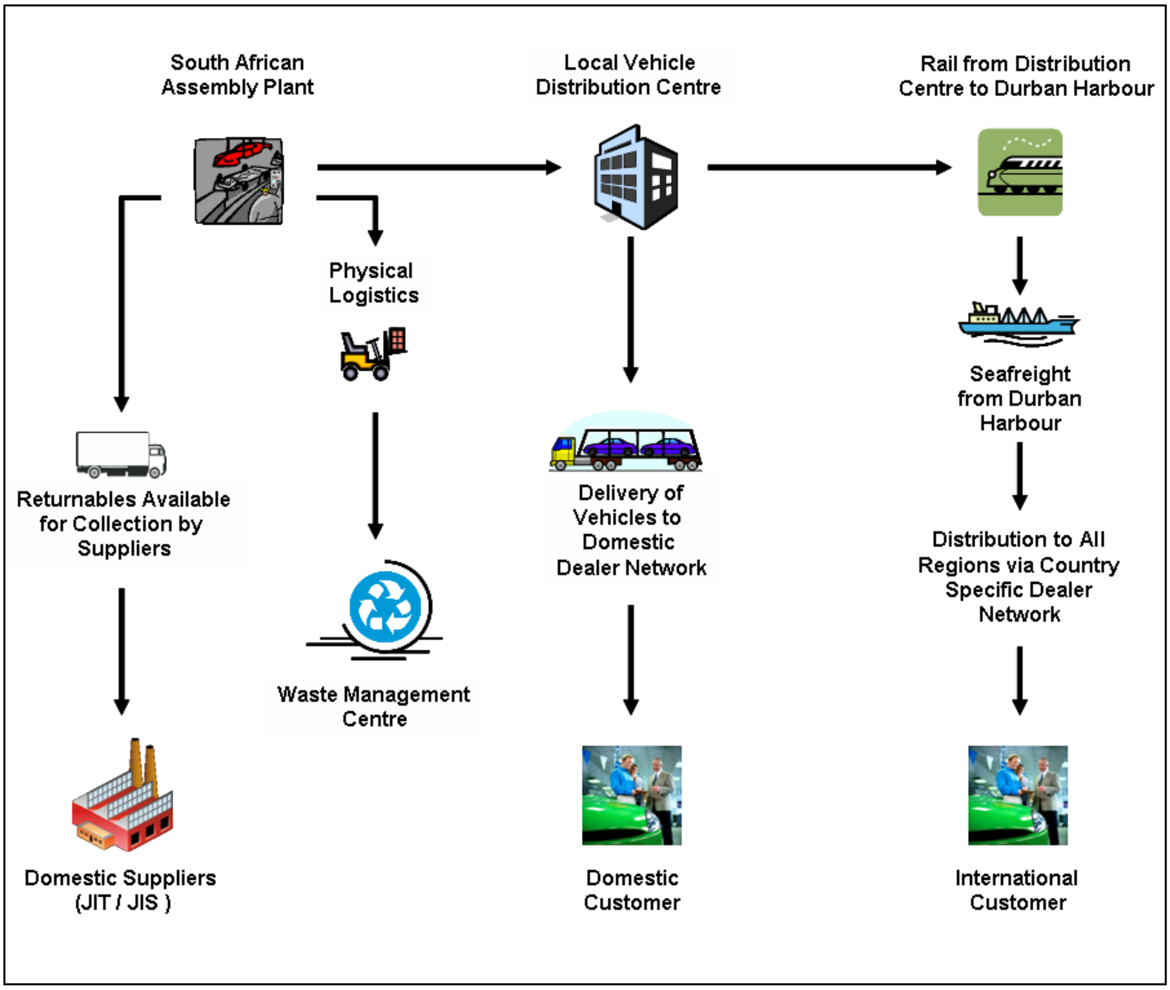
- *Mature suppliers* have the capacity and capabilities to supply and, in some cases, even fit modules on a global basis. These suppliers typically have a characteristic quality focused culture, significant R&D capabilities, as well as a global presence and ownership of key areas of supply chain.
- *Developing suppliers* are typically Tier-one suppliers focused on the development of skills in key areas of the supply chain as well as operational processes corresponding to modular supply concepts.
- *Fringe suppliers* are those suppliers who are predominantly Tier-two and can also be referred to as VAST suppliers. They may, in many cases, be better placed to accommodate the transfer of non-core activities upstream from modular suppliers.

Much has been document by various professionals in the automotive industry about the concepts of JIT, JIS and modular production/supply as well as its impact on the supply chain. Although the preceding sections only covers the basic concepts and implications, it is imperative to understand that these concepts have been central to the establishment of many supplier park initiatives all over the world.

### 3.4.5 Distribution management process

The distribution management process or outbound material flow (figure 3.11) is managed to meet the required delivery date and place originally specified in the customer order. The outbound material flow can be divided into finished vehicle distribution, management of returnables and waste management.

Figure 3.11 – Typical outbound material flow from the assembly plant of an automotive OEM in South Africa




Source: Compiled for the purposes of this study based on data from a specific German OEM and Holweg and Pil (2004: 43)

Waste management includes the management of all destruction and re-cycling processes. In the case of a vehicle manufacturer, this could include, but is not limited to, the destruction of damaged vehicles, un-useable packaging material and re-cycling of water, metal, plastics and packaging material. Due to environmental impacts and government legislation, this process may be of a very costly and complex nature.

The management of returnables mainly covers the area of returnables to domestic suppliers (mainly stillages belonging to the JIT/JIS suppliers) and also, to a lesser extent, packaging material to be returned to international suppliers. Many international suppliers will prefer using one-way packaging to avoid the costly management of returnables through such a long supply chain. The establishment of specialised companies such as Chep (the international pallet and returnable packaging management company) and Trenstar (a South African company specialising in the management of returnable packaging) is due to the increasingly important role of managing reverse logistics processes.

Finished vehicle distribution in the South African context is predominantly the responsibility and management of the OEM. Although the services of various LSPs (Logistic Service Providers) are utilised, the OEM ultimately controls the flow of the vehicles and information. From a financial perspective, it is a very large financial investment for the OEM and stands in contrast to the supply of parts for assembly where payment is only required after use.

At the specific German OEM mentioned earlier in this section, all finished vehicles are consolidated at a centrally controlled distribution centre located in close proximity to the assembly plant. After final inspection, the German OEM’s vehicles are moved to the holding area awaiting either distribution via road freight to their domestic dealer network, or railage to the port of Durban for sea freight exports to the country of destination.

## 3.5 Summary

Globally, the automotive industry is a multi-billion Euro business. Employing more than five per cent of the worlds' labour force, it is a cornerstone of many economies, with a global turnover of close to € 2 trillion. Putting this into perspective is the fact that, in 2006, Toyota built a vehicle somewhere in the world every 3.9 seconds, every hour of every day which equated to an annual global production figure of more than 8 million units (http://autospies.com).

The 2008/2009 downturn in global economies, due to various financial crises compacted by volatile oil prices, has had a dramatic impact on the global and local automotive landscape. In South Africa alone, unit aggregate sales declined by 25.9%. The biggest impact, however, is in the form of reduced exports of vehicles and related automotive components and services but this does not downplay the importance of the automotive industry globally and locally. On the contrary, when taking the potential and actual losses in global revenue and employment into consideration, it highlights the fact that the global automotive industry is an important and complex driver of many economies around the world.

There are, however, some factors negatively impacting the local industry. These take the form of rate hikes in the short and medium term which are slowing consumer spending, as well as the replacement of the current MIDP in 2013 by the APDP (Venter, 2009) which will affect the industries' long term profitability. Also, recent agreements between representatives of the European Union and the South African government which will lead to the zero rating of import and export duties, will add challenges to the management processes of domestic players. In spite of this, the South African automotive industry will continue to make a significant contribution to the global automotive industry. This is underlined by the continuous investment by OEMs, their supplier networks and government in upgrading and expanding their current footprint in the domestic economy through direct foreign investment and the support structures required.

From a global perspective (and the influence on domestic strategies and decision making due to the global market), this chapter highlighted that some of the main industry drivers are:

- The move from a push to a pull supply chain where the customer order serves as the basis for production planning and scheduling, adding complexity to the inbound material flow;
- OEMs are pressurised, due to competitive forces, to shorten the product life cycles;
- Mass customisation which adds additional complexity to an already difficult supply chain environment;
- Customers' demands for continuously higher service level offerings and a wider product offering; and
- The continuous drive of partnering with and sourcing from a strategic global supplier base.

These industry drivers (which will be discussed in greater detail in Chapter 4) also have a definite influence on the logistics and supply chain strategies followed by the OEM and its suppliers, driving the actual operations of the organisation and the extended supply chain to meet specific supply chain objectives (Happek, 2005:1).In light of this, the supplier park can play a key part in the supplier's functional and supply chain strategies, mainly focusing on channel strategy and design.

Over the last several years, the automotive industry has evolved to include not only niche domestic suppliers but also billion-Euro global mega-suppliers capable of providing complete systems that can present complex internal integration and external collaboration challenges. This increase in supplier complexity is reflected in the challenges that the supply chain suppliers must face in the future of increased complexity of manufactured orders, costs and pricing issues, risk management, collaboration and relationship management.

For automotive suppliers, cost is a major source of concern as manufacturers increase the complexity of their orders. In addition, suppliers must consider the risks inherent in manufacturer demands for global sourcing, especially in the cost of inventory obsolescence. Finally, suppliers must understand the importance of collaboration and relationship management within their own supply base, as well as with customers – particularly because of the role it could play in future supplier rationalisation.

The Internet has enabled better communication across the supply chain by fostering data transparency and open communication. Supply chain management is also viewed as a way to aid inventory optimisation. Without the proper supply chain management tools, higher inventories in the form of safety stock would be required – a matter of replacing inventory with information.

Collaboration can only exist between assemblers and suppliers who build a relationship based on trust or confidence. In this relationship, suppliers play a very important role in improving and standardising common processes that will facilitate collaboration with their assembler customers. Finally, suppliers must understand that co-locating with customers, consolidating their design activities under one roof, and integrating products and customers across the entire company, will facilitate customer collaboration.

In this chapter, logistics was presented as a cross-functional integrative concept that seeks to develop a system wide view, bridging the gap between the competitive strategies of production and marketing. The supplier park theoretically bridges the gap between supply (related to production) and demand (related to marketing), especially where complexities of the automotive supply chains are compounded by high demands for flexibility and customisation by customers.

Some of the key enablers, from an inbound logistics perspective, that allow modern OEMs to concentrate their efforts on their core business, were identified as the concepts of Just-in-Time, Just-in-Time II, Just-in-Sequence and Modular supply. The main aim of these concepts is to have suppliers deliver components only when required, ultimately leading to zero inventory and waste reduction by coordinating the processes and strategies of purchasing with those of manufacturing. These strategies improve flexibility, responsiveness and overall delivery cost optimisation, with

Modular supply forming another pillar of supplier park success. Their strength lies in their ability to streamline the supply chain by focusing management's attention on information flow systems, collaborative networks and pipeline visibility.

The dramatic changes in global markets and customer expectations place increasing emphasis on the role of the supply chain in creating customer value. The collective strength of the domestic automotive OEMs and their supply chain partners will be the only way to outperform competing automotive supply chains (Hugo, et. al., 2004: 83).

Today, a vehicle can be designed in California, engineered in Munich, tested in Upington and assembled in Rosslyn – with components sourced from around the world – to the exact specifications of a customer in Tokyo. This illustrates the true global and complex nature of today's automotive industry and the reason why supply chain management has become such a critical driver of success for the different stakeholders. It is clear that the inbound process is a complex network of forecasting, planning, sourcing, ordering, scheduling and time management.

The average vehicle comprises of tens of thousands of parts and components from a multitude of domestic and global sources. Managing these already complex global networks of suppliers and service providers is made even more difficult by South Africa's compromising distance from both its supply and demand base, requiring vigorous management processes spanning various functional areas to ensure uninterrupted supply by efficient and ultimately uninterrupted production. The limited logistics infrastructure and the annual state of logistics survey which exposed the fact that the main cause for supply chain bottlenecks is the lack of adequate rail capacity and efficiency, port congestion, border post delays and customs clearance, emphasises the fact that the supply chain professional plays a key role in the automotive industry.

The domestic automotive industry is a strategic and valuable sector of the South African economy. Fortunately, there is a productive working relationship between industry and government that is positively impacting the competitiveness of the domestic industry. The continuing direct foreign investment by OEMs and suppliers alike, as well as the global support for export agreements of South African produced vehicles and components bolsters this competitiveness.

The concepts discussed in this chapter serve as the foundation for the assessment of what role the supplier park concept, specifically incarnated in the Rosslyn Automotive Supplier Park, are playing in the drive for increased efficiency and global competitiveness. In chapter 4 the methodologies around the supplier park concept are assessed to establish its merits from an academic perspective.

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# Chapter 4

## Automotive Supplier Parks: Defining the Concept

*This chapter introduces various concepts that support the establishment of supplier parks, and defines the concept of the supplier park from an automotive perspective. Finally, it describes the position of the supplier park within the automotive value chain and how the supplier park drives value creation within this value chain.*

## Content

## 4.1 Introduction

Automotive companies are increasingly focusing on their core competencies and transferring fixed costs into variable costs (Collins, Bechler & Pires, 1997: 498; Pfohl & Gareis, 2005: 303) highlighting the importance of outsourcing at the strategic management level. The main catalyst for this shift in focus is the dynamic and complex economic environment in which these companies find themselves.

In the preceding chapters, the economic importance of the automotive industry, the complexities of the modern automotive supply chain and the greater interdependencies between assemblers and their supply chain partners have been presented. The objective of closer collaborative partnerships is to provide assemblers with a tool to satisfy an increasingly diversified pattern of demand for vehicles. These relationships are not limited to the pursuit of short-term cost reductions but target innovations in design and technology, creative research and development and quality improvements (Morris, Donnelly & Donnelly, 2004: 129). OEMs have recognised that they do not necessarily have the knowledge and expertise for achieving the aforementioned goals on their own and so closer relationships with suppliers are required (Morris, et al., 2004: 129).

The development of concepts such as Just-in-time (JIT), Just-in-sequence (JIS) and Modular supply (see Chapter 3) means that both OEMs and suppliers realise that collaboration has to be mutually beneficial over the long term. Although these are widely acknowledged outsourcing concepts, many OEMs remain cautious about transferring key elements such as design and research and development (R&D) functions to suppliers as they believe this could lead to the possible loss of core competence (Morris, et al., 2004: 130).

Outsourcing, as defined by Gattorna and Walters (1996: 298), describes the return to the organisation’s core business by transferring certain supporting activities to outside service providers, for example, activities such as transport, warehousing and inventory control being outsourced to Third-Party Logistics service providers (3PL). This release large amounts of capital locked into fixed assets from which the returns are less than those used in producing the major product of the business. In essence, it allows the organisation to increasingly focus on those activities in the value chain where it has a distinct advantage (Christopher, 2005: 224). Outsourcing and partnering often come under the same heading because outsourcing without partnering is a futile exercise which will not unlock the full benefits this concept has to offer. The strengths and weaknesses of outsourcing have been extensively documented. Because the Supplier Park concept is so strongly rooted in outsourcing, it will be briefly discussed in this chapter.

Research by Belzowski, Flynn, Edwards, Ban and Martin (2004: 2) uncovered three critical topics that define the role of supply chain management within the automotive industry. They are:

- *Varying relationship models* have the ability to define supply chain efficiency and cost effectiveness;
- *Globalisation* will test even the most sophisticated and well financed companies because of the dual focus on developing both a global manufacturing footprint and a global sourcing capability;
- *Complexity*, ranging from organisational cultures and product designs to multiple sourcing and pricing models that will create particularly complex supply chain management conditions.

Services provided in supplier parks are typically closely linked to outsourcing based on built-to-order principles (Holweg & Pil, 2004: 149). Supplier parks have both a supporting and enabling role to play in outsourcing – *supporting* in the form of the management and maintenance of the factories and physical infrastructure, and *enabling* in allowing their tenants to pursue outsourcing strategies such as modular manufacturing and the outsourcing of logistics services.

Co-location of suppliers in dedicated supplier clusters next to the OEM’s assembly facility emerged when Seat officially labelled a co-located industrial estate adjacent to its assembly facility in Abrera, Spain in 1992 (Reichhart & Holweg, 2008: 54). Since then, depending on the definition used, between forty and seventy supplier parks have been established. The phenomenon shows considerable regional variation. In

Europe (e.g. Bratislava, VW; Cologne, Ford) they are commonly attached to brown-field sites. In some newly industrialised countries, such as Brazil (e.g. Curitiba, Renault) they are commonly opened in conjunction with new assembly plants (Reichhart & Holweg, 2004: 3).

This chapter defines the supplier park concept by means of a literature review and an analysis of concepts that are regarded as cornerstones for the construction of supplier parks.

## 4.2 Automotive Supplier Park Supporting Concepts

Vehicle manufacturers strive to minimise component inventory and mitigate their exposure to expensive interruptions in parts flow that can easily disrupt assembly plants (Kochan, 2002). Academics and practitioners alike consider concepts such as outsourcing, modularisation, clustering, location management, assembler-supplier relationships and collaboration as potential cornerstones for the establishment of supplier parks (Donnelly, Morris & Donnelly, 2006; Reichhart & Holweg, 2004; Sako, 2005).

### 4.2.1 Outsourcing

Japanese automakers set the benchmarks for component outsourcing in the 1980s (Cullen, 2002). The concept remains a controversial issue, and there have been many debates about the relative strengths, weaknesses and strategic applications.

The concept of outsourcing as a strategic management tool for the creation of competitive advantage is considered a source of untapped potential that is seen as ‘one more approach that can lead to greater competitiveness’ (Kujawa, 2003: 2: 8). This concept has been used in many successful projects especially in logistics activities such as warehousing and distribution that have been identified as non-core competencies. A key feature of the global automobile industry is the outsourcing of modules and systems to suppliers who are co-locating close to the OEM’s assembly plants (Sako, 2005: 2).

The aim of this section is not to advocate the concept of outsourcing nor is it to analyse its impact on modern business management, but rather, it is to provide a basic introduction which will lay the foundation for the understanding of outsourcing in the supplier park environment. More specifically, outsourcing will be considered as one of the pillars supporting supplier park concepts around the globe and as an enabler of many of the other related concepts (such as modularisation and build-to-order) because 'supplier parks are a manifestation of automakers' desire to outsource various responsibilities to suppliers' (Sako 2003b: 1).

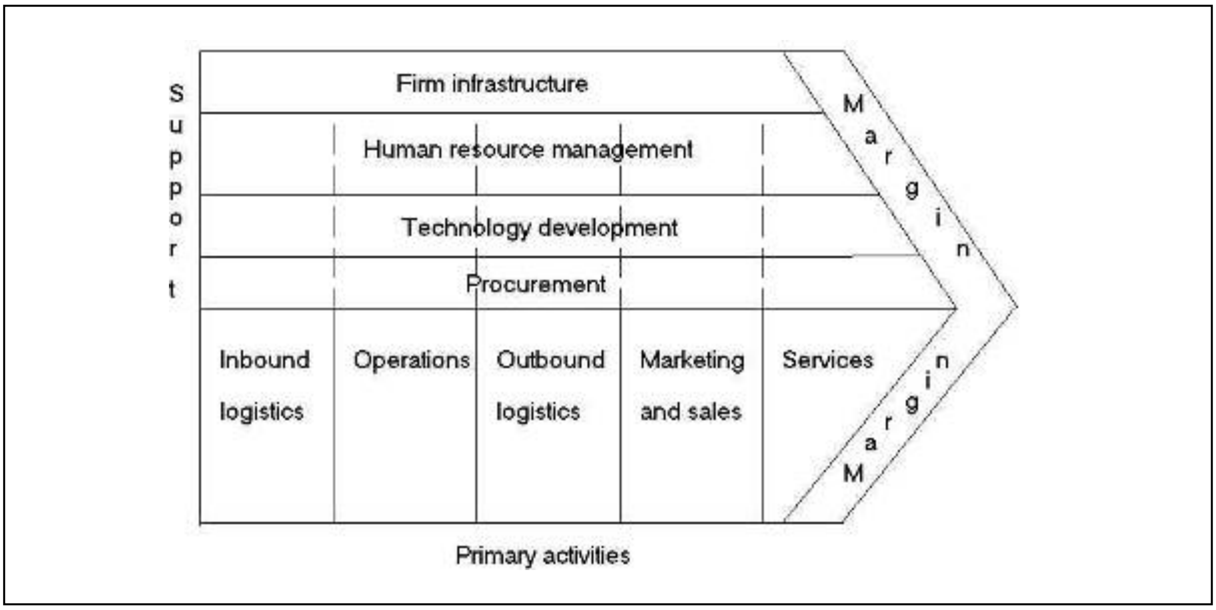
Outsourcing, as defined by Gattorna and Walters (1996: 298), is the return to the organisation's core business by transferring some of the supporting activities to outside service providers. Greaver (1999: 18) defines outsourcing as 'the act of transferring some of a company's recurring internal activities and decision rights to outside providers, as set forth in a contract'. Sako describes outsourcing as 'the redrawing of the boundaries of the company' (2005: 5). The key to the definition of outsourcing is the concept of the 'transfer of control' (Kujawa 2003, 3: 4). A study by international consulting firm Capgemini, reported that, in the past few years, automobile manufacturers have been transferring more tasks related to production, product development and controls to third parties. According to the German Automobile Industry Association (VDA in its German abbreviation), German automotive assemblers retain less than 25% of these tasks and this figure is accelerating (SupplyChainBrain, 2007).

Increased levels of outsourcing can also be ascribed to changes in the competitive market environment facing modern companies. The most prominent of these are: increasing technological change, a greater focus on core corporate competencies, globalisation, and a search for flexibility (Lonsdale & Cox, 2000). As mentioned earlier, a company's return to its core business releases large amounts of capital locked into fixed assets commonly found in 'service' activities. The returns from these 'service' activities are generally less than the returns from the capital used in producing the company's major products (Gattorna & Walters, 1996: 298). Gattorna and Walters argue that the released capital can therefore be allocated to those activities that could increase competitive advantage such as research and

development, implementation of more effective and efficient production methodologies, investing in better information technology and, in the process, moving towards a closer relationship with the customer.
While cost saving is frequently the primary motive behind outsourcing initiatives, there is more to outsourcing than only cost savings. Outsourcing strategies are also developed to improve service, to focus on core business and to benefit from access to expertise outside of the organisation (Kujawa, 2003, 3: 11; Lonsdale & Cox, 2000: 446).

Porter’s value chain as discussed in Chapter 2 (Figure 4.1) shows functions or activities that can be outsourced with reasonable success. Christopher (2005: 236) supports this argument by stating that no part of the value chain has been immune from this phenomenon with companies outsourcing distribution, manufacturing, accounting and information systems, among others.

Figure 4.1 – Porter’s value chain




Source: Porter, M.E. 1985

It is however important to understand that outsourcing is not the ‘solution to all ills’ many companies make it out to be. Greaver (1999) argues that it is critical for a company to understand its reasons for considering outsourcing and the benefits it seeks.

Kujawa (2003, 3: 13) states that:

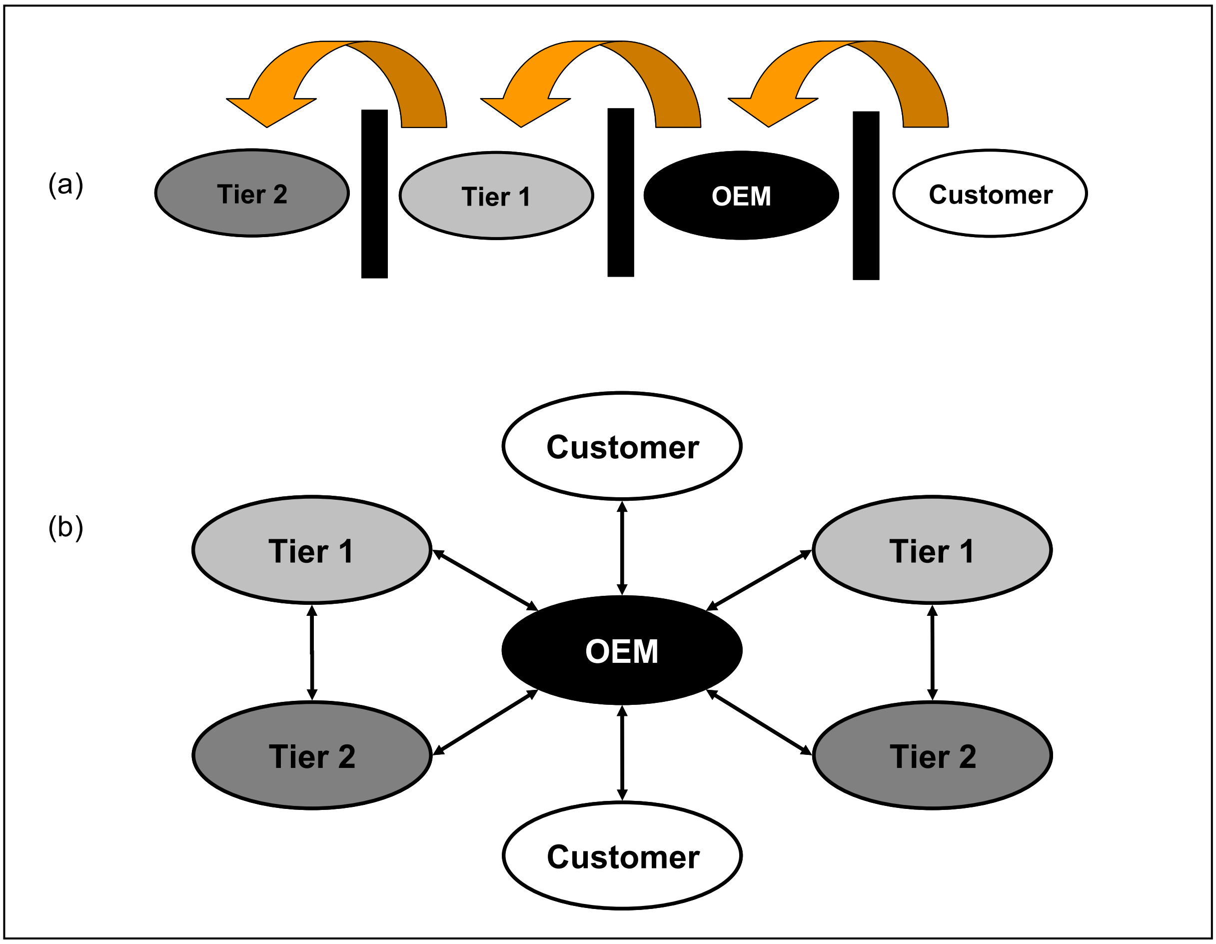
> '…historically, outsourcing was used when organisations could not perform, perhaps due to incompetence, lack of capacity, financial pressures, or technological failure. Now outsourcing is being used to restructure organisations that are successful as they recognise that management's undivided attention on building core competencies and serving user needs is critical. Anything that distracts from this focus should be considered for outsourcing'.

It can therefore be argued that this restructuring of organisations is leading to the creation of what Christopher (2005: 178) refers to as 'network organisations', where organisations are linked through shared information and aligned processes to achieve greater overall competitiveness.

Many of the current OEMs' first-tier and second-tier relationships are a perfect example of the 'network organisations' utilising mainly information sharing as the enabler (Figure 4.2). Electronic links connecting suppliers, transportation providers, manufacturers, distributors, and customers allows for efficient exchange of information that can be used to co-ordinate the activities of supply chain members. Supply chain software can also provide real-time data to supply chain members, enabling them to react quickly to changes in the dynamic environment in which they operate.

Outsourcing makes sense in industries that have global sources of supply, such as the modern automotive industry, where companies negotiate with several outside providers for their various requirements. Global competition is also prompting companies to not only reduce the number of providers but to demand higher levels of service and quality. This serves to develop a more integrated and mutually beneficial long-term business relationship that, in essence, makes it more strategic in nature (Kujawa, 2003, 3: 12). Strategic outsourcing thus takes the concept to a higher level by questioning the relevance of this practice to the organisation and its vision of the future, as well as its current and future core competencies; structure; costs; performance and competitive advantages (Greaver, 1999).

Figure 4.2 – Achieving synchronisation through shared information: (a) before synchronisation; (b) after synchronisation.




Source: Christopher (2005: 178)

Embleton and Wright (1998: 95), in discussing the strategic nature of outsourcing, emphasise that the renewed focus on outsourcing' is driven by:

- *Information technology* whereby computers, and the ability to manufacture products, have dramatically changed the structure of work, type of work and the responsibilities to perform it.
- *Communication* and associated technologies, have accelerated change as world events can influence and impact management decisions in very short time and whereby activities can be executed anywhere and at any time.
- *Organisational changes* are transforming the way business is conducted especially in the areas of re-engineering, organisational change and JIT manufacturing.

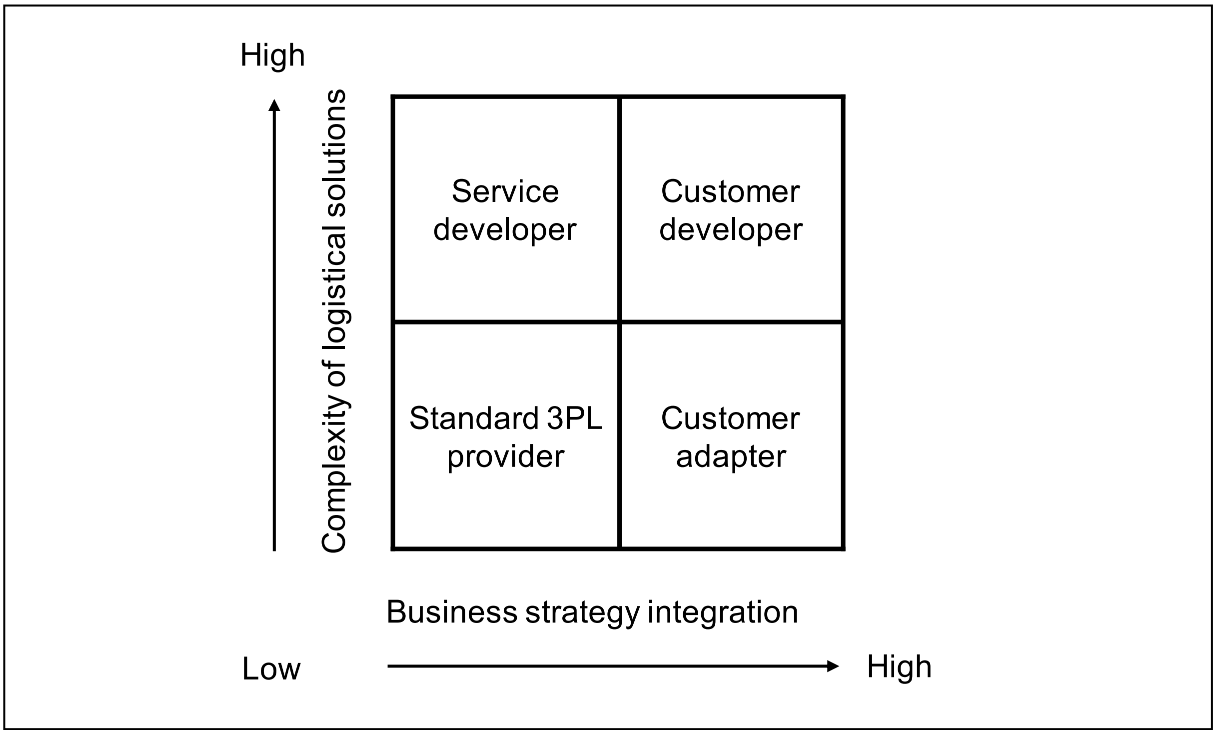
- *Cost reduction* has become a primary focus of many successful companies.

The Third party logistics (3PL) concept, a good example of the strategic outsourcing of logistics services, can be defined as a company that provides outsourced logistics services to clients for part of or sometimes all their functions. 3PL providers typically specialise in integrated warehousing and transportation services scaled and customised to customer's needs based on market conditions as well as the demands and delivery service requirements for their products and materials (Hertz & Alfredsson, 2003: 141). The use of 3PL providers allows the company to quickly gain advantage without acquiring the logistics and/or supply chain expertise beforehand (Wisner, Leong & Tan, 2005: 100)

Hertz and Alfredsson (2003: 141) have described four categories of 3PL providers (Figure 4.3):

- The *standard 3PL provide*r typically performs basic activities such as pick and pack, warehousing and distribution – the most basic functions of logistics. For the majority of these organisations, the 3PL function is not their main activity.
- The *service developer* will offer their customers advanced value-added services such as tracking and tracing, cross-docking, specific packaging, or a unique security system. A solid IT foundation and a focus on economies of scale and scope will be the enabler of these 3PLs.
- The *client adapter* comes in at the request of their customer and essentially takes over control of the company's logistics activities. Although they may dramatically improve the logistics, they do not develop a new service.
- The *client developer* is the highest level a 3PL provider can attain with respect to its processes and activities. This occurs when the 3PL provider integrates itself with the client and takes control of the logistics function. These providers will have few customers and perform extensive and detailed tasks on behalf of their client.

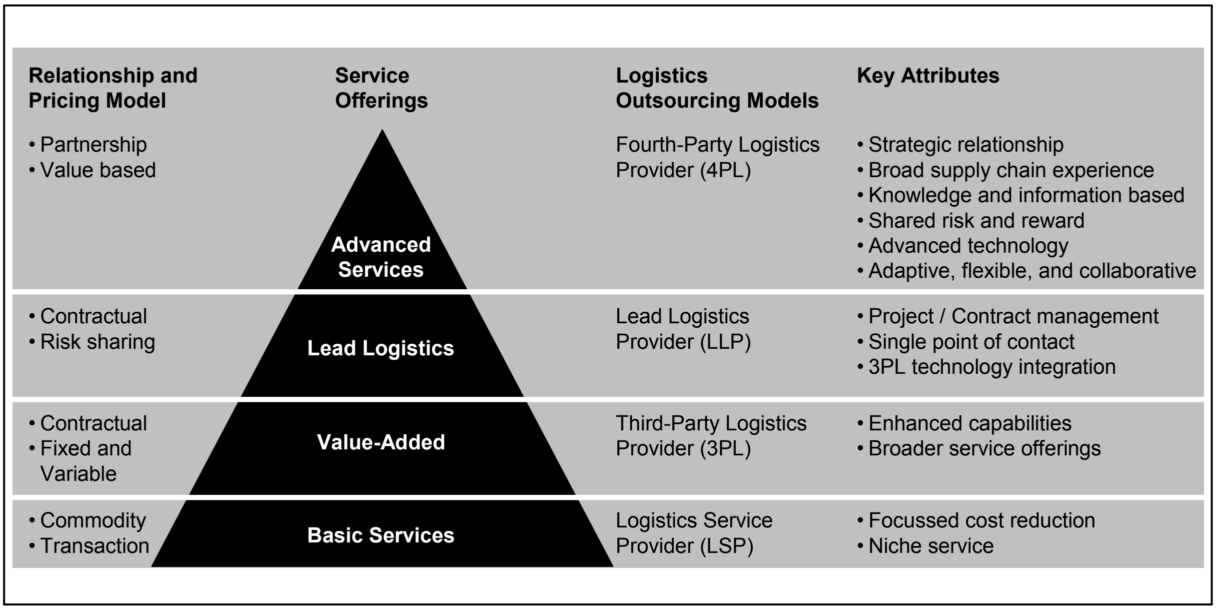
Figure 4.3 – Categories of 3PL service providers




Source: Compiled for the purposes of this study adapted from Hertz and Alfredsson (2003: 141)

Anderson Consulting (now Accenture) describes service providers with a high level of competency in information technology as Fourth Party Logistics (4PL). (De Villiers, Nieman & Niemann, 2008: 206; Hugo, Badenhorst-Weiss & van Biljon, 2004: 63). The underpinning principle behind this evolutionary term is that because modern supply networks are increasingly global and certainly more complex, the full capabilities to manage these networks properly do not exist in any one organisation. In such situations, there is a need for an organisation that can use its knowledge of supply chains and specialist third-party service providers to manage and integrate the complete end-to-end supply chain (Christopher, 2005: 295). Figure 4.4 provides insight into the evolution of the logistics service provider business model from a basic or standard service to an advanced 4PL service. The categories described by Hertz and Alfredsson and depicted in Figure 4.4 complement each other.

Figure 4.4 – Evolution of the logistics service provider business model




Source: Langley, Allenand Dale (2004: 23)

The above is supported by Kujawa (2003, 4: 22) who argues that '…while in earlier years 3PLs may have been viewed as vendors for whom the key issues were cost, control and service, now more meaningful relationships are emerging with increasing emphasis on value, innovation, and performance in a global context'. As more companies, for example OEMs, outsource their logistics to allow them to focus on their core business, logistics companies will specialise in providing efficient 3PL services that will improve, in the entire supply chain. The supplier park is a good case in point. Here manufacturers are provided with infrastructure which allows them to focus on their core business, and hand over the responsibility of managing the inbound and outbound flows to service providers. Kujawa (2003, 4: 27) states that logistics outsourcing and 3PL development is progressing beyond the historical realm of outsourcing. Companies have traditionally thought of logistics outsourcing services as a solution to a single logistics activity or process. For example, companies could outsource warehousing and distribution to one service provider, freight payments to another, and transportation to yet another. However companies are increasingly intent upon the integration of their different business processes to foster operational visibility across the organisation. Companies are also looking to optimise the number of service providers that they use to better manage the provider relations.

As depicted in Figure 4.3 the focus of companies, convinced about maximising the potential which outsourcing holds, are moving towards the first and second quadrants of service developer and customer developer respectively. Here the company is not only able to plug into the service provider's logistical knowledge base, but also rely on customised solutions tailored to its specific requirements. This is in stark contrast with the 'one-size-fits-all' solution provided by the 3PL's active in the third and fourth quadrants.

There has been a trend where companies are seeking more comprehensive logistics solutions from their service providers. To meet this demand logistics outsourcing service providers are adding new technologies and service options to expand the value of their offerings. This leads to better strategic alignment and ultimately a competitive advantage not easily replicated by their competitors. Herein lies one of the core attributes of the supplier park concept from an outsourcing perspective. The supplier park provides, in a format such as the RASP, the tenant with access to not only quality infrastructure, but also valuable logistics expertise in the form of the AIDC and its links to the CSIR and the German Fraunhofer institute (Fraunhofer-Gesellschaft). The ASP also attracts world-class 3PL service providers such as DB Schenker, UTi, Schnellecke and others with whom they have strategic alliances for the provision of warehousing, transportation, freight forwarding, materials handling, logistics consulting solutions and other services.

### 4.2.2 Modularisation, Postponement and Build-to-Order

There have been some substantial changes in the automotive industry over the past twenty to thirty years. The majority have been based on technological improvements and production techniques that led to changes in the relationships between OEMs and suppliers (Donnelly et al., 2006: 14).

To highlight the relationship between the concepts of modularisation and outsourcing, Takeishi and Fujimoto (2002: 5) note three main reasons why Western automakers have been expanding the scope of outsourcing. Firstly, these automotive companies want to benefit from their suppliers' lower labour costs, secondly they are able to reduce investment costs and risk by increasing their suppliers' responsibilities, and finally, their policy of reducing the number of the first-tier suppliers has increased their focus on modularisation. However, European manufacturers are already letting their suppliers take responsibility for larger modules that usually outsourced by their Japanese rivals.

In chapter 3 the concepts of modularisation and integrated supply were introduced. Modularisation (sometimes also referred to as fractal production) was defined as '…the process of building a complex product or process from smaller subsystems that can be designed independently yet function together as a whole' (Doran, 2004: 102). The key drivers for a modular approach were also introduced through the concept of core competence and in the increasing utilisation of built-to-order strategies.

The use of modular components and the outsourcing of production are neither new nor exclusive to the automotive industry (Holweg and Pil, 2004: 184). It can be considered as a longer-term solution to the increased competition with low profitability in the volume typically seen in the Western Europe automotive industry (Donnelly, et al., 2006: 7). It is also possible to define modularisation as '…an option linked to a particular competitive game and business strategy of some assemblers to cope with their need to internationalise their production activities by saving investment expenditure…' (Salerno and Diaz, 2002: 61).

Modularisation arose, in part, because vehicle manufacturers started outsourcing portions of the production process in an attempt to achieve three basic goals. Firstly, to convert their own fixed costs to variable costs. Secondly to lower their own labour costs, and thirdly to leverage economies of scale at suppliers (Holweg and Pil, 2004: 185). This aligns favourably with the cost focus it shares with outsourcing, as well as the drivers for supplier parks (cost reduction, labour cost reduction and increased efficiency) as discussed earlier.

What is, however, defined as a module by some firms differs elsewhere (Salerno and Diaz, 2002: 61), and may even simply be defined as a component by some. Adding to the confusion is that the number of modules in a vehicle varies. The Audi A3 for instance has 16 items designated as modules. In the VW Passat the number rises to 26, as it does in the Porsche Boxster (Donnelly, et al., 2006: 7).

The increasing complexity of vehicle manufacturing and assembly as confirmed by GEAC (1999) as cited by Donnelly, et al. (2006: 7-8) is confirmed by identifying different types of modules:

- *Assembly modules* are typically bulky or fragile components which are characterised by lengthy assembly cycle times and vary on a per model basis;
- *Product modules* are mainly concentrated in a particular product area such as starter motors or clutches;
- *Vertical modules* are where particular competencies or skills are offered by a supplier to gain overall control of a module. An example of this is the Krupp Hoesch Group which positions its skill in steelmaking, whereas Boge specialises in suspension units and Talen, Camford Engineering in underbody pressings;
- *Horizontal modules,* for example, are modules such as bodies in white pressings, material supply and rubber extrusions. NYEL, for instance, supplies all small bodies in white pressings and sub-assembly for Nissan's Sunderland plant; and
- *Integrating modules* cross-traditional boundaries in the component supply chain by offering innovative solutions to meet the assemblers' precise requirements. This area is very fluid and is a dynamic in which suppliers combine and re-combine internal and external capabilities within networks of relationships to find solutions to problems in design or in assembly.

A widely used application of modularisation is platform sharing where vehicle platforms are engineered to suit multiple products, for instance Volkswagen's Jetta, Beetle, Audi TT and Audi A3 share the Golf IV platform (Holweg and Pil, 2004: 178). Platform engineering has brought considerable reductions in costs, stockholding, and economies of scale. Controls and reduced variability also permit a spin off of products that meet specific brand requirements (Lung, 2003 as cited by Donnelly, et al.) However, it is now thought that greater benefits may be had from sharing designs, architecture and technologies across models rather than simply across steel platforms.

McAlinden, Smith and Swiecki (1999), as cited by Donnelly et al. (2006: 8) further argue that employing modularisation as a manufacturing strategy can have the following economic benefits:

- *Flexibility* by enabling OEMs to meet a more extensive variety of customer demand by allowing product differences to be incorporated into a vehicle's design.
- *Speed and Expanded Design Capability* are improved because the use of modules shortens the time taken assemble new products. Moreover, firms relying significantly on modularity can divert the development of specific competencies in many obscure manufacturing and engineering areas of expertise. This allows them to specialise in the optimal utilisation of modules in vehicle design.
- *Reduced costs* are generated because in some parts of the world, labour costs in supply firms tend to be lower than those in more unionised assembly plants. Also, the specialised facilities in assembly plants along with the related economies of scale can often result in higher capital and labour productivity with an associated reduction in cost and therefor, improved profit.

Consumers now demand higher quality and often 'more car for less money'. These cost pressures, as well as the widening and deepening of the complexity required to construct modern vehicles, supports the implementation of modularisation and outsourcing. Modular supply can reduce this complexity in both manufacturing and sourcing by increasing an OEM's ability to manage changes in demand (Donnelly et al., 2006: 8; Reichhart & Holweg, 2004: 7),

From a modular supply perspective, Reichhart & Holweg (2004: 6), identified three core drivers for the establishment of supplier parks. One, OEMs are experiencing benefits in modular supply and a shift in the automotive value chain. Two, operational advantages of co-locating suppliers of those modules are evident. Finally, there are distinct benefits in a formal supplier park as opposed to loosely co-located supplier clusters.

The transfer of key elements such as design and R&D functions to suppliers could lead to the possible loss of core competencies. This should provide some OEMs with an element of caution. Also, from a supplier point of view, fear of losing their ability to compete may result in their unwillingness to share information with assemblers (Coffey & Tomlinson, 2003; as cited by Morris, et al., 2004). Modularisation therefore is not simply about technology - it is about organisational and even social relationships between firms (Frigant and Lung, 2002; as cited by Morris, et al., 2004).

Complexity in automotive manufacturing can be highlighted by linking it to the concept of postponement, which again, has very close ties to modularisation. Postponement, also known as 'delayed differentiation', can be described as delaying the completing of the product into its final form by designing products to use common platforms, components or modules only when final demand has been confirmed (Christopher, 2005: 216).

Postponement can be discussed based on three generic types (van Hoek, 1999: 19):

- *Form postponement* relates to delaying activities that determine the form and function of products in the chain until customer orders have been confirmed.
- *Time postponement* focuses on delaying the forward movement of goods until the customer order has been confirmed
- *Place postponement* is concerned with positioning inventories upstream to postpone the forward or downstream movement of goods

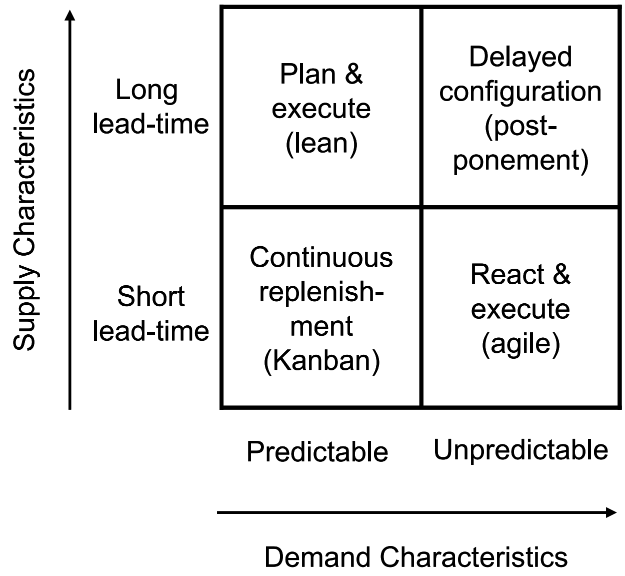
Postponement is, in many instances, a crucial enabler for the implementation of a pull logistics strategy where the supply chain is driven by the final demand for a product and not by the forecast (van Hoek, 1999: 20) (as briefly discussed in chapter 3). Postponement is in fact '…a practical manner for realising mass customisation' (van Hoek, 1999: 20; Boone, Craighead and Hanna, 2007: 595) and is already applied, to a significant extent along the supply chain of many industries (van Hoek, 1999). Postponed manufacturing (with strong linkages to the build-to-order concept) combines the three types of postponement. So, final processing and manufacturing activities are postponed until customer orders have been received (time postponement). These activities are performed from central locations in the international supply chain (place postponement) to include customer and country specific characteristics in the finished product based on final manufacturing (form postponement). This is frequently followed by direct shipment to retailers or customers (van Hoek, 1999: 19). In short, manufacturing operations are postponed until there is a demand from the supply chain (Wadhwa, Bhoon & Chan, 2006: 308).

A general observation made by van Hoek (1999: 23) is that postponement increases when moving downstream in the supply chain and is also evident in markets characterised by long lead-times and unpredictable demand (Figure 4.5). This is a common characteristic of the modern automotive industry. Supplier lead times vary from a couple of hours (mostly modular suppliers, i.e. seats, cockpits and cooling systems) to several weeks (mostly imported parts such as wheels, exterior trim, engines and gearboxes), with demand variability being mainly driven by extensive option lists.

According to Christopher (2005: 216) there are several benefits to postponement. Firstly, reduced stock keeping variants and hence less inventory in total by holding inventory at a generic level. Secondly, because of the generic nature of the inventory, flexibility is greater which allows for components, modules or platforms to be embodied in a variety of end products. Thirdly, forecasting at a generic level is less difficult than on a finished product level.

An example of these advantages in the automotive industry would be the assembly of all the vehicle body panels (doors, bonnet and boot lid) and storing the bodies in a ‘body-in-white’ state. When more accurate demand information becomes available, the painting process is completed using economic batch quantities and the painted bodies are then kept in inventory. This process allows the OEM to build stock of popular colours of vehicles that can then be delivered to the final assembly line only when firm orders have been received. The OEM can then divide the assembly process into more manageable chunks. This is characterised by shorter lead times and more predictable demand that makes production based on Just-in-Time principles possible (Liker 2004: 23).

Figure 4.5 – Postponement as a function of supply and demand




Source: Christopher 2005:119

Postponement also results in savings. By moving differentiation closer to the time of purchase, forecasting demand is more accurate.  This in turn reduces risk and uncertainty costs. Also, by sorting products in larger lots in relatively undifferentiated states, logistics costs are reduced (Lambert & Stock, 1993: 79). Companies therefore can use postponement to shift the risk of owning goods from one channel member to another. Using the above ‘body-in-white’ example, where the OEM’s outsource the body panel assembly process, the OEM will conclude the financial transaction of paying the body supplier only when the bodies have entered the paintshop.

In a postponement context, the supplier park serves a dual purpose. Firstly it helps the OEM to invest time and finances in successfully implementing this concept and taking full advantage from its benefits. The suppliers, in close proximity, are able to supply material with less lead-time variability.  This ultimately leads to a reduced dependence on safety stock. Secondly, the suppliers gain strategic and competitive advantage (see chapter 2) by becoming an integral part of the extended process. This is as a result of their ability to react more vigilantly to changes in demand. As depicted in Figure 4.5, this enables the supplier to 'react and execute' which makes them part of a more agile supply chain.

Research has found that, although implementing a successful build-to-order (BTO) strategy doesn't necessitate the construction of a supplier park, certain types of supplier parks support the objectives of BTO (Howard, Miemczyk & Graves, 2006: 93). Regardless of its form, some co-location is necessary for a successful build-to-order system' (Holweg and Pil, 2004: 150). The achievement of BTO objectives however, lies closer to outbound vehicle distribution logistics than the inbound process (Holweg and Miemczyk, 2002: 832) with '…factories generating product with as little as 4 hours of incoming inventory. Still, the typical vehicle manufacturer has a 2-month supply of finished goods available in the marketplace' (Holweg & Pil, 2004: 3).

BTO can be loosely defined as '…fulfilling customer orders in short lead times through responsive manufacturing and information exchange' (Howard et al., 2006: 91) In other words '…reconnecting the customer to the value chain' (Holweg and Pil, 2004: 99) by producing exactly what they need, and making it available when and where they need it.

Holweg and Pil (2004: 100) summarise the key benefits from BTO (in an automotive context) as:

- Manufacturers are able to provide the right vehicle more quickly, thus *improving customer service and minimising the need for an obsolete inventory*; and
- Manufacturers and dealers don't need to finance inventory as excess inventory has disappeared. Discounts are no longer required to move inventory or compensate for alternative specifications. This yields *more profit*.

The objectives of BTO are documented by Holweg and Pil (2004) as process, product and volume flexibility. Process flexibility centres on integration whereby suppliers can view orders based on actual demand from customers, so customisation is brought closer to the point of use. This ultimately creates product flexibility and volume flexibility (Howard et al., 2006: 92).

It can be concluded that the supplier parks which support BTO are those characterised by '…large-scale sites, 1km or more distant from the OEM assembly facility, and providing both volume and product mix flexibility' (Howard et al., 2006: 100).

Concepts such as modularisation, postponement and build-to-order have made the assembler-supplier relationships more complex, and '…logistics has become the key competence in the relationship between modularisation, supplier parks and vehicle assembly' (Donnelly et al., 2006: 13).

### 4.2.3 Clustering

In the 1960s and 1970s integrated enterprises competed based on manufacturing most of their components and assembling their products themselves.. The 1980s and 1990s saw companies outsource a much larger portion of their components and assemblies, to become extended enterprises. During this period supply chains competed and supply chain management became a major management skill and concepts such as lean and agile manufacture become important. In the new millennium, '…as competition becomes truly global, the competitiveness of industry in any region of the world will depend much more on the total business infrastructure, which will attract companies to and retain them in any region of the world. Competition will be between clusters of interrelated organisations that add and generate value through cooperation. The agility of individual manufacturers depends not just on their own actions and systems but also on those of the interrelated organisations' (Carrie, 1999: 45).

Michael E. Porter defines a cluster as '…a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities. The geographic scope of a cluster can range from a single city to a country or even a network of neighbouring countries' (1998: 78). Clustering goes far beyond the supply chain concept, which focuses on an organisation and its customers and suppliers.

Carrie defines a cluster as a 'network of companies, their customers and suppliers of all the relevant factors, including materials and components, equipment, training, finance and so on. It extends to educational establishments and research institutes which provide a large part of their human and technological capital. They are all stakeholders in the end market, influenced by globalisation, commercialisation, skills development, inward investment, start-ups and trade development' (1999: 46).

A cluster can be seen as a virtual enterprise. The Japanese car industry is just such an example. Japanese automakers typically have a significant network of suppliers in close proximity supporting their logistics strategies with even the Japanese finance houses demonstrating the importance of synergies between the manufacturing industry and finance. This philosophy is not limited to their home countries, but extends to the foreign countries in which the Japanese automakers operate (Carrie, 1999: 46).

In theory, identifying the elements of a cluster typically involves looking vertically (upstream and downstream) from a specific large firm, or concentration of similar firms, to identify the vertical chain of firms and institutions. The next step is to look horizontally to discover industries that pass through common channels or that produces complementary products and services. Next follows isolating the organisations that provide specialised skills, technology, information, capital, or infrastructure and any collective bodies covering cluster participants. Finally seek out government or other regulatory bodies that significantly influence participants in the cluster.

Porter (1998: 90) argued that the forte of a cluster is dependent on several interacting factors that can be classified into four groupings. In the electronics cluster in Austin, Texas, for example, there are more than 400 companies and also the largest concentration of software and semiconductors in the USA (*firm strategy, structure and rivalry*). A strong base of technologically sophisticated buyers is located in this area (*demand conditions*). Supporting this are a fast growing venture capital network, a strong research base and upstream suppliers (*related and supporting industries*) an above average education system, low taxes, low unionisation, low cost of living and high quality of life (*factor conditions*).

Later research also suggests that clusters exhibit three broad characteristics of physical proximity, core competencies and relationships. According to DeWitt, Giunipero & Melton (2006: 291) '…it (clusters) can also present opportunities for an organisation to streamline and shorten its supply chain, as these sources exist in a concentrated area.' Clusters also impact competition in three broad ways. Firstly, by improving the productivity of contributing firms or industries. Secondly, by increasing their capacity for productivity and growth through innovation. Finally, by stimulating the establishment of new business that supports innovation and expands the cluster (Porter, 1998: 80).

'This shift in the basis of competition requires managers to re-examine their assumptions about strategy. In particular, they must recognise the interdependence of all the stakeholders in the economic infrastructure of their part of the world' (Carrie, 1999: 45). Large multinationals are able to relocate their operations to any part of the world, with significant impact on the regions into and out of which they move. A case in point was the unstable employment environment in the South African automotive industry during the 1990s, and also August of 2001, when negotiations with many unions deadlocked. This to unprecedented strike actions rippling through the entire industry. Many multinational OEMs (in particular BMW in Rosslyn and DaimlerChrysler in East London) actively investigated the feasibility of relocating operations to less hostile environments. The impact of this would have been catastrophic, not only for the industry, but also for the broader South African economy (Beeld, 2001). Fortunately a mutual understanding between all stakeholders with regard to their interdependence, successfully defused the situation, and led, not only to a civilised solution, but to the forging of stronger working relationships.

The strategic importance of supplier parks rests mostly in the clustering effect (directly related to the role played by distance and proximity, as discussed previously), which has the potential for creating knowledge, sharing networks, promoting inter-firm communications and improving quality (Morris et al., 2004: 132). When overlaying (as highlighted below) the characteristics of a cluster (outlined by DeWitt et al., 2006: 291) with the description of a supplier park (put forward by Pfohl &Gareis, 2005: 306), one can appreciate the favourable alignment of the two concepts. *The supplier park is an example of the spatial concentration (physical proximity) of suppliers, sub-suppliers and/or service providers where suppliers deliver from their location in the supplier park to the automotive manufacturer, while sub-suppliers deliver to suppliers in the supplier park (core competencies). The spatial concentration allows cost savings for infrastructure and promotes a build up of tight relationships between the suppliers and the OEM under the precondition that suppliers and the OEM are willing to cooperate.*

In essence, clustering leads to high productivity and innovation because it gives good access to resources such as employees, suppliers, and specialised information. There is also  the opportunity for healthy face-to-face rivalry amongst competitors. In this case proximity is important because local competition among companies with an established identity creates a stronger motivational force for competition and co-orporation than anonymous competition (Sako, 2003a: 6).

It has been suggested that in the next decade competition will be between regional clusters rather than individual firms and their supply chains. The South African Automotive cluster, when compared to similar concepts in Germany, Spain and even Brazil, is an example of where competition is not between the individual companies within the cluster, but amongst the clusters themselves. When one member takes competitive strain (i.e. the OEM loses an export contract), the other members also suffer.  For example the freight forwarder then loses the volume needed to secure more competitive rates. Agility will therefore depend more on the interactions among industrial stakeholders and less on the tactics of individual companies. Furthermore, the  capacity to be agile will depend increasingly on the knowledge management and the knowledge assets of the organisation (Carrie, 1999: 45).

### 4.2.4 Location management

The preceding section highlighted some documented findings of various industry professionals commenting on outsourcing, modular supply, and clustering. Very little research about the structuring, coordination and optimisation of a global network of production facilities has been published. In many cases the role played by distance and proximity is considered a supporting argument for the establishment of supplier parks. This is especially important in the role of site ownership, transaction costs and the clustering effect (Morris et al., 2004: 131).

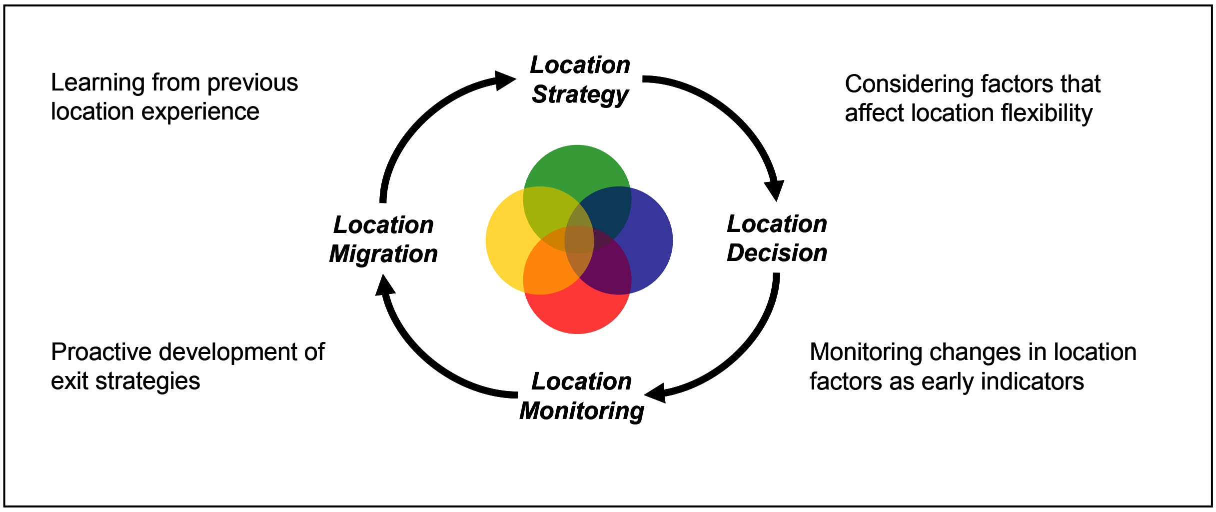
Brush, Maritan and Karnani (1999: 109-110) state that traditional plant location criteria singled out cost based variables and plant mission within the business unit. More recent additions to these criteria are variations in factory costs and government policies associated with different markets and locations.

According to a study conducted in 2005 by KPMG International, the issues relating to location management have become of more importance to the interviewed company executives (Dressler, Klinker & von Heynitz, 2005: 1). The study highlighted that organisations are increasingly required to have the capacity for rapid and flexible adaptations to changing market and competitive conditions. This creates challenges for organisational structures and affects the coordination of their global location networks (Dressler et al., 2005: 2).

The following discussion on location management is solely based on the research carried out by KPMG. This is necessitated by the lack of quality literature on the subject.

The KPMG study identified four critical cross-functional focus areas of location management – location strategy, decision, monitoring and migration (Figure 4.6; Table 4.1).

Figure 4.6 – Integration of tasks involved in global location management




Source: Dressler et al. 2005: 31

Table 4.1 – Summary of activities involved in global location management

| Location Strategy | Location Decision | Location Monitoring | Location Migration |
|---|---|---|---|
| Observe market and competition | Location analysis | Develop key metrics | Adjust capabilities |
| Assess customer requirements | Planning and location development | Structure reporting | Transfer production |
| Assess production conditions | Implementation and commencement of operations | Assess location performance | Close location |

Source: Dressler et al. 2005: 6

These areas are seldom viewed by organisations as integrated activities and typically comprise a very large number of independent departments in the organisation (Dressler et al., 2005: 31).

The importance of proper location management is underlined by continuous migration of locations from one low-wage country to the next (e.g. from Hungary to Romania). Production facilities are planned around the decreasing product lifecycles of vehicle models. This has decreased the lifespan of production facilities from twenty years to around five to ten years (Dressler et al., 2005: 6).

#### 4.2.4.1 Location strategy

There are three objectives driving automotive suppliers to establish production facilities (Dressler et al., 2005: 8). First is the need to have a presence in a major market, for example China (Market-driven location decision). Second is a decision to select a location based on cost factors (Cost-driven location decision, as in a low wage area such as Romania). Finally the goal is to be located in close proximity to the customer (Process/customer-driven location decision, as in a supplier park).

An important fact gleaned from the KPMG study is that 88% of the suppliers confirmed that their OEM customers have an influence on their location decision, with 60% rating this influence as high to very high. It is clear that OEMs and large system suppliers require their suppliers to have a global reach with a presence in at least the more important international markets such as North America, Asia and Europe (Dressler et al., 2005: 8). Furthermore, many companies expect their suppliers to be in close proximity to their own operations with up to one third of the suppliers surveyed acknowledging that they have been confronted by the need to relocate to a supplier park. Local content requirements are also important and in some cases, although suppliers are not compelled to be in immediate proximity to their OEM customer, suppliers do at least have to be located in the same country.

Clearly, the positive impact of this business model has been recognised by various OEMs. Although these facts shed an interesting and reassuring light on the future of supplier parks in the global automotive industry, the study showed that direct vicinity requirements have become less important where the supplier could guarantee the reliability, quality and competitive cost of supply (Dressler et al. 2005: 10). Improved supply chain systems are therefore becoming a notable threat to the future of supplier parks. The role of any plant within the greater OEM plant network is in many cases an important consideration that could ultimately lead to a different location decision than would be made if only economic factors were considered (Brush, et al., 1999:110). In other words, when considering factors such as material flows, knowledge transfer, etc., locating in a particular region or country could be considered even though it might not have a substantial business case.

The dependency of local suppliers on a single OEM for business and the subsequent lack of economies of scale also pressures suppliers into searching for long term contracts (or even additional set-off points) to compensate for possible negative return on investment. This leads to location flexibility being identified as an important issue in a company's location strategy.

#### 4.2.4.2 Location decision

Brush et al. (1999: 111) argues that the location decision '…should be influenced by the degree of interdependence and the need for coordination stemming from the firm's multinational strategy and its demands for the products made in a plant.' Location decisions therefore represent a long term binding commitment with a significant impact on the future success and the ability of the company to survive. During the decision process companies have to assess whether it is viable from a sales, competitive strategy and revenue perspective, to follow a customer to a foreign market.

The KPMG study goes further and identified that many of the difficulties encountered in making location decisions can be attributed to the low degree to which companies have formalised this process. This fact was proven by only 16% of the companies surveyed stating that they had a specialist for location decisions, and only one company confirming that they had a dedicated department focusing primarily on global location and investment decisions (Dressler et al., 2005: 15). In general companies approach each location decision project individually and assemble project teams on an ad-hoc basis. Many companies lack the continuity of standardisation of methods and processes, or the transfer of knowledge from previous projects within the company. It is frequently initiated by the business area and supported by various head-office divisions, such as strategic planning, market research, legal, production planning and control.

Brush et al. (1999: 112) has grouped location determinants into three categories. First, proximity to other nodes (the interrelationship between role-players such as suppliers, customers, etc.). Second, the access to factors of production (creating a competitive advantage for the whole network, for example locating with a particular OEM could show commitment and release other business opportunities in other parts of the business). Finally, national and regional characteristics (characteristics of a particular region such as favourable tax laws, etc.). The latter is especially relevant when considering it's relation to the Automotive Production Development Program (APDP) discussed in chapter 3, and the establishment of the Industrial Development Zone discussed later on in this chapter. Both of these references can be considered catalysts for the development of specific industries through the attraction of foreign investment, ultimately influencing the location decision.

Currently the trend indicates that new production facilities are being budgeted for in line with project duration, which is based on the lifespan of a vehicle model. The vehicle model lifespan is in the region of approximately six to eight years, but financial projections generally include an additional two years for development (Dressler et al., 2005: 16).

#### 4.2.4.3 Location monitoring

The monitoring of a global production network has, however, been put under renewed scrutiny because the growing scale of these networks places increased reliance on efficiency and effective centralised monitoring (Dressler et al., 2005: 18). Location monitoring enables global production networks to promptly identify location challenges and leading practices. In practice however, 'fire fighting' in response to changes in the identified factors is more frequent than early prevention.

The KPMG study identified that '…76% of companies evaluated confirmed that production facilities are able to compete for production orders, while the remaining 24% indicated that production orders are determined by customer proximity or the equipment at various factories' (Dressler et al., 2005: 21). Production orders are thus awarded based on an internal performance comparison (i.e. current capacity utilisation and capacity expansion potential), whereas the identification of new locations is primarily based on an analysis of environmental factors.

The allocation of new production orders can be mainly traced to three different approaches. These approaches are on the basis of a central controlling system by which the production facilities can be compared; the head office requests information and undertakes individual analysis; and the individual production facilities are requested to submit bids.

#### 4.2.4.4 Location migration

Although supplier companies continually strive for a long lifespan for their production facilities, the harsh reality of moving production between locations or decommissioning facilities does exist. Dynamic markets and competitive changes, in spite of attempts to maintain the competitiveness of some facilities (e.g. through the investment in new technologies), frequently lead to plant closures.

A classic case in point is that of the US auto industry, and more specifically Ford. A $ 12.7 billion loss reported for 2006, the biggest in the company's 103 year history, resulted in Ford's CEO, Alan Mulally (at that time recently appointed from Boeing), having to introduce a drastic rescue plan that involved the closing of 16 production facilities and slashing 45,000 jobs in the US and Canada alone (Ford very very red, 2007). With GM also under market pressure and recording their lowest share price in half a century (GM shares hit 50-year low, 2008) the same fate seems inevitable. In this particular case the numbers only relate to the OEMs. Tactual impact in lost supplier contracts up and down the supply chain will only manifest in a few years time. Not considering the subsequent effect on employment and economic growth in those industrial areas relying on the automotive industry (such as Detroit, Michigan).

Dressler et al. (2005: 26), highlighted the following as some of the most common reasons for recent production facility closures:

- Companies continuing their migration from industrialised (mainly Western) countries to countries with lower wage costs;
- Further second stage migration from a former low-wage country (e.g. Hungary) to a new low-wage country (e.g. Romania);
- The establishment of new production facilities in growth markets (e.g. China and India) resulting in excess global capacity;
- Model lifespan is increasingly being used as the basis for the planning of process and customer-driven facilities;
- Regional duplication of facilities due to mergers and acquisitions; and
- The consolidation of facilities in specific regions to reduce cost.

Facility closures require the regular development of exit strategies to identify and set out the consequences of the plant closure. The relevant action points need to be addressed. The main reason being the effects on a large number of interest groups such as employees, local authorities, trade unions and other production facilities within the company's network.

In order to properly manage the risks involved in the investment in new locations, many companies try to keep the level of initial investment as low as possible by pursuing a strategy of phased internationalisation. The supplier park concept provides new entrants to the domestic automotive environment an opportunity to limit their exposure to risk through certain benefits such as flexible facility investment options, pre-set logistics and IT infrastructure, access to reliable energy and an availability of a qualified and reliable workforce.

From a South African perspective, the over utilised logistics infrastructure (as discussed in chapter 3) supports the argument for the supplier park business model. This is particularly relevant when combined with the increasing importance for flexibility, the demand from OEMs to have their suppliers (especially module suppliers) in close vicinity, and the link with shorter project life spans. This rings especially true for those suppliers who are new entrants to the South African automotive market riding on the wave of international contracts, MIDP and local content requirements. For these organisations the supplier park can provide a viable alternative for costly, inflexible and long term investments.

Pfhol & Gareis (2005: 313) state that the formation of a supplier park should be done centrally and ideally by the leader of the supply chain or by an institution that takes the biggest advantage of the concept. This places supplier parks in the enviable position of being able to provide possible investors with a solution characterised by managing risks such as capital outlay, infrastructure, exit scenario planning, domestic factors and growth flexibility. In a South African context, with the involvement of the AIDC, the government has accepted the responsibility of providing the infrastructure in the form of the Rosslyn Automotive Supplier Park.

As the landscape continues to change for the automotive industry, the focus of management needs to align to the critical success factors. As was discussed in the preceding section, the importance and impact of a proper location strategy and management is imperative. The topic is gaining more attention and momentum in business circles that implies that the business case for industrial parks, regional consortiums and supplier parks will come under the spotlight.

## 4.3 The Automotive Supplier Park Defined

The concept of the clustering of companies operating on various levels within the same industry is not unique to a specific industry. In an article published in the Harvard Business Review, Michael Porter (1998: 78) refers to various other examples such as Hollywood as a cluster for the entertainment industry, Wall Street for finance and Silicon Valley for the IT hardware and software development industry. Suppliers co-locating or clustering with factories in supplier parks are a more recent trend (Holweg and Pil, 2004: 35), and it is closely related to procurement logistics that in essence focuses on the degree of service and on cost (Pfohl and Gareis, 2005: 315). The various role players in the automotive industry have however been working in close proximity to each other for decades, being it via vertical integration, as in the Ford Rouge facility of the early nineteen hundreds, or via industrial clusters, such as industrial parks or supplier parks which are becoming increasingly common in automotive and other industries (Howard, et al., 2006: 91; Reichhart and Holweg, 2004: 54).

Porter (1998: 77) also states that:

> 'Now that companies can source capital, goods, information, and technology from around the world, often with the click of a mouse, much of the conventional wisdom about how companies and nations compete needs to be re-evaluated. In theory, more open global markets and faster transportation and communication should diminish the role of location in competition, because anything that can be efficiently sourced from a distance through global markets and corporate networks is available to any company and therefore has essentially nullified proximity as a source of competitive advantage'.

Considering Porter's statement within the influences of lean production and the development of modularisation, the development of supplier parks could be argued to be quite unexpected (Morris, et al., 2004: 129). In many instances supplier parks owe their existence to the fact that '…manufacturers simply cannot provide reliable call-off information' (Holweg and Pil, 2004: 36) which necessitate suppliers to compensate for the variability in demand by locating in close proximity to their OEM customer. Research has however shown '…contrary to received wisdom that supplier parks have developed because of the disruption caused by extended supply chains' (Howard et al., 2006: 101), that supplier parks are actually adopted for reasons such as the availability of government funding, corporate restructuring, and the result of changing strategies in addition to need for volume and product mix flexibility (Holweg and Pil, 2004: 148).

Defining the supplier park concept is made difficult when considering that it has been implemented in a variety of forms with each manufacturer not only taking a different approach, but with some also not even using the same system for individual plants (Cullen, 2002). Sako (2003a: 1) refers to supplier parks as '…a generic term to refer to the phenomena variously termed as modular consortia and industrial condominiums'. Other descriptions of supplier parks in the automotive industry include 'decentralised production in local assembly units…located close to the assembly plant' (Millington, Millington and Cowburn, 1998: 180), and nodes in the supply chain from the sub-supplier to the OEM where suppliers handle value-added processes next to the production facility of their customer (Pfohl and Gareis, 2005: 304), or even a ‘supplier manufacturing campus’ (Cullen, 2002).

In this study, when referring to the supplier park concept from an automotive perspective, the definition of Howard et al. (2006: 92) will stand true, as:

> ‘A concentration of dedicated production, assembly, sequencing or warehousing facilities run by suppliers or a third party in close proximity (i.e. within 3km) to the OEM plant’.

Most OEMs including BMW, Ford, Fiat, General Motors, Peugeot, Renault and Volkswagen have implemented supplier parks in Europe in some form or another (Chew, 2003). Typical activities found in these facilities include warehousing and inventory management, sequencing, assembly and late configuration (Cullen, 2002; Kochan, 2002).

According to Holweg and Pil (2004: 149) supplier parks support greater assembly-sequence reliability, reduce the transport effort of fragile integrated assemblies and support the simplification of quality problem resolutions of because closer proximity. Some challenges are that suppliers find it difficult to balance volume fluctuations for multiple customers, to locate and retain low-wage workers, and to manage overhead costs.

From an automotive perspective there exist polarised views of the success of supplier parks (Cullen, 2002; Chew, 2003). Sako (2003b: 1) states that supplier parks might be regarded as clusters with all the benefits of a locally surrounded production system, but can also constitute the ultimate tool by multinational corporations to de-territorialise and control the global commodity chain’. It can therefore be reasoned that for some, supplier parks represent new experiments in production and logistics management, but for others they represent degeneration to the model of highly vertically integrated factories, except that the ownership is fragmented. Supplier parks will however be subject to different interpretations based on political economies and regional development (Sako, 2003b: 1-3).

Even though '…formal definitions for the term 'supplier park' are at times conflicting' (Reichhart & Holweg, 2008: 58), the importance of the concept as part of the modern automotive supply chain is evident in the current academic debate. The aim of the following sections is not to comprehensively discuss the merits and pitfalls to the automotive supplier park concept. (Plenty of literature on this subject has been published). The aim is rather to introduce some of the forms of supplier parks from an international and local perspective, to introduce some of the concepts that support the automotive supplier park's reason for existence, and the interrelationship of these supporting concepts.

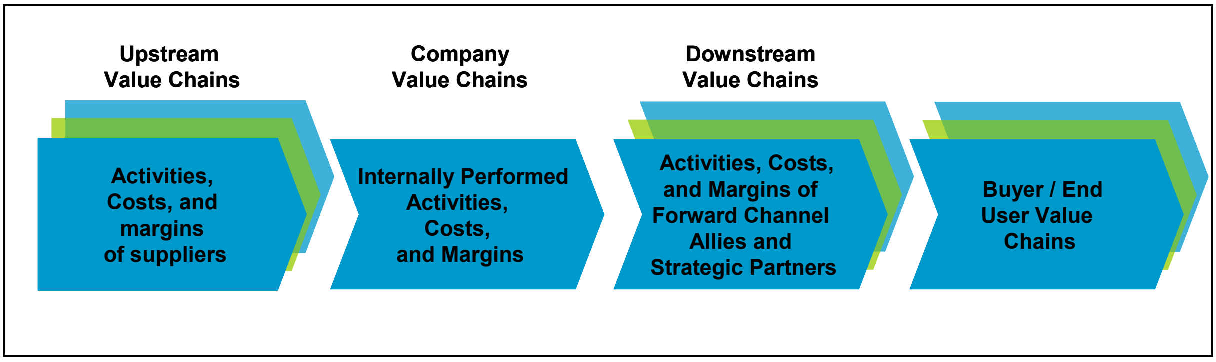
## 4.4 Supplier Parks and Value Creation

Porter's value chain, as introduced and discussed in Chapter 2, has proved a very useful instrument in describing the relation between activities within companies in traditional industries like manufacturing, and has outlined the thinking around value and value creation (Peppard and Rylander, 2006: 131).

A company's value chain is embedded in a larger system of activities that include the value chains of its upstream suppliers and downstream customers or allies engaged in getting its products/services to the end user. Accurately assessing a company's competitiveness in end-use markets requires that the company not only be familiar with their own value chain, but also understand the entire value chain system for delivering a product or service to their customer (Thompson & Strickland, 1999: 117). A company must be aware of the value chains of its suppliers. The activities and costs incurred by suppliers will influence the company's costs and differentiation capabilities. This is illustrated in Figure 4.7.

This approach highlights the importance of creating collaborative partnerships with upstream suppliers, as anything a company can do to reduce its suppliers' costs or improve suppliers' effectiveness can enhance its own competitiveness. In other words the relevance of the upstream value chains are highlighted because the cost and margins of downstream companies are part of the price the ultimate end user pays. Thus, the activities performed by the upstream allies affects the end user's satisfaction. It is therefore imperative that companies work closely with their upstream allies to adjust or recreate their value chains to improve their mutual competitiveness. (Thompson & Strickland, 1999: 118).

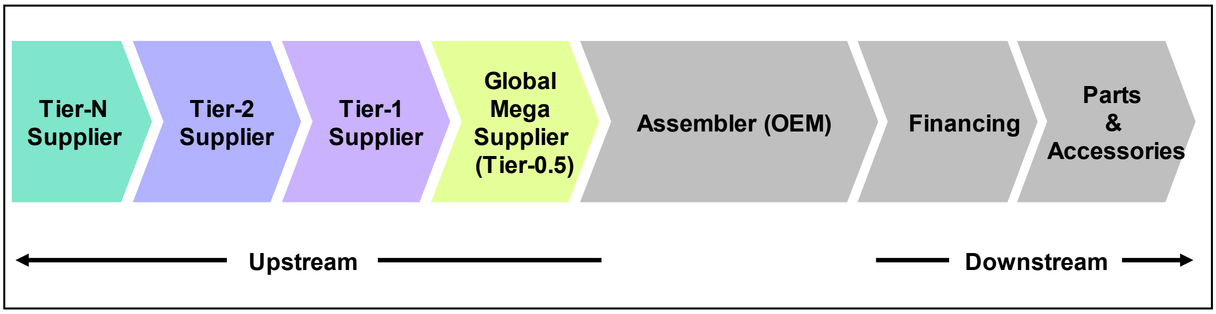
Figure 4.7 – The value chain system




Source: Thompson and Strickland (1999: 118)

Based on the depiction of the value chain system in Figure 4.7 it is possible to provide a simplistic view of the typical automotive value chain (Figure 4.8) depicting the major value creators upstream and downstream from the OEM.

Figure 4.8 – A typical automotive value chain




Source: Compiled for the purposes of this study; Adopted from Humphrey and Memedovic (2003: 22)

The global automotive industry at the beginning of the 21st century is composed of a number of different sections, each of them having distinct capability requirements which align with the traditional automotive value chain depicted in Figure 4.8.

Assemblers, global mega-suppliers (Tier-0.5) and some Tier-one suppliers require global reach, innovation and design capabilities, as well as considerable financial resources. Global reach is not mandatory for Tier-two suppliers, even though there are some trends highlighting the move towards internationalisation in this sector. The competencies required in Tier-three are much less, but the returns are also much lower. Downstream from the OEM, the aftermarket section (including activities related to finished vehicle distribution, financing, servicing, parts and accessories) offers an entirely different route to customers. The business is much more fragmented and access is easier but this section is also very price-competitive (Humphrey & Memedovic, 2003: 19). Although the impact of the aftermarket sections of automotive value chain should not be undervalued, the complexities are however out of scope of this particular study and will not be addressed in any detail.

Belkowski, Flynn, Edwards, Ban and Martin (2004: 20) quote one automotive supplier stating that, ‘the view of managing the entire value stream is potentially the foundation for doing this work. If you look at it as unrelated buy/sell transactions down the chain, you are working in the old model. You need to look at the integrated value chain to make improvements. You need to look at interrelated waste and process identification’

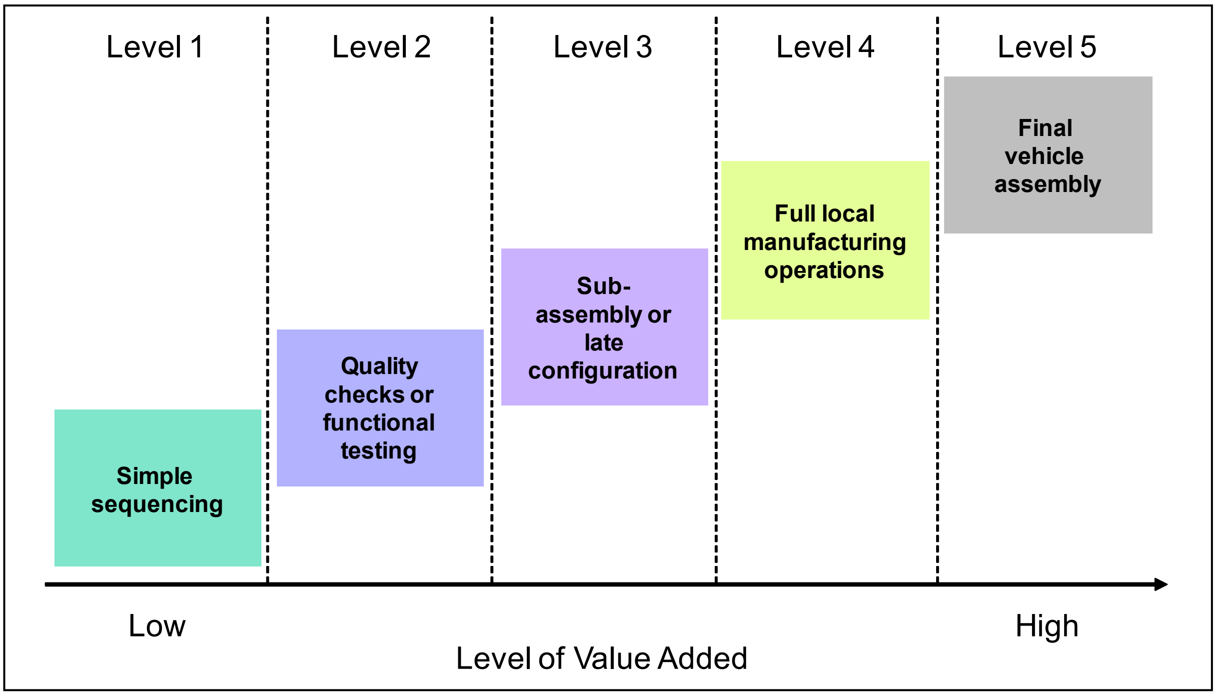
Automotive assemblers consider supply strategies vital, because most of the value creation activities are lying upstream from them (Hugo et. al. 2004: 33). Changes in component production during the last decade were as much driven by the alterations in the nature of value chain relationships between assemblers and suppliers as by the industry’s globalisation (Humphrey & Memedovic, 2003: 1). Suppliers have, however, taken on a majority of the responsibilities for vehicle manufacturing from the OEM’s. Suppliers make over two-thirds of the annual capital investment, employ a majority of the manufacturing employees, create two-thirds of all product and process innovation, and provide two-thirds of the material content of each vehicle (Humphrey & Memedovic, 2003: 2).

Peppard and Rylander (2006: 131) argues that suppliers and assemblers are becoming more skilled in following a network approach where there is focus on the value-creating system rather than the company or industry, and where value is co-produced by different parties such as suppliers, partners and even customers'. Bolstorff (2005) highlights the understanding of recent complexities in the supply chain by stating that supply chain managers are forced to start '…learning to deal with the increased pace of new product introductions paired with more efficient material acquisitions; increased sales productivity paired with more effective pre- and post-sale customer service; more flexible global distribution paired with more efficient use of warehouse and transportation costs; and planning for both supply chain and customer's supply chain paired with improving planning efficiency'. In other words global networks have replaced local supply linkages. Even when production remains local, design and contract allocation is increasingly global (Humphrey & Memedovic, 2003: 1). Global supply networks are becoming particularly important in the automotive industry as assemblers and suppliers develop parallel networks across the globe and supplier parks become increasingly useful in enabling and supporting the value adding activities of their tenants.

Reichhart and Holweg (2004: 15) documented that five categories of value adding activities, which differ significantly in terms of value add, were identified in supplier parks internationally (Figure 4.9).

Firstly, the least value is added by simple sequencing activities. This is typically used for less expensive components that require either a high investment in production machinery (e.g. carpets) or are very labour intensive (e.g. wiring harnesses). These components are often produced centrally in newly industrialised countries, and then shipped in batches to a warehouse close to the assembly plant, from where they are delivered in sequence to the assembly line. An example of such a value adding relationship can be found between Mercedes-Benz (MB) (OEM), Delphi (Tier-1 supplier) and DB Schenker (LSP) in East London. MB assembles the C-Class for local and international markets in their facility in East London. Delphi is the wiring harness supplier. Their manufacturing facility is based in Botswana (due to a more favourable business environment), but they are contractually obligated to deliver on a JIS basis to the MB assembly line. To resolve the related timing and logistics challenges, Delphi has partnered with DB Schenker to perform the JIS activities on their behalf. Delphi therefore delivers four to five times per week to the DB Schenker facility in East London, while DB Schenker sequences the harnesses as per the confirmed MB production schedule and delivers the sequenced harnesses to the MB marshalling area. Here MB collects the stillages and makes them available at the fitment point (Rudolph 2007).

Figure 4.9 – The value add continuum




Source: Compiled for the purposes of this study; Adopted from Reichart and Holweg (2004: 20)

The second level of value adding activities typically revolves around performing quality checks or functional testing on components before sequencing. These activities can be in the form of simple tasks (e.g. visual inspections), but can include a full functional test using advanced equipment (e.g. the testing of electronic components like front end lighting systems or park distance control sensors).

Thirdly, late configuration or simple pre-assembly activities are performed (e.g. installing fog lights or sensors to bumpers, which were manufactured in a central facility). One such an example for such activities is where Plastic Omnium Automotive late-configures bumpers that were built in central plants for the Peugeot plant in Coventry, UK.

Fourthly, the most local value is added when suppliers have full local manufacturing operations. There is however a balance between potential high investments and lost economies of scale, which needs to be weighed against a smooth value flow not requiring buffer stocks of finished or semi-finished components.

Finally, the highest level of value add is demonstrated when suppliers perform the final vehicle assembly. It is however important to distinguish between the mere outsourcing of vehicle assembly tasks (e.g. vehicles are assembled from centrally produced modules) and true modular consortia (e.g. where suppliers assemble their modules locally prior to fitting them to the vehicle on the assembly line). An outsourced vehicle assembly process does not constitute high local value added. The VW Resende plant (described in Chapter 5) is a typical example of such a modular consortia and the associated value add is demonstrated.

Reichhart and Holweg (2004: 22) argue that the main and also most obvious drivers of how much value add is to be performed inside the supplier park or close to the assembly plant, are based on the existence of central manufacturing facilities, economies of scale and logistics considerations. They continue by stating that '…if an OEM establishes a new vehicle assembly plant in an area, which lacks any supplier facilities, the suppliers are more likely to agree to a high local value-added content compared with a region in which they have spare capacity or could otherwise benefit from economies of scale using existing operations. On the other hand, the OEM will not necessarily see the need for a supplier park if the most important suppliers have sufficient regional representation and capacity'. It is for that reason that many

Greenfield sites in newly industrialised countries that have a supplier park show a higher local value-added content than Brownfield sites in industrialised countries.

Logistics costs are one of the main drivers for co-location within a supplier park environment (Reichhart and Holweg, Simeka TWS Communications, 2003). More often than not OEMs purchase components from their overseas suppliers on an ex works basis (EXW) (where the buyer arranges and pays for the transport of the items themselves) while local suppliers more often deliver the parts at a price which includes transportation and other value added services like sequencing. Reichhart and Holweg (2004: 22) argues that 'OEMs therefore have a direct interest in co-locating their local suppliers as long as such a move would not increase unit cost over proportionally thereby increasing the components' total cost (unit cost + transport cost)'. A good example of how OEMs and suppliers are re-evaluating the packaging and movement of components through the supply chain in order to reduce associated logistics costs can be found in the disbanding of components. By dis-assembling components into smaller more manageable parts, the OEM or supplier can save on transportation costs as the parts can now be stacked more densely thereby improving space utilisation. This necessitates additional value adding steps close to the vehicle assembly line. Such an approach will only be beneficial, if it is applied to several parts in order to achieve economies of scale. It would also prove the ideal opportunity for a LSP to perform the disbanding and re-assembly function. It must also be noted that the importance of logistics considerations – both in terms of transportation costs and in delivering reliability and supporting supply chain responsiveness – must be considered in the establishment of supplier parks.

## 4.5 Summary

Three major drivers for the establishment of supplier parks were presented. These were logistical cost reduction (i.e. costs in inventory, transportation, and materials handling), labour cost reduction and efficiency improvements. Core issues were also identified. Specifically, because OEMs see benefits in modular supply and a shift in the automotive value chain, there are apparent operational advantages of co-locating suppliers of those modules. There are also distinct advantages to a formal supplier park rather than loosely co-located supplier clusters.

Related concepts such as outsourcing, modularisation, postponement and build-to-order, clustering, and location management, were identified as cornerstones for the supplier park concept. Supplier parks are a demonstration of automakers' desire to outsource various responsibilities to suppliers, and the outsourcing concept as pursued by OEMs and their suppliers are supported by the supplier park concept in providing the enabling infrastructure and services to drive and support the cornerstone initiatives. Supplier parks support the pursuance of manufacturing strategies such as modularisation, postponement and build-to-order as some co-location and clustering is necessary to successfully achieve these strategies. Location management forms the catalyst for the co-location of OEMs and suppliers in close proximity (such as in supplier parks), especially in new-entrant countries and developing economies where the infrastructure is not yet available.

Outsourcing has been driven by various changes in global business management with the most notable being rapid technological change, greater emphasis on core corporate competencies, globalisation, and therefore increased risk and search for flexibility. Companies continue to outsource distribution, manufacturing, accounting and information systems. This is leading to the creation of 'network organisations', whereby confederations of firms are linked together – usually through shared information and aligned processes – to achieve greater overall competitiveness. Even though the reasons why companies outsource have changed from primarily cost disciplines to strategic re-positioning, core competence enhancement, greater service integration and/or higher value creation, the automotive industry's decisions to outsource is driven primarily by cost reduction efforts through scale economies and strategic sourcing.

There was allusion to the fact that Logistics outsourcing and 3PL/4PL development has progressed beyond the historical realm of outsourcing. Companies are looking for increasing integration of their different business processes so that they can have operational visibility across the organisation, and ultimately the streamlining of the number of service providers that they use to better manage their provider relations.

The relationship development focus has led to companies seeking service providers that offer more comprehensive logistics outsourcing solutions, with logistics outsourcing service providers adding new technologies and service options to expand the value of their offerings. This in itself leads to better strategic alignment and ultimately a competitive advantage not easily replicated by their competitors. It has been concluded that herein lies one of the core attributes of the supplier park concept, from an outsourcing perspective that is the fact that the supplier park provides the tenant with access to not only world-class infrastructure, but also world-class logistics expertise as well as attracting world-class 3PL service providers.

The direct correlation between outsourcing and modularisation was introduced and defined, as were the three main reasons why Western automakers have been expanding the scope of outsourcing. Firstly, these automotive companies want to benefit from their suppliers’ lower labour costs. Secondly they are able to reduce investment costs and risk by increasing their suppliers’ responsibilities. Finally their policy of reducing the number of the first-tier suppliers has increased their focus on modularisation. However, European manufacturers are already letting their suppliers take responsibility for larger modules than is the practice by their Japanese rivals. It seems that the difficulty in making profits from their car business underlies their aggressive outsourcing. It was concluded that the main drivers towards modularisation and its accompanying outsourcing have been cost pressures and the widening and deepening of the knowledge base required to construct a modern vehicle as consumers demand higher quality and often ‘more car’ for less money.

It was documented that there is agreement in the automotive industry that modular supply can increase an OEM’s responsiveness to customer orders and market changes. These benefits are evident due to a major reduction in complexity, both in manufacturing and in sourcing, with modular supply reducing the number of direct suppliers and also simplifying the final assembly process by reducing the number of parts to be installed. Reducing complexity is particularly important when considering the increase in product variety, as this is one of the key drivers in the modern automotive industry.

The concept of postponement, which has very close ties with modularisation, is in many instances a crucial enabler for the implementation of a pull logistics strategy where the supply chain is driven by the final demand for a product and not by the forecast. This is evident in markets characterised by long lead-times and unpredictable demand - also a common characteristic of the modern automotive industry. Supplier lead times vary from a couple of hours (mostly modular suppliers, i.e. seats, cockpits and cooling systems) to several weeks (mostly imported parts such as wheels, exterior trim, engines and gearboxes), with demand variability being mainly driven by extensive option lists.

In a postponement context, the supplier park provides both the OEM and the supplier with concrete benefits. On the one hand the OEM can invest time and finances in successfully implementing this concept and taking full advantage from its benefits, because it has access to suppliers in close proximity who able to supply material with less lead time variability. This ultimately leads to a reduced dependence on safety stock. Suppliers are able to obtain strategic and competitive advantage by becoming an integral part of the extended process, because of their ability to react more vigilantly to changes in demand.

It was concluded that modularisation is not simply about technology; it is about organisational and even social relationships between organisations.

Research found that although implementing a successful build-to-order (BTO) strategy does not necessitate the construction of a supplier park, certain types of supplier parks do not support the objectives of BTO, which are process, product and volume flexibility. These supplier parks are characterised by large-scale sites, 1km or more distant from the OEM assembly facility, and provide both volume and product mix flexibility. Although the concept is closely related to supplier parks, the achievement of BTO objectives however, lies closer to outbound vehicle distribution logistics due to largely optimised inbound process with far less inventory compared with the large amounts of finished vehicle inventory in the dealer network.

The outsourcing of larger parts of manufacturing and assembly to their supply partners, saw companies shift from integrated enterprises to extended enterprises and, in more recent times, also extending across geographical lines to become truly global enterprises. Thus, competition is now between clusters of interrelated organisations that add and generate value through cooperation. Also, agility of individual manufacturers depends not just on their own actions and systems but also on those of the interrelated organisations. These clusters were defined as geographically proximate groups of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities that can range from a single city to a country or even a network of neighbouring countries. It was presented that clustering leads to high productivity and innovation because it gives good access to resources such as employees, suppliers, and specialised information. It also leads to healthy face-to-face rivalry amongst competitors. It was concluded that supplier parks benefit from the clustering effect that has the potential for creating knowledge sharing networks, promoting inter-firm communications and improving quality.

Location management was discussed as the structuring, coordination and optimisation of a global network of production facilities and the higher level of importance it is continuing to serve on the agendas of automotive companies' senior management. This is mainly due to the fact that these companies have to be capable of rapid and flexible adaptations to changing market and competitive conditions. This has created the challenge for companies to structure and coordinate their global location network. Four critical cross-functional focus areas of location management were identified as location strategy, decision, monitoring and migration. It was concluded that in practice, location management and the tasks involved are rarely viewed by organisations as integrated activities encompassing a very large number of departments in the organisation. The supplier park with its related services in the form of the AIDC 3PL and 4PL service providers offers both the OEM and its suppliers the required information to make strategic decisions with regards to location management, ultimately minimising the associated guess-work involved in the establishment of production facilities in unknown markets.

Global networks have replaced local supply linkages. Even when production remains local, design and contract allocation is increasingly global. Global supply networks are becoming particularly important in the auto industry as assemblers and suppliers develop parallel networks across the globe and supplier parks become most useful in enabling and supporting the value adding activities of their tenants.

It was argued that a company's value chain is embedded in a larger system of activities that include the value chains of its upstream suppliers and downstream customers or allies engaged in getting its products/services to the end user. Accurately assessing a company's competitiveness in end-use markets requires that company managers understand the entire value chain system for delivering a product or service to the end-users, and not just the company's own value chain. This approach highlights the importance of creating collaborative partnerships with upstream suppliers, as anything a company can do to reduce its suppliers' costs or improve suppliers' effectiveness can enhance its own competitiveness. The upstream value chains are relevant because the cost and margins of downstream companies are part of the price the ultimate end user pays, and the activities performed by the upstream allies affects the end user's satisfaction. It is therefore imperative that companies work closely with their upstream allies to adjust or recreate their value chains in ways that enhance their mutual competitiveness.

The value add continuum described that the value add within the supplier park environment can be grouped into five levels of activities - simple sequencing activities, quality checks or functional testing on components prior to sequencing, late configuration or simple pre-assembly, full local manufacturing and final vehicle assembly by suppliers. It was concluded that the main and also most obvious drivers of how much value add is to be performed inside the supplier park or close to the assembly plant, are the existence of central manufacturing facilities, economies of scale and logistics considerations.

Built on the definition and understanding of a supplier park, the supporting concepts and the supplier park's contribution to value creation, Chapter 5 will further present the various supplier park concepts implemented from both an international and South African perspective. It will also detail the Rosslyn Automotive Supplier Park at the hand of the concepts discussed in this chapter.

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# Chapter 5

## Rosslyn Automotive Supplier Park: Value Proposition and Benefits Model

*This chapter highlights the various forms of supplier parks implemented across the world, and the South African applications of the concept. It also describes the value proposition and benefits model based on the communicated benefits of the Rosslyn Automotive Supplier Park, within the South African automotive value chain.*

## Content

## 5.1 Introduction

Automotive assemblers in South Africa operate within a constantly changing and turbulent global business environment (Hugo, Badenhorts-Weiss & van Biljon, 2004:32). The root cause of this trend is the global nature of the modern automotive industry in which national boundaries and closed domestic markets have disappeared. The local industry's focus on increased competitiveness has been driven by a number of factors including the challenges associated with low product volumes (compared to international norms), the fact that assemblers are quite distant from their export markets, and the long inbound supply lines which complicate logistics management and increases supply chain costs. In addition, assemblers face many newcomers in the form of imported models from low cost countries like India and China, in an environment where growth in the domestic market remains essentially limited.

One approach to managing this turbulent environment led many companies to search for ways to gain competitive advantage by forging superior business relationships within their supply network (as discussed in Chapter 4) or value chain. Many business leaders now know that partnerships within the supply chain have the ability to unlock the long term competitive advantage – or collaborative advantage as referred to by Kanter (1994:96) – that many of their competitors unsuccessfully seek to duplicate. At the same time, the global production and sales strategies of leading multinational automotive companies have become more inclusive of developing countries with this trend becoming integral to their business and production plans. This has also led to a more macroeconomic approach to managing the challenges and gaining industry wide competitive advantage. The current MIDP, and evolutionary APDP which will replace it in 2013 (both discussed in Chapter 3), have been the key drivers of the South African government's plan to stimulate the local automotive industry's production volumes, and subsequently export volumes, and also encourage the use of locally produced content in these export vehicles.

Competitive advantage can be defined as the ability of an organisation to firstly differentiate itself from its competitors in the eyes of the customer, and secondly by operating at lower cost and hence greater profit. The terms assigned to these factors are value advantage and productivity advantage respectively (as discussed in Chapter 2). Collaborative partnerships can be utilised to facilitate the creation of these advantages (Christopher, 1998:5). The challenge for supply chain management is however, to seek out and pursue strategies that will take the business away from a low productivity advantage and low value advantage position (‘commodity’ end of the market) towards a secure position of strength based upon differentiation and cost advantage (Christopher, 1998:10).

Supply chain costs are a significant part of total production costs. Effective management of supply chain costs can result in substantial savings through essentially reengineering supply chain processes. The alternative is to seek a strategy of differentiation through service excellence to meet the requirements of customers seeking greater responsiveness and reliability from suppliers. Their aim is an optimal combination of reduced lead-times, increased reliability in delivery services (such as JIT and/or JIS) and value added services that enable them to better serve their customers.

The increasingly large and important role the suppliers play in the manufacturing of an automobile has created various challenges for the assemblers. Foremost among these is the dependable, on-time delivery of the components necessary to assemble a vehicle. As the automakers have pushed much of the pre-final assembly work out of their plants, they have found themselves subject to the logistical challenges and constraints of their suppliers Some of the drawbacks are less control over costs, reduced visibility into technological developments, less access to market information, and less control over sustainability (Choi and Linton 2011: 1-7).

In an effort to manage the impact of the logistical challenges, the OEMs have taken a more active role in how and where their suppliers conduct their operations (Hill and Szakaly, 2006:1). Assemblers introduced the concept of JIT (as discussed in Chapter 3) where components are delivered to the assembly plant within hours of when they are needed, thereby reducing the need for the holding of inventory. This constant need for a flow of high quality parts has created demand for many more trucks to be part of an ever increasing logistics delivery system. The resulting congestion, unpredictability of shipping times, and differing inventory requirements has created a system where some suppliers are located very close to an assembly plant, while others are further away - depending on the component and the needs of the OEM. One of the solutions for this tiered system of distance requirements is the supplier park concept.

## 5.2 Types of Automotive Supplier Parks

Supplier parks can be found in various forms around the globe (Cullen, 2002; Howard, Miemczyk and Graves, 2006: 93). From an automotive perspective, suppliers typically move closer to their OEM customers, when their modules (usually complex, model specific, requiring configuration to individual vehicles, and expensive to transport) require sequenced in-line delivery (Holweg and Pil, 2004: 35). It is however interesting to note that the concept has not yet found favour with Japanese manufactures who share the view that an efficient in-bound logistics system is preferable (Cullen, 2002; Morris, Donnelly, and Donnelly, 2004: 130).

In Europe, Toyota and other Japanese manufacturers typically collect components from their suppliers by using dedicated trucks. Toyota, for example, instructs suppliers on which parts and what quantities to prepare for collection during a specific time slot. A Toyota appointed logistics service provider (LSP) collects the components from various suppliers across Europe and delivers them to Toyota's assembly plants in Valenciennes, France, and Burnaston, UK. GM, in comparison, utilises supplier parks near its Opel assembly plant in Russelsheim, Germany, and the Vauxhall plant at Ellesmere Port, UK. GM’s significant use of modules necessitates that major suppliers are located in close proximity to the assembly plants. GM also employs LSPs to collect and sequence components from other suppliers (Kochan, 2002).

In the USA, despite being a significant production location for both finished vehicles and components for production facilities around the world, Honda's Marysville, Ohio, facility has no supplier park. Even though some of Honda’s component suppliers are located more than 200km from the assembly facility, Honda decided to concentrate on managing transportation. Honda has developed a process whereby smaller quantities of inventory can be consolidated from an outlying freight depot into large and economical traffic flows. Honda's stable production planning also allows information sharing with their suppliers up to two weeks in advance (Cullen, 2002).

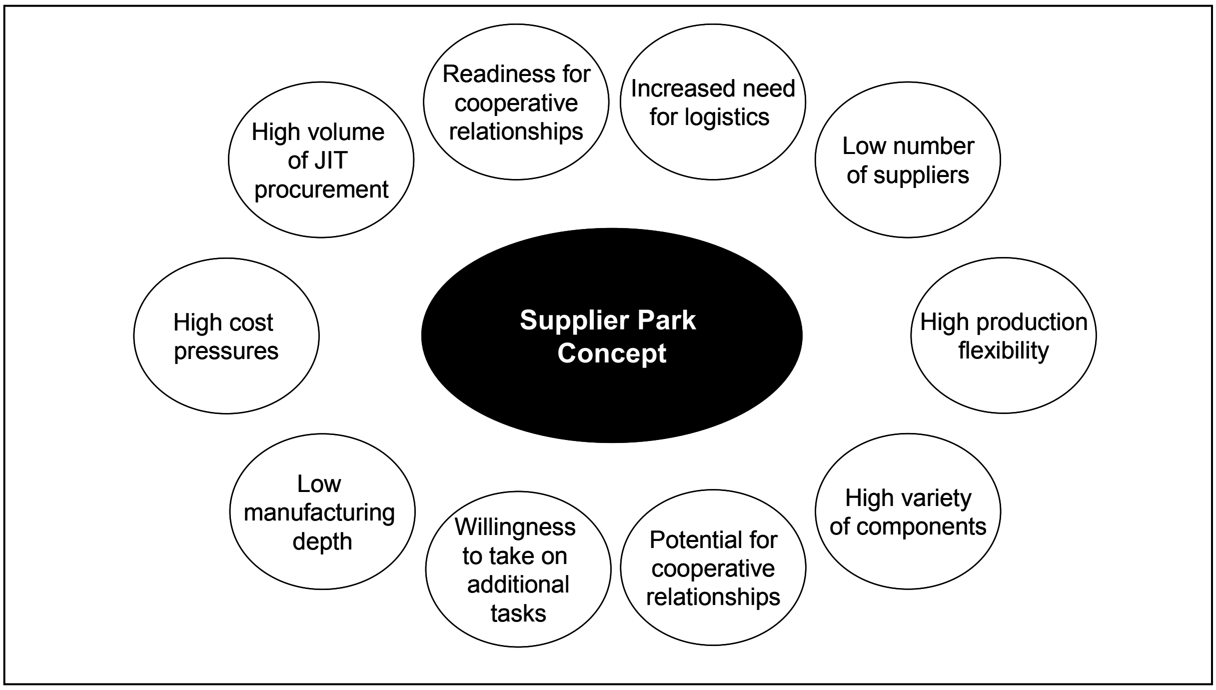
Pfohl & Gareis (2005: 309 & 315) explain the phenomenon of limited use of supplier parks by Japanese automotive assembles, by stating that '…the joint spatial concentration of suppliers is one of the main differences to settlement behaviour of suppliers in Japan, where hierarchical networks exist between auto manufacturers and many suppliers that are realised by financial and social relationships – widely referred to as the 'keiretsu' concept'.

Apart from the clustering of suppliers in close vicinity of, or even adjacent to, the final assembly line of their OEM customers, as well as the idea of suppliers sharing in the upfront investment costs, Sako (2003a: 15-16) argues that supplier parks vary substantially based on the following criteria:

- *Physical layout*
  Suppliers clustered in separate buildings or under one roof.
- *Synchronisation*
  The presence or absence of conveyors linking the OEM's final assembly line and the suppliers' operations, as well as the amount of buffer inventory in the assembly process.
- *Capital investment*
  Are the land and buildings owned by the supplier, or leased to them by the OEM involved?
- *Employment governance*
  The extent to which the labour force management are unified or diversified (modular consortia typically selects a more uniform human resource system).
- *Strategic supplier involvement*
  The level of supplier involvement in parts research and development and whether they undertake manufacturing and/or assembly only.

Current arguments also indicate ten possible drivers for constructing a supplier park as depicted in Figure 5.1 (Pfohl and Gareis, 2005: 308). These can however be summarised into three key drivers which benefit the OEM's and suppliers: operating cost reduction, labour cost reduction and increased efficiency (Table 5.1) (Morris et al., 2004: 131; Howard et al., 2006: 93).

Figure 5.1 – Possible drivers for constructing a supplier park




Source: Pfohl and Gareis (2005: 308)

Depending on the definition used as well as the differentiating criteria, numerous types of supplier parks can be identified (Reichhart and Holweg, 2008: 60). When taking a simplistic approach however and utilising asset ownership and governance as criteria, supplier parks can be divided into consortium type parks and industrial condominium type parks (Morris et al., 2004: 130).

Table 5.1 – Key drivers of Supplier Parks with potential benefits for OEMs and suppliers

| Driver | Potential Benefit |
|---|---|
| Operating cost reduction | Reduced inventories |
| | Reduced transport costs |
| | Lower capital and working costs |
| | Reduced handling / loading / unloading and packaging costs |
| Labour cost reduction | Reduced labour costs for suppliers located in the park compared to those of the OEM |
| Increased efficiency | Modules of components delivered directly to the fitment point |

Source: Morris et al. (2004: 131)

*Consortium* type parks tend to be greenfield sites (a term used to describe previously undeveloped land in an industrial or commercial area), such as VW's Resende assembly plant in Brazil and the MCC Smart Hambach assembly plant in France. In the case of Resende VW does not directly participate in the manufacturing process, but it does own the majority of fixed assets such as the buildings and land. VW also remains in command of the entire supply chain via its role in design, and also directs the various suppliers. The suppliers in turn are responsible for assembling the various modular units before fitting these to the vehicle in the specified sequence. VW thus acts as a systems integrator. At the MCC Smart Hambach facility eight of the ten suppliers are integrated into the site. They are Magna (body-in-white assembly), Eisenmann (body painting), Dynamit Nobel (plastic body panels), Ymos or Magna (doors), Mannesmann VDO (cockpit), Krupp-Hoesch (engine mounting and mechanical parts), and Bosch (front end module). The remaining two -, Faurecia (seats) and Continental (wheels) - operate in close proximity of the plant (Sako, 2003a: 12; Morris et al., 2004: 130).

In the *Industrial condominium* type parks assemblers own the facility and lease out or rent space to suppliers. The OEM maintains control over the preparation of the final assembly, though even this may be outsourced to a third party. An example of this is Chrysler's operation in Brazil where Dana offers a synchronised delivery of pre-assembled chassis from around eight kilometres away. Europe also has similar concepts such as Seat's Martorell complex near Barcelona, Ford's plants at Cologne, Valencia, Genk and Halewood and Renault's Sandouville facility (Morris et al., 2004: 130).

Expanded on the above Sako (2005: 11) identified criteria such as the degree of activity *outsourcing* that is occurring, what *asset ownership* patterns are applied (i.e. ownership of land, buildings, and equipment), and the nature of *relational agreements* that are supported by specific local institutions. In using these criteria, Sako (2005) identified three configurations of supplier parks characterised by 'integrated ownership and relational governance', 'non-integrated ownership and relational governance' and 'non-integrated asset ownership and spot governance'.

More recent studies have gone further by identifying three high-level supplier park differentiating factors (Reichhart and Holweg, 2008: 64). *Spatial integration* refers to the supplier's location in relation to that of its OEM customer due to its direct influence on transportation costs. *Local value added content* directly influences the probability of outsourcing activities to third parties such as Logistics Service Providers (LSPs). This in turn will influence the investment required for establishing co-located facilities, and determine the space required for the operation. Finally, *the presence of dedicated infrastructure* has a high impact on the operations due to the required investments and associated savings in transport costs.

### 5.2.1 An International Perspective

Donnelly, Morris and Donnelly (2006: 7) state that 'modularisation is a longer term solution to the increased competition with low profitability in the volume end of especially the Western Europe automotive industry'. They go further by highlighting six main causes of the increased competition. Initially the increased competition was as a result of the increased market share of Japanese producers in the North American and European markets. Secondly, as these mature markets became progressively saturated, OEMs had no choice but to discount prices to gain the lost market share. Thirdly, the increased use of complex technologies also amplified the development costs of new models, leaving the manufacturers increasingly conscious of the cost of surviving in markets where they were already suffering from overcapacity. Fourthly, rising demand for a wider variety of models such as sports utility vehicles, people carriers, and city cars lead to a reduction in economies of scale which affected the costs per unit. Fifthly, there was the increasing cost of capital along with the increasing product development and specific tooling costs. Lastly, in order to control increased R&D costs, as vehicles were becoming more complex to design, develop and produce, the manufacturers who often lacked the necessary expertise and knowledge had little option but to turn to the specialised knowledge and expertise embedded in the supply chain which of course resulted in increased outsourcing (Donnelly et al., 2006: 6).

It was pressures such as these that convinced the OEMs of the need to share in their component suppliers' respective advantages if the industry was to survive. The changing Assembler-Supplier relationship (as discussed in Chapter 2) on the basis of mutual dependency and the increasing levels of consolidation among the suppliers, have resulted in the surfacing of very powerful supplier groups (mega- or Tier-0.5 suppliers) such as Valeo, Bosch, Magnetti Marelli, Johnson Controls, Lear and Faurecia (Donnelly et. al., 2006: 9).

It is important, at this point and in this context, to understand the concepts of follow source and follow design as documented by Humphrey and Memedovic (2003) in their United Nations Industrial Development Organisation report. These are strategies adopted by global automotive companies in the pursuit of global design combined with the need for the adaptation of local content. *Follow source* can be defined as the '…preference of OEMs for using the same suppliers in many different locations'. The supplier 'follows' the assembler to new locations and is a logical outcome of the supplier’s increased responsibility for the design and for the increasing commonality of models between markets. Closely linked to this is *Follow design* whereby the OEMs demonstrate strong preference towards the assembler for minimizing model differentiation between markets. An example of which would be the production of identical models in various markets for both local consumption and export. Further, the follow source will take responsibility for ensuring that the assembler’s standards are adhered to by the rest of the supply chain. Instead of managing the testing and approval, as well as a large number of local suppliers whose designs and prototypes have to be tested and approved for use, and whose production and quality systems have to be audited and improved, the assembler deals with a limited number of ‘follow source’ suppliers providing components and/or sub-assemblies.

This has an impact on design and contract allocation, which will ultimately have an impact on whether the supplier will be contractually obligated by the assembler to move to a specific location. This will have a direct effect on their need for facilities in close proximity to their OEM customer, without a considerable investment in fixed assets which would be accessible in a supplier park.

The main motivation for these supplier parks were the gains in logistics efficiency (Frigant & Lung, 2002; Salerno & Dias, 2002; as cited by Reichhart & Holweg, 2004: 3). Firstly, because they cannot be stacked as densely as smaller parts the transportation costs for expensive, bulky and/or fragile modules are high. The transportation costs are also further increased by JIS deliveries compared with JIT or batch deliveries due to an increased delivery frequency. JIS deliveries are however, fundamental to modular supply. Secondly, delivery reliability is crucial for JIS modules (Frigant & Lung, 2002; Larsson, 2002; as cited by Reichhart & Holweg, 2004: 6), because in theory no buffer inventories should exist. Thus, any interruption in the delivery service, which has a greater probability of occurring over long distances, will result in a line stoppage. Even if safety stocks would existed, a high product variety together with customer-responsive strategies would make the availability of a module with the exact specifications highly unlikely.

Reichhart & Holweg (2004) continue by identifying the second most important parameter in supplier park decisions to be the uniqueness of the supplier-OEM relationship and its relation to the concepts of trust and asset specificity. OEMs rely on their suppliers as the sole source of the specific component with no other supplier being able supply that component at short notice. Suppliers also have to invest in land, buildings, machinery and, increasingly, R&D. Furthermore, knowledge transfer is improved through face-to-face contact (Frigant & Lung, 2002; as cited by Reichhart & Holweg, 2004: 5) with general organisational and technical integration also benefiting from proximity.

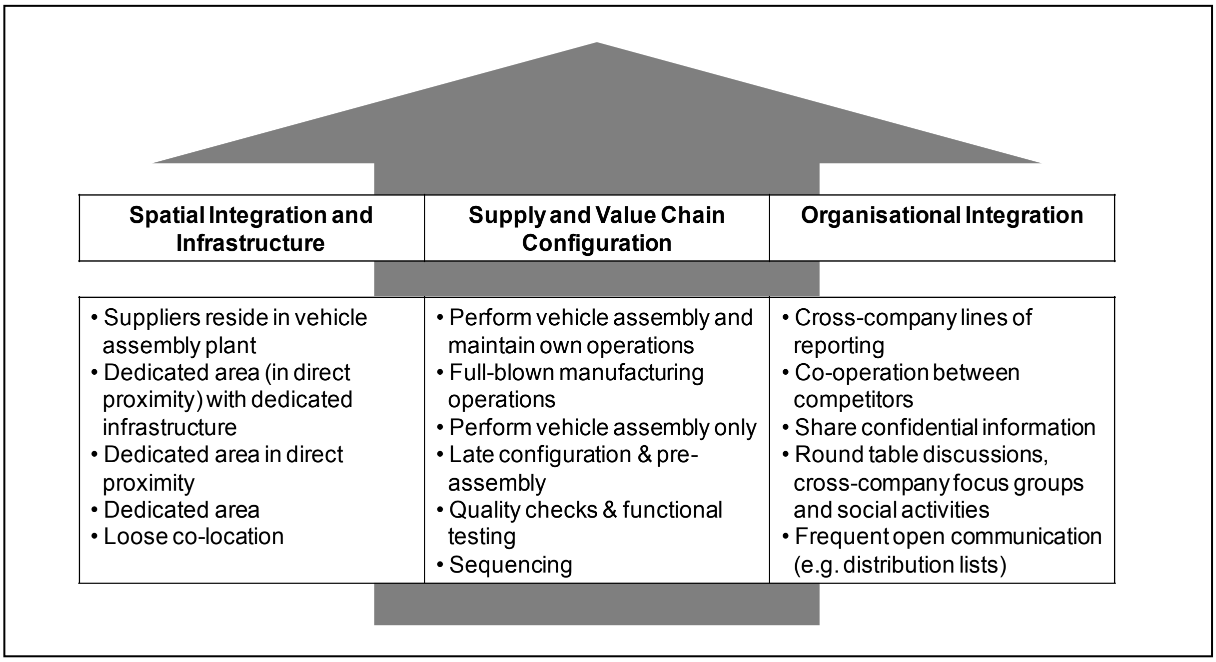
Between March 2002 and December 2004, Mari Sako (Professor of Management Studies in International Business and Professorial Fellow at Oxford's Saïd Business School) visited 14 supplier parks to '…analyse the causes and consequences of outsourcing and co-location for the governance of the firm, industry dynamics, and employment.' (Sako, 2005: 2). During this study she conducted interviews with plant managers and studied various functions of the automakers, such as purchasing, logistics, quality control, human resources and finance. Because of the extent of the implementation of the supplier concept around the world, the parks visited by Sako represent only a selected sample of the greater population.

The 14 supplier parks varied substantially in their scheduled capacity, the size of the workforce on site, the number of suppliers, the type of components the suppliers produce and also the diversity in the arrangements of these supplier parks. For example, the number of suppliers on site varies from as little as five (at Renault Douai and Palencia) to up to 21 (at Ford Camaçari), and in some instances suppliers are evenly dispersed in relation to the types of components they assemble, whilst in other cases they are concentrated in specific areas (Sako, 2005: 11).

Sako (2005: 11) subsequently identified three configurations of supplier parks which exist in the field. Firstly, VW Resende, Smart Hambach, and Ford Camaçari are defined as cases of *integrated ownership and relational governance*. Secondly, GM Gravatai is described as an example of *non-integrated ownership and relational governance*. Thirdly, Renault (at their sister plants Douai and Palencia) is described as a case of *non-integrated asset ownership and spot governance*. In each instance, the supplier park was assessed with respect to (1) the degree of activity *outsourcing* that occurs , (2) what *asset ownership* patterns are applied (i.e. ownership of land, buildings, and equipment), and (3) the nature of *relational agreements* that are supported by specific local institutions.

Sako's approach is supported by Reichart and Holweg (2004: 13-14) who also use three very similar differentiating factors or dimensions of co-location: (1) Spatial integration and infrastructure, (2) supply and value chain configuration, and (3) organisational integration (Figure 5.2).

Figure 5.2 – The dimensions of co-location




Source: Reichhart and Holweg (2004: 14)

Table 5.2 compares Sako's view with that of Reichhart and Holweg, and highlights the clear alignment.

Table 5.2 – Supplier park differentiating factors compared

| | Differentiating Factors | |
|---|---|---|
| **Definition** | **Sako** | **Reichhart and Holweg** |
| Those two aspects were grouped into one dimension as they usually go hand-in-hand, e.g. dedicated infrastructure, such as a conveyor belt, can only work together with close spatial integration. | Asset Ownership | Spatial integration and infrastructure |
| Various categories of activities differing in terms of the level of value add from simple sequencing to final vehicle assembly. | Outsourcing | Supply Value Chain Configuration |
| Cross-company synergies and the creation of an atmosphere of mutual trust in the form of frequent communication between OEM and suppliers, as well as amongst suppliers, for example sharing confidential information like wage & benefit structures to ensure similar structures across companies. | Relational contracts | Organisational Integration |

Source: Sako (2005: 11-30); Reichhart and Holweg (2004: 14-18)

The following discussion on the various forms of supplier parks from an international perspective is solely based on the research done by Sako due to the limited availability of other quality literature.

To provide a concise view of the various types of supplier parks in other parts of the automotive world, Sako's findings are summarised in Table 5.3. Each of the three configurations will be discussed in more detail in the following section. The three differentiating factors will also be used to illustrate the various applications of the supplier park concept in a South African context.

Table 5.3 – International perspective summary

| Facility | Outsourcing | Asset Ownership | Relational Contracts |
|---|---|---|---|
| **VW Resende (Brazil)** | Total outsourcing of final assembly | Assets and Inventory owned by OEM | OEM has taken leadership role |
| **Smart Hambach (France)** | Outsourcing limited to subassembly; OEM controls final assembly | Land, buildings and equipment are owned and managed by OEM | Strong relational contracts with a tightly coordinated social system |
| **Ford Camaçari (Brazil)** | Outsourcing limited to subassembly; OEM controls final assembly | Land and buildings owned by OEM; machinery and equipment are owned by supplier | Strong relational contracts with uniform resource system |
| **General Motors Gravatai (Brazil)** | Outsourcing limited to subassembly; OEM controls final assembly | Land and buildings owned by supplier | Suppliers prohibited from supplying to other automakers from the Gravatai site |
| **Renault Douai and Palencia (France / Spain)** | Outsourcing limited to subassembly; OEM controls final assembly | Buildings owned by OEM; Supplier negotiates with OEM for other asset investment | No uniform resource system |

Source: Compiled for the purposes of this study

### 5.2.1.1 Integrated ownership and relational governance

#### 5.2.1.1.a Volkswagen Resende

The Volkwagen (VW) Resende truck plant set in the state of Rio de Janeiro in Brazil is a modular consortium in its pure form. It opened on a greenfield site in 1996 and represents the earliest implementation of an experimental production system that had previously existed only as a concept.

The modular consortium at Resende is unusual in the vehicle manufacturing industry due to its practice of totally outsourcing of the final assembly process. At Resende VW focuses on strategic functions such as the overall vehicle design and customer satisfaction, whilst making the suppliers, not only responsible for manufacturing components, but also participate in final assembly of the trucks.

The production process is coordinated between seven component suppliers (partners). First, body panels are welded by Delga, who then passes them onto Carese (owned by Eisenmann), for painting. The body shop and the paint shop are located in separate buildings, but all other partner suppliers are located in the final assembly area. Maxion assembles the chassis at the first point on the final assembly where Remon (a consortium of Pirelli, Bridgestone and Michelin) fixes the assembled tires and wheels onto the chassis. Powertrain (a consortium of Cummins and MWM) operates a sub-assembly area for engines and transmissions, but also delivers and fixes them at the final assembly line. Finally, seats and cockpits are installed inside the cabin by Siemens/VDO before VW conducts final inspection of the completed truck.

VW had to make an initial investment of $250 million in 1996. The majority of this initial investment went into the construction of the 90,000 square meter buildings and shared facilities, and to purchase machinery and equipment. The modular consortium was built on one million square meters of land that was previously a sugar cane field.

VW owns and controls the majority of the production factors, apart from labour.

- VW owns the land, but does not charge partner suppliers any rental;
- All machinery and equipment (including those in the paint shop and the body shop) are designed by, paid for, and owned by VW;
- Shared facilities are owned by VW, but suppliers are charged for making use of the canteen, medical care facilities, etc. Suppliers are however, not charged for their electricity and water usage; and
- VW also owns the inventories of materials and components on site.

Plant logistics are typically managed by an external logistics company (Binotto) who deliver parts to a consolidation centre, while another logistics company (Union Manten) records the delivery on behalf of VW and delivers parts to the line side for fitment. Partner suppliers have no scope for earning profit on their parts prices. This is because they only use materials and components ‘on consignment’ and thus are not paid for the material inputs they work on. Also, the suppliers would not have an incentive to lower the cost of holding inventories because the inventories are owned by VW.

In summary, the VW Resende operation can thus be described as an extreme (‘pure’) case of a modular consortium, where even the final assembly is outsourced to the onsite ‘partner’ suppliers. All productive assets are however owned by VW, which doesn’t allow for much scope in terms of discretionary action, even in matters of inventory control. Suppliers could have been able to exercise discretion in the key area of labour management but VW, however, ended up taking an informal leadership role in imposing uniform employment governance. As a result remuneration and employment conditions are the same for all workers at both VW and ‘partner’ suppliers.

#### 5.2.1.1.b Smart Hambach

Another modular consortium with an integrated asset ownership structure is that of Smart Hambach (Smartville), in the north east of France. The key difference with VW Resende is that final assembly is the responsibility of Smart employees. Even though supplier autonomy is respected in formal terms, the site is a tightly coordinated social system because of strong relational contracts.

The establishment of a new market segment by building its own sales distribution network capable of offering consumers a choice in differentiated options, is a key feature of the Smart project. The modular product architecture made this possible with suppliers developing major pieces of the car on a completely new platform. The extreme dependence on suppliers for design and development was very unusual for Daimler (then Mercedes-Benz) who traditionally had had a culture of doing everything in-house. Retaining final assembly in-house, is however based on Daimler’s view that its core competence lay in ‘retaining responsibility for the total car’.

Seven ‘system partners’ operates on the Hambach site. Body-in-white is assembled by Magna; Surtema Eisenmann paints the bodies, whilst three-dimensional transfer printing for some of the bodies are performed by Cubic Europe. Dynamit Nobel provides customised plastic body panels. Siemens-VDO assembles the cockpit and fixes it onto the body frame. This is also the starting point of the final assembly line. Thereafter, the final assembly line is managed by Smart, which takes delivery of doors assembled by Magna and drive train made by ThyssenKrupp.

Suppliers do not operate from a single location but from separate buildings, or they are demarcated from each other by walls. This approach has led the physical layout of the Hambach site being more dispersed than the Resende site.

Land, buildings and equipment are owned and managed by Smart. Although suppliers are charged a rental fee for equipment, the pay no rent for land and buildings. Smart’s policy is to only charge suppliers for those things where the usage are influenced by the suppiers. The initial investment fund of around 800 million Euros was raised, by a specifically created leasing company, from three sources: equity finance from French banks, loans from German banks, and subsidies from the French local government.

The French authorities apparently wanted one legal entity for Smartville, but it ended up with each company as an independent entity. As a result, the site has seven system partners and three logistics suppliers, as well as Smart itself. Of the total 2,250 employees on site, 900 are employed by Smart. The Smart plant manager does not have actual authority over suppliers, and each company manages its own social policy. However, in order to sustain Smartville as an ‘eco-system’ it is necessary for the salary conditions be comparable (if not identical) across suppliers. To facilitate this coordination, the HR managers from the eleven companies on site gather for meetings, in which the Smart HR manager takes a moderating role.

#### 5.2.1.1.c Ford Camaçari

Ford Industrial Complex at Camaçari, in the state of Bahia in Brazil, is a condominium with suppliers, some of which are operating alongside Ford in a single plant environment. As is the case with VW Resende and Smart Hambach, the land and buildings are owned by the automaker. Like VW Resende, all employees on the Camaçari site are on an identical human resource system. However like Smartvile, and unlike VW Resende, Ford manages the final assembly process.

Part of the development of the industrial complex involved creating an economical B-platform car using Ford's product architecture with 19 modules. The Fiesta started its production at Camaçari in 2002, and the EcoSport followed in 2003. The objective from the outset idea was to maximise outsourcing in this environment, as well as to save on overhead and fixed costs by sharing them with suppliers. In order to accomplish this the suppliers committed at the time of Program Approval (when design was frozen) to locate into the Fordsite.

At Camaçari,Ford retains control over the final assembly process, however 21 component suppliers and 4 service providers (in maintenance, logistics, and product development) are located on the site. Eight further component suppliers are located in close proximity to the site. Of the 21 component suppliers, 11 are in the final assembly area 'under one roof'. These component suppliers include Faurecia (door module), Visteon (cockpit), Pelzer (soft trim), Interfrim (headliner), Lear (seats), Mapri-Textron (fasteners), Valeo (front end module), Benteler (suspension), ArvinMeritor (exhaust), Cooper (fluid tube), and Pirelli (tire assembly). Other significant suppliers include Forrrolene and Sodecia in the stamping shop, DDOC undertaking body painting, Dow and Autometal doing plastics injection, ABB in maintenance, and Exel providing logistics service. Thus, compared to VW Resende and Smart Hambach, Ford Camaçari is a much bigger site in which significant value-adding manufacturing processes, other than assembly, are performed.

Within the Ford Industrial Complex, land and buildings are owned by Ford. Suppliers own the machinery and equipment they use. In order to provide value-adding manufacturing activities suppliers had to determine the trade-off between high transportation costs if sourced from the industrial south and upfront new investment costs if sourced from within the Bahia region. The distance between the traditional industrial region in the south and Bahia is equivalent to 3 days in transit, 50 hours of which is on the road Since Bahia has no history of industrial production, local suppliers do not meet required standards. This, compels most Ford suppliers to consider making rather than buying components locally.

Apart from recruitment and training, there is a comprehensive list of services and facilities which are shared amongst Ford and its suppliers (e.g. restaurant, medical services, banking, maintenance and logistics, health and safety procedures, plant security, fire protection, and cleaning services). The Camaçari site also has a common wage structure for operators (excluding managers and engineers) that applies to Ford and its suppliers on site. The shared Human Resource Management Committee manages staff development and monitors the common system in order to avoid labour conflict.

The objective is to create a consensus, even if it requires imposing a common solution through the committee structure. G7 consists of seven key companies (Ford, Benteler, Visteon, ABB, Lear, Exel, Faurecia) with each representing other suppliers. Various issues are discussed in the weekly meetings between the G7 plant managers and HR managers.

### 5.2.1.2 Non-integrated ownership and relational governance

### 5.2.1.2.a General Motors Gravatai

VW Resende, Smart Hambach and Ford Camaçari are all characterised by an integrated asset ownership structure and highly developed relational contracts. This is mirrored in the compulsory uniform human resource system they enforce. The General Motors (GM) supplier park in Gravatai, in the state of Rio Grande do Sul, has a similarly uniform HR system. However, asset ownership is not integrated which means that suppliers purchase their own land and construct their own factory buildings.

The project started in 1996, aimed at the development of a small subcompact car, with a modular product architecture based on the Corsa platform. Its vision included firstly the full participation of suppliers to co-design, co-validate and co-locate. Secondly the implementation of lean manufacturing concepts by the suppliers, and finally a high degree of minimal options variety.

The site was initially bought by the state , which in turn sold allotments at a subsidized rate to GM and the suppliers. Each company then constructed its own factory building, and sourced their own machinery and equipment. The only exception is Polyprom, which does small stampings within GM's stamping shop. There are no other suppliers inside the stamping shop, body shop, paint shop, or the final assembly area.

Suppliers' ownership of assets was considered a non-issue by GM, as suppliers were expected to have a long term commitment to the project. This expectation is supported by the fact that the model cycle tends to be relatively long in Brazil, reducing the chance of supplier turnover. At the same time, suppliers are contractually prohibited from supplying to other automakers from the Gravatai site. Whilst respecting supplier independence in matters of asset ownership, GM takes an initiative in applying a uniform human resource system in a manner similar to Ford's at Camaçari.

### 5.2.1.3 Non-integrated asset ownership and spot governance

#### 5.2.1.3.a Renault Douai and Palencia

The configuration of 'non-integrated asset ownership' combined with 'spot governance' (i.e. relative absence of relational contracts) is common in many brownfield sites (a term used to refer to abandoned and/or underused industrial and commercial facilities and/or land available for re-use) in Europe. This approach is reflected in the cost-cutting motivation for outsourcing, enabling automakers to minimise initial capital investment cost and labour costs (assuming that supplier wages are lower than the wages automakers offer).

As an example, Renault's parks at Douai in France and Palencia in Spain, sister locations that make the Megane, are correspondingly designed, housing five suppliers in separate warehouse-like buildings on site. Benteler makes cross car beams, Siemens assembles wiring harnesses, VPO (a joint venture between Valeo and Plastic Omnium) assembles the front end module, SAS assembles the cockpit, and Grupo Antolin assembles the door inner. The park is mainly for suppliers that deliver bulky and difficult-to-transport products in sequence and also face high variety doing so. For example, the cockpit has a theoretical variant of 1 million, which is a considerable difference from the Corsa derivative in Brazil).

The proximity necessitated by the combination of high variety and bulkiness of the products have had adverse effects, such as the merging of pay scales. At Douai and Palencia, a Renault logistics manager is responsible for each supplier on site, but there is little overall communication between the five suppliers on the site.

The rent for each building is negotiated by the relevant supplier, as is negotiating over who pays for the specific investment on site. Suppliers are not given details about negotiations with other suppliers. Moreover, each supplier is left to determine its own human resource policy, which allows some suppliers to rely more on temporary workers than others. Suppliers are also individually responsible for negotiating with unions on pay, flexibility, and work hours. There is little lateral communication amongst suppliers.

In conclusion, it is clear that there are no 'one-size-fits-all' solution when it comes to the conceptualisation, assessment, implementation and management of supplier parks with practises varying considerably between firms and across continents. Comparing the South African and selected international examples will contextualise the uniqueness of the local application of the concept.

### 5.2.2 A South African Perspective

The industrial park concept has been implemented in the form of various initiatives in South Africa (Figure 5.3). Among these are the Coega Industrial Development Zone, (Port Elizabeth, Eastern Cape), the Richards Bay Industrial Development Zone

(Richardsbay, Kwazulu-Natal), the East London Industrial Development Zone (East London, Eastern Cape), the Johannesburg International Airport Industrial Development Zone (JIAIDZ), the Nelson Mandela Bay Logistics Park (Uitenhage, Eastern Cape) and the Rosslyn Automotive Supplier Park (Rosslyn, Gauteng). The most recent initiative will be the Durban Automotive Supplier Park (DASP) and although the exact nature of the service offering and park set-up at the time of writing is unclear, initial comments by stakeholders do indicate that it will be closely related to the ASP.

Figure 5.3 – Industrial parks in South Africa


Source: Compiled for the purposes of this study

Of these initiatives only the Nelson Mandela Bay Logistics Park and the Rosslyn Automotive Supplier Park, although varying substantially in ultimate application and strategic objectives, in essence remain true to the definition of being a cluster of suppliers located adjacent to, or in close vicinity of, a final assembly plant.

Although each of these initiatives will be briefly discussed in the subsequent section, the main focus will be on the Rosslyn Automotive Supplier Park. This is due to the undiluted nature of its focus on supporting the South African automotive industry, and not only a single OEM, in achieving and maintaining global competitiveness, and the ground breaking role it played in introducing the concept to the South African business environment.

#### 5.2.2.1 Industrial Development Zones

Industrial Development Zones (IDZs) are also referred to in other parts of the world as Economic Development Zones (EPZs) (Tang 2008: 2). In a South African context they are purpose built industrial estates linked to an international air and/or sea port through which goods can be imported or exported, and which might contain one or more Customs Controlled Areas designed for manufacturing and/or storage of goods (South African Revenue Service, n.d.).

The South African Department of Trade and Industry (DTI) (n.d.) states that the aim of the IDZ concept is '…to promote the competitiveness of the manufacturing sector and to encourage beneficiation of locally available resources'. The South African IDZ programme is based on three economic objectives and rationales. Firstly, to improve international competiveness through efficient logistics services, fiscal incentives and improved industrial infrastructure; Secondly, to attract foreign direct investment and reap the possible benefits of external knowledge and technology in production methods and deepen integration into the global production network; and finally to encourage the development of industrial clusters. The IDZs operational in South Africa are summarised in Table 5.4.

In November 2011 the South African Cabinet approved the Special Economic Zones Bill which will govern the IDZ concept within a South African economic context and should ensure IDZs avoid competing for investors. The bill is meant to accelerate IDZ development, ensure job creation, and is part of the government's drive to promote economic activity. The bill envisages a particular economic zone fund supported by the South African Treasury. Furthermore, the bill proposes the establishment of a special economic zone board consisting of government departments, state agencies and independent experts. It is reported that to date the IDZs '…have attracted 40 projects with a total investment of R11.8bn and created 33,000 jobs since inception in 2000 – albeit at a R5.3bn cost to the taxpayer' (Mjikelosi, 2012).

Table 5.4 – Summary of Industrial Development Zones in South Africa

| Facility | Outsourcing | Asset Ownership | Relational Contracts |
|---|---|---|---|
| **Coega Industrial Development Zone** | Planned automotive industry related production activities (exact nature of outsourcing not available at time of writing) | Buildings leased by tenant; Assets and inventory owned by tenant | Government has taken leadership role; No uniform resource system |
| **Richards Bay Industrial Development Zone** | No automotive industry related production activities | Buildings leased by tenant; Assets and inventory owned by tenant | Government has taken leadership role; No uniform resource system |
| **East London Industrial Development Zone** | Outsourcing limited to subassembly; OEM controls final assembly | Buildings leased by supplier; Assets and inventory owned by supplier | Government has taken leadership role; No uniform resource system; Strategic partnership with one OEM |
| **Johannesburg International Airport and City Deep Industrial Development Zones** | Exact nature of outsourcing not available at time of writing | Exact nature of asset ownership not available at time of writing | Government has taken leadership role |

Source: Compiled for the purposes of this study

### 5.2.2.1.a Coega Industrial Development Zone

The Coega Industrial Development Zone (IDZ) is a multi-billion rand Greenfield industrial development which covers 11,500 ha (Figure 5.4). It also included the development of a new R 3.2 billion deepwater port and is located 20km from the city of Port Elizabeth (Nelson Mandela Bay). The primary objective of the Coega IDZ is the stimulation of economic growth, skills development and sustainable job creation within the Eastern Cape and the greater South African economy (CDC Annual Report, 2008; SA Goodnews, 2005).

The project seeks to realise sustainable growth through the realisation of specific objectives such as the attraction of foreign direct investments, and the facilitation of export manufacturing, technology transfer, industrial expansion and mineral beneficiation (CDC Annual Report, 2008: 14). The Coega IDZ is aimed at new investors and companies interested in expanding their operations in the Eastern Cape and presents purpose built infrastructure and shared services to minimize costs . The business case for locating in the parks is based on the opportunity to take advantage of synergies existing between vehicle manufacturers, component suppliers as well as logistics and related automotive service providers.

Figure 5.4 – An aerial view of the Coega industrial development zone

Source: www.coega.co.za

The aim of Zone 2 at the Coega IDZ (www.coega.co.za) is to provide a safe and secure manufacturing environment for automotive investors and tenants. This total business solution aims to provide land and buildings for lease, shared telecommunication networks and a 24-hour security service. All of this is provided within an enclosed and fenced off area.

What makes Coega unique in a South African context is that the development of a deepwater port alongside the IDZ facility was envisaged from the outset. Contrary to facilities in other parts of South Africa, the Port of Ngqhurha is a new development and construction project rather than the utilisation of current facilities – as in Richards Bay, Durban and East London. The global growth in container shipping led to a long term shortage of container capacity in South Africa. Construction of the Port of Ngqhurha can be seen as Transnet's solution to this shortage. This deepwater port is one of the biggest projects of its kind on the continent The Transet National Ports Authority has invested R10 billion to date in its development (www.coega.co.za) and is one of the largest undertaken in post-apartheid South Africa.

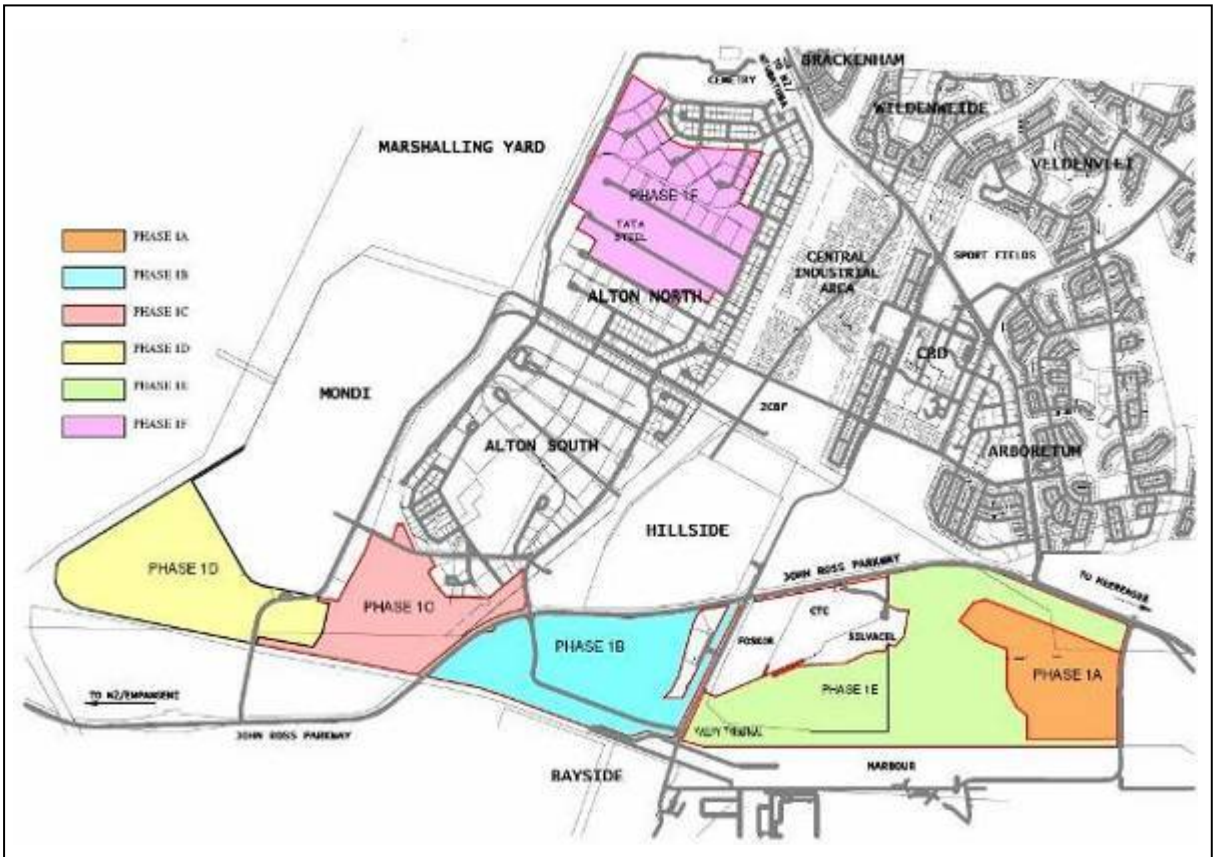
Strategically positioned on the global east-west trading route, the port of Ngqhurha offers worldwide container shipping and other outstanding port facilities to businesses situated in the neighbouring Coega IDZ, and beyond. The Coega IDZ provides infrastructure and facilities for back-of-port operations to the deepwater Port of Ngqhurha. The objective is to ensure logistical and operational efficiency by seamless incorporation of landside and marine infrastructure. The port will have 330 anchor days per year. With only an overnight train or truck trip from the major centres of Johannesburg, Cape Town and Durban, the port is very well positioned to meet the needs of import and export markets. ,

The Coega Development Company has, reported up to 2008, attracted estimated investments in the region of R 30 billion from 12 investors and facilitated the creation of approximately 5,800 jobs (Pringle, 2008).

### 5.2.2.1.b Richards Bay Industrial Development Zone

The Richards Bay Industrial Development Zone (RBIDZ) is an industrial estate covering some 520ha and is purpose-built to encourage competitiveness through tax and duty-free initiatives (Richards Bay IDZ, n.d.) (Figure 5.5). The aim of this initiative was to attract light industry to a region which was previously dominated by heavy manufacturing (Robbins, 2010).

Figure 5.5 – Layout depicting the various zones within the Richards Bay industrial development zone




Source: www.richemp.org.za

It is a government promoted company, owned by the Kwazulu-Natal Provincial Government (60%) and the City of uMhlathuze (Richards Bay) (40%).

The strategic objectives of the RBIDZ are comparable to those of similar initiatives. These include the establishment of a purpose built industrial park with a delimited customs controlled area (CCA) linked to the Richards Bay, providing quality infrastructure, attracting foreign direct investment, mobilising resources for the development of the RBIDZ, and promoting BEE and SMME business opportunities in and around the zone (Richards Bay Industrial Development Zone, n.d.).

#### 5.2.2.1.c East London Industrial Development Zone

The East London Industrial Development Zone (ELIDZ) has as its ultimate goal the facilitation of economic growth in the Eastern Cape by attracting foreign and local investment to the region (www.elidz.co.za). This is accomplished by offering investors a globally competitive combination of infrastructure, geographic position, and services and labour. This initiative is supported by the Department of Trade and Industry (DTI).

Established in 2003, as part of the South African government's initiative to improve industrial competitiveness and economic growth in the country, the ELIDZ is a private company owned by the Eastern Cape Development Corporation (74%) and Buffalo City Municipality (26%). It is funded via three funding streams - Department of Trade and Industry (on a national level), the Department of Economic Development and Environmental Affairs (on a provincial level) and through internally generated revenue streams (www.elidz.co.za).

The ELIDZ is located next to the existing port and airport on the West Bank of East London. More than 1,500ha of land has been made available for industrial development (Figure 5.6). This includes a 250ha Customs controlled duty-free area with customs facilities and personnel. Construction for bulk internal and external infrastructure was completed in August 2004 with manufacturing starting soon after. It is planned environment that includes premium core infrastructure, facilities and support services that can be offered to businesses.

The ELIDZ investors have a strategic advantage due to the development zone's location. The adjacent East London port is in a position to serve markets on a local and global scale. When the project was implemented, East London's port already had bulk infrastructure and spare capacitywhich allowed for immediate commencement and benefit realisation.

Figure 5.6 – An aerial view of one section of the East London industrial development zone

Source: www.elidz.co.za

The attractiveness of the ELIDZ as an investment opportunity is further promoted by the national government's investment incentives to promote economic growth. The ELIDZ targets investment from specific industries such as automotive, marine aquaculture, agro-processing, pharmaceuticals and business process outsourcing (www.elidz.co.za). The project focuses on manufacturing and processing for export, facilitating the utilisation of the first-class infrastructure and raw materials that are available in South Africa.

The business case for investing in the ELIDZ is based on its close proximity to major transport networks, its cluster-driven approach and development of centralised logistics and shared services infrastructure, the close proximity of the ELIDZ Automotive Supplier Park to the Mercedes-Benz assembly facility which supports JIT and JIS related production concepts, the dedicated logistics services from a leading logistics service providers, shared services such as medical and financial services, as well as dedicated staff transport services.

The ELIDZ offers growth oriented companies access to new markets and strategic industry netareworks, a specialised manufacturing platform, and innovative industrial and business solutions. A number of global organisations have set up facilities in the ELIDZ. Some of these companies Mercedes Benz South Africa, the Feltex Group, Johnsons Controls, Ti Automotive, Sunningdale Dairy and Matla Diamond Works..

#### 5.2.2.1.d Johannesburg International Airport and City Deep Industrial Development Zones

The OR Tambo Johannesburg International Airport is the busiest airport in Southern Africa. The areas surrounding the airport were identified in 2002 as an ideal location for companies that need rapid transport for their exports and imports. The objective of the Johannesburg International Airport Industrial Development Zones (JIAIDZ) is to attract businesses involved in industries such as information technology, electronics, defence and aerospace as well as light manufacturing (Chinguno, 2009: 24; Investing in the Smart Province).

According to BlueIQ the envisaged IDZ will provide a duty free zone for highvalue-added, light manufactured goods for export by air freight. South African goods will be marketed on the IDZ platform, and will include light export-oriented manufacturing industries, together with the avionics and aerospace cluster. To date progress has been delayed because of a change in the airport master plan which resulted in re-zoning of the land for the airport expansion after it had been earlier designated for an IDZ. However, new land has now been acquired for the setting up of the zone and a new application for redefining the borders and operator permit has been approved by government. Funds have been allocated in the 2012 Gauteng provincial budget. (Unemployment in Gauteng to receive attention).

Roads and highway interchanges have been completed to improve access to the IDZ and airport.

The City Deep container terminal in Johannesburg is known as the largest ‘dry port’ in the world (www.tradeocean.co.za/ports-johannesburg.htm). It is strategically located in the centre of South Africa’s industrial heartland, and known as the country’s premier container depot. More than 40% of all cargo exported via the main port of Durban originates from City Deep (www.joburg.co.za). The IDZ unites businesses in professional services as well as companies involved in manufacturing, transport, storage, chemicals and plastics, food and metal and machinery..

### 5.2.2.2 Logistics and Supplier Parks

Of the current operational South African initiatives the Nelson Mandela Bay Logistics Park (NMBLP), and the Rosslyn Automotive Supplier Park (RASP) in essence remain true to the definition of being a concentration of dedicated production, assembly, sequencing or warehouse facilities run by suppliers or a third party in close proximity to an OEM plant (Howard et al., 2006: 92).

Table 5.5 below provides an overview of the characteristics of the Logistics- and Supplier Parks in South Africa based on criteria such as the level of production outsourcing, asset ownership and relational contracts as introduced in Table 5.3.

When compared the services and ultimate value proposition of both entities is similar, but the NMBLP in essence (when considering the need for close proximity for subassembly and modular supply) only really serves one OEM. The RASP on the other hand is able to serve the multiple OEMs which are within a 5km radius. Also the NMBLP was initially developed in planned collaboration with Volkswagen South Africa and the Automotive Industry Development Corporation. The RASP was developed without any partnership from a single OEM, but rather the support from multiple OEMs, suppliers and service providers.

Table 5.5 – Summary of Logistics- and Supplier Parks in South Africa

| Facility | Outsourcing | Asset Ownership | Relational Contracts |
|---|---|---|---|
| **Durban Automotive Supplier Park** | Exact nature of outsourcing not available at time of writing | Exact nature of asset ownership not available at time of writing | Government has taken leadership role; No relationship contracts; Strategic partnership with one OEM |
| **Nelson Mandela Bay Logistics Park (Uitenhage)** | Outsourcing limited to subassembly; OEM controls final assembly | Buildings leased by supplier; Assets and inventory owned by supplier | Government has taken leadership role; No relationship contracts; Strategic partnership with one OEM |
| **Automotive Supplier Park (Rosslyn)** | Outsourcing limited to subassembly; OEM controls final assembly | Buildings leased by supplier; Assets and inventory owned by supplier | Government has taken leadership role; No relationship contracts; Suppliers allowed to supply multiple automakers |

Source: Compiled for the purposes of this study

The Durban Automotive Supplier Park will be the most recent addition to the category of logistics and supplier parks. The project is however currently only in an early stage of economic impact assessment – a call for proposals for conducting the Durban Automotive Supplier Park economic impact study was published in September 2011 – and it will therefore not support the objective of this study to include the Durban Automotive Supplier Park in any detailed review. A brief background presenting the history of the project will however be included to provide insight and context.

### 5.2.2.2.a Durban Automotive Supplier Park

In 2005 Toyota entered into a partnership with the Kwazulu-Natal provincial government and the eThekwini Municipality to establish the automotive supplier park. The R450-million supplier park was established near Toyota's Prospecton assembly plant. It was expected that Toyota would occupy approximately 30% of the proposed 30-hectare supplier park where the car manufacturer was to build an import parts storage warehouse as well as a pressing and welding facility (Venter, 2005). The main objective driving the development of the Durban Automotive Supplier Park at that stage was to support Toyota to become more efficient in order to benefit from the assembler's high-volume export program that was the key to their future expansion. In order to achieve this objective Toyota was reliant on having their component suppliers in close proximity to the vehicle assembly plant to implement greater JIT and JIS supply to achieve lower logistics costs. Construction was to have started in early 2007 (Walker, 2006).

In 2012 Transnet signed a deal to purchase the old Durban International Airport from the Airports Company of South Africa (ACSA) . The proposed plan is to develop a Dug-Out port, the Dube Trade Port, with an Automotive Supplier Park around it. Kwazulu-Natal's import and export capacity of goods will thereby be expanded. The new international passenger and cargo airport will be the key drivers of the Dube Trade Port. However, the new facility's proximity to the Durban and Richards Bay harbours will provide major advantages for the park to be a transport and logistics hub. It is also envisaged that rail and road links up and down the coast to these two major seaports will make it easy to switch cargo between different modes of transport (Dug out port in KZN, 2012).

#### 5.2.2.2.b Nelson Mandela Bay Logistics Park

The Nelson Mandela Bay Logistics Park (NMBLP) in Uitenhage, adjacent to the Volkswagen South Africa assembly plant, has as its main objective, a plan to play a major role in developing the infrastructure in the region. The NMBLP has been developed as a governmental project with participation of institutional and private investors, and is operationally managed by the Coega Development Corporation. The Nelson Mandela Bay Metro, in strategic partnership with Volkswagen South Africa and the Automotive Industry Development Corporation was initially responsible for the NMBLP. The project was officially taken over by the Coega Development Corporation Pty (Ltd) in March 2008. Figure 5.7 provides an aerial view of the NMBLP.

Figure 5.7 – An aerial view of the Nelson Mandela Bay logistics park

Source: www.google.com

The reduction of costs by shortening and improving the supply chain and the achievement of economies of scale for the automotive manufacturing industry through centralisation of different functions is the main vision of the NMBLP. The NMBLP focuses on light industrial assembly and manufacturing operations, and is laid out to consolidate the infrastructure necessary to provide an integrated service to the automotive industry. The core of the park is a logistics hub with international communications and regional interfaces for component delivery and material supply. The park provides global and regional material and component control. Container storage on site and a good road infrastructure between site and harbour already exists for speedy transit thereby minimizing demurrage at the arrival harbour.

The park focuses on light subassembly factories which permit suppliers to establish cost effective assembly facilities for rapid delivery to the customer. This is in line with the logistics infrastructure as well as JIT and JIS requirements. The Volkswagen assembly facility is less than one kilometre from the park with the General Motors and Ford Engine Plants also being easily accessible. This close proximity permits an integrated approach to supply logistics with obvious economic benefits arising from the economies of scale. The site is also conveniently placed to the Coega deep water harbour development in order to take full advantage of its growth potential.

An industrial service centre forms the heart of the park. From this building clients have access to various services (i.e. financial and legal advice, administrative services, etc.) required in the modern globally competitive business environment.

The business case to support the decision of suppliers and service providers to locate in the NMBLP, are based on projected benefits which includes cost savings, improved process stability to OEMs, cost synergies, improved environment and strategic position to suppliers as well as additional opportunities for service providers to reduce operational costs.

The NMBLP has been developed as industry specific for the automotive manufacturing sector. The development is in the industrial area of Uitenhage and was started as a government project with further participation of institutional and private investors.

#### 5.2.2.2.c Rosslyn Automotive Supplier Park

The Automotive Supplier Park (ASP) concept in Rosslyn is modelled on global best practice adapted for South African specific requirements, and aims to offer a logistics management model, shared services, buildings and infrastructure based on advanced technological requirements (Simeka TWS Communications, 2003). The ASP was conceived in order to address two basic challenges identified by the major industry stakeholders. One, South African automotive OEMs and their suppliers are constantly on the back foot in terms of volumes, business case development and competition. Two, there is a constant focus by global players on China and India due to their lower total cost, i.e. labour, infrastructure, land and resources. In fact, the local industry lags behind in terms of cost competitiveness by approximately 20% compared with manufacturers in Western Europe and by up to 40% when compared with manufacturers in India and China (Venter, 2008).

The main function of the Automotive Supplier Park (ASP) is to achieve synergies through the concentration of automotive component manufacturers and suppliers in one location (Automotive Supplier Park – Annual Report, 2008). In doing so it aims to improve the production environment and services, lowers costs, and takes advantage of the latest advances and logistics in the automotive manufacturing chain. It can also be seen as a 'blueprint' for other similar initiatives (such as the ones discussed in the preceding section) in South Africa and has realised regional and national macro-economic benefits. Figure 5.8 provides an aerial view of the layout of the ASP.

Among the ASP's offerings are (Automotive Supplier Park – Annual Report, 2008: 3):

- Customised turnkey production buildings and a full service package for component manufacturers and assemblers to the automotive industry;
- A common logistics centre and optimised logistics infrastructure. Core to the development is an integrated logistics concept with experienced logistics service providers as development partners;
- A Central Hub incorporating offices and facilities such as conferencing and video conferencing, a restaurant, retail centre and other facilities for use of tenants and external users; and
- The availability of advanced information and communication technology infrastructure and services.

The Supplier Park Development Company (SPDC) was created as a joint strategic initiative between the Fraunhofer Institute (Germany), CSIR (represented by the AIDC) and Government. Rosslyn was earmarked as the ideal location due to its strategic location (close proximity OEM representation in the form of BMW, Nissan, Fiat and Ford) and hub for the South African automotive industry. The South African government, represented by the Gauteng provincial government, initiated the project to develop long term and qualified employment opportunities in strong industries, and was designed to primarily attract logistics service companies and suppliers for the local automotive manufacturers.

Figure 5.8 – An aerial view of the Rosslyn Automotive Supplier Park

Source: Automotive Supplier Park – Annual Report. (2007).

The SPDC operates as a commercial entity and is fully owned by Blue IQ Investment Holdings (Pty) Ltd (Automotive Supplier Park Annual Report, 2006: 2). It has its own board of directors and a management structure similar to any other company which includes responsibilities for business development, human resources and logistics. The main objectives of the SPDC are to facilitate the effective management of the park, and promote the concept to facilitate business development, ultimately delivering the required return-on-investment for their shareholders.

Although various stakeholders (i.e. OEMs, suppliers, logistics service providers, etc.) were involved in the conceptualisation and feasibility phases, the interpretation of the supplier park concept is unique in that the ASP is managed as a separate entity without any direct relation to other companies in the automotive industry. The objective approach, without prejudice and non-business influence, enables the ASP to provide a truly unique solution to all companies in the local automotive industry. In fact, one of the challenges facing suppliers in supplier parks as mentioned earlier is that of balancing fluctuations in demand (Holweg and Pil, 2004: 149). The supplier in the ASP is in the unique position of being able to balance reduced demand volumes from one manufacturer with increased demand from another. This is because of their relational contract does not commit them to a single OEM.

The ASP is therefore able to provide services to any automotive supplier, irrespective of their OEM customer, the percentage of local content in their final product, or whether their production is for local consumption or focused on the export market. SAS/Faurecia for example, is responsible for the manufacturing and delivery of cockpits and front ends for the current BMW 3 Series (E90) assembled at BMW Rosslyn facility. All of their production volumes from their facility in the ASP are focused on local consumption. On the other hand, Fleetguard Emissions Solutions a part of the component segment of Cummins, have invested nearly R 24 million in a 2,500 square metre facility to manufacture and assemble stainless steel exhaust systems for their truck OEM customers. All selective catalyst reduction (SCR) systems manufactured in the plant are exported to Europe (Fleetguard Press Release, 2005).

In its current form competitive value is targeted through the relative proximity of suppliers to their OEM customers (reduced operational and logistics costs) and improved conditions of share services, buildings and infrastructure which all assists in providing a working environment conducive to productivity improvements through improved employee spirit and morale.

There is a very apparent difference between the international and local application of the supplier park concept. The conception of international supplier parks is predominantly due to the driving force of the OEM and thus also aligned with only that particular OEM’s operational requirements. In South Africa, the driving force behind establishing the supplier park concept was various stakeholders in the automotive cluster. Using the specific criteria of outsourcing, asset ownership and relational contracts to evaluate the application of the Supplier Park concept in South

Africa would have been ideal. But, as there is no direct OEM involvement in the South African concept, the ASP will be evaluated by more general criteria.

Sako (2003b: 15) has identified specific distinguishing criteria along which supplier parks can be evaluated. These criteria are physical layout, synchronisation, capital investment, employment governance, and strategic supplier involvement. Below, these criteria are used to provide a clearer understanding of and insight into the South African context.

- *Physical layout*
  At the ASP tenants are clustered in separate buildings or mini-factories as they are referred to. There are no direct links (i.e. conveyor system, bridge, etc.) between the tenants and their OEM customers.
- *Synchronisation*
  There is a focus on synchronisation between the OEM's final assembly line and the suppliers' operations. In the absence of conveyor links the amount of buffer inventory in the assembly process is minimised through Just-in-Time and Just-in-Sequence deliveries.
- *Capital investment*
  The land is owned by the SPDC and as part of the rental agreement the tenant is provided with a basic turnkey structure built to their specifications allowing them to commence operation immediately. The SPDC is prepared to accommodate any additional requirements the tenant might have (i.e. factory layout and design, racking, office furnishings, etc.). The costs involved would be for the tenants account. The lease agreement is between the tenant and the SPDC that normally would be in the form of a rate per square metre. Typically shared services included in this rate would be water and electricity, parameter security and access control, and access to canteen facilities. The SPDC can however tailor rental agreements to suit the individual requirements and business cases of each tenant.
- *Employment governance*
  Tenants are responsible for the labour force management in their particular operations. The SPDC however has appointed preferred labour outsourcing and staffing solutions providers who can assist with this function.

- *Strategic supplier involvement*
  The level of supplier involvement in parts research and development depends on their relationship with their OEM customer.

It becomes apparent (Appendix 5A) how different the application of the supplier park concept is within the South African context compared to the international perspective, but also that all the concepts are grounded on some common concepts. In the South African context the government has played a significant role, where in other parts of the world they are mainly business driven initiatives, especially from an investment perspective. The most common theme, when comparing all the various parks/zones, is the unlocking of efficiencies associated with economies of scale and synergies.

The next steps for the supplier park concept in South Africa have been identified as the establishment of a collaborative platform in order to promote the sharing of best practice between the various parks (i.e. NMBLP and ELIDZ as briefly discussed above). The Aerospace industry has also noticed the benefits and success of the supplier parks concepts in South Africa, with a similar concept already in the various stages of planning and implementation based on the experience gained in the automotive sector (Venter, 2007).

In conclusion, it is clear that collaboration between all the stakeholders in the automotive cluster was vital to the initial success of the ASP concept. The critical success factors identified for the implementation of the ASP concept were two fold. One, from a SPDC viewpoint the focus has to be on realising shareholder value through maximising space utilisation and generating critical mass. As is the case with any other business concept, the real value is measured by the return on investment to the shareholders. Finally, from a tenant point of view it was identified that the concept has to show financial benefit (i.e. logistics cost reduction through synergies), long-term sustainability and expanding potential. It will be the latter that will be further discussed and evaluated by means of semi-structured interviews with key ASP stakeholders in Chapter 6.

## 5.3 Rosslyn Automotive Supplier Park: Value Proposition and Benefits Model

As discussed in the preceding section, the Rosslyn Automotive Supplier Park's main function was to concentrate automotive component manufacturers and suppliers in one location to achieve synergies.

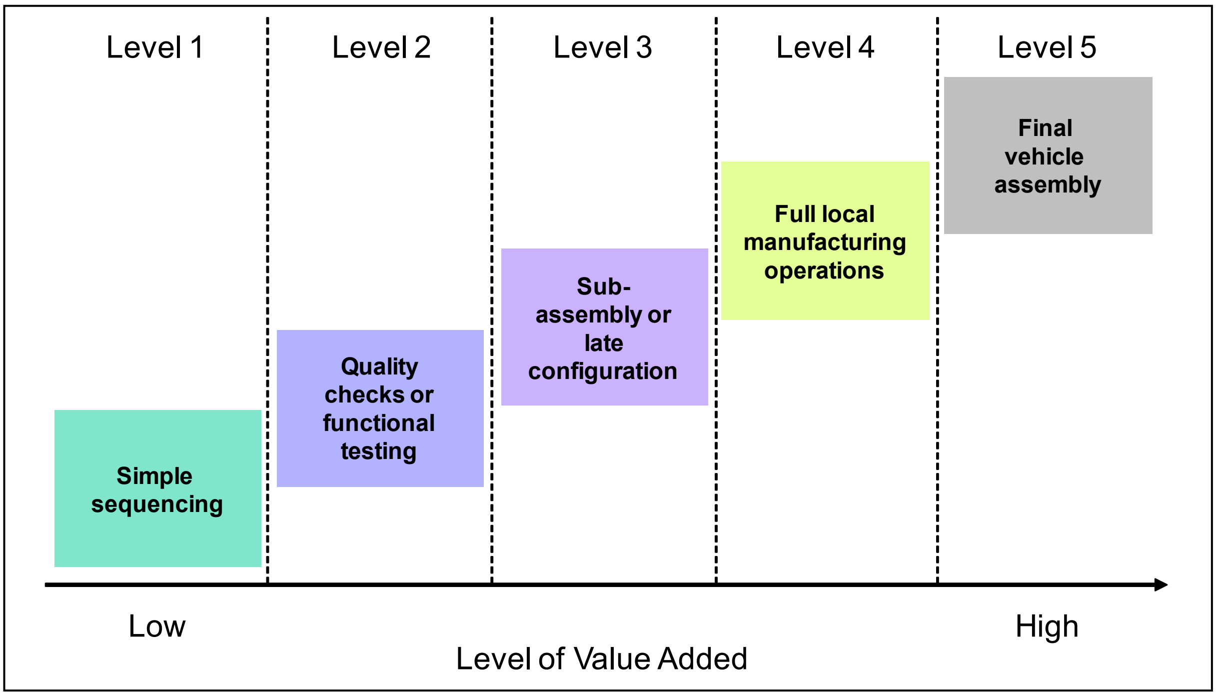
One of the factors, highlighted in the preceding section that contributes to the uniqueness of the ASP when compared with the international applications of the concept, is that the ASP is managed as a separate entity without any direct relation to other companies within the automotive industry. In other words, it is managed without the direct involvement and the leading role played by OEMs in other parks presented. In theory this allows the supplier in the ASP to balance reduced demand volumes from one manufacturer with increased demand from another, due to their relational contract not committing them to a single OEM. The ASP can therefore be described as being in a position of providing services and infrastructure that will enable their tenants to perform activities across the value add continuum (Figure 5.9).

When the results from the feasibility study of the ASP concept was initially presented to the Gauteng Provincial Government in December 2001 (Simeka TWS Communications, 2003), it was concluded that the ASP…

> '…would support the existing operations through improved processes, increased productivity and cost competitiveness, ensuring the survival of the local plants. New and increased services would promote business opportunities in the area and benefit communities by supporting job creation and strengthening the automotive industry generally in the area.'

Considering Reichhart and Holweg's (2004) description of the drivers for the establishment of international supplier parks (Figure 5.2), it can be argued that central manufacturing facilities, economies of scale and logistics considerations (transportation costs, delivery reliability and responsiveness) are also drivers underlying the establishment of the ASP (Simeka TWS Communications, 2003; Automotive Supplier Park – Annual Report, 2006 to 2008).

Figure 5.9 – The value add continuum

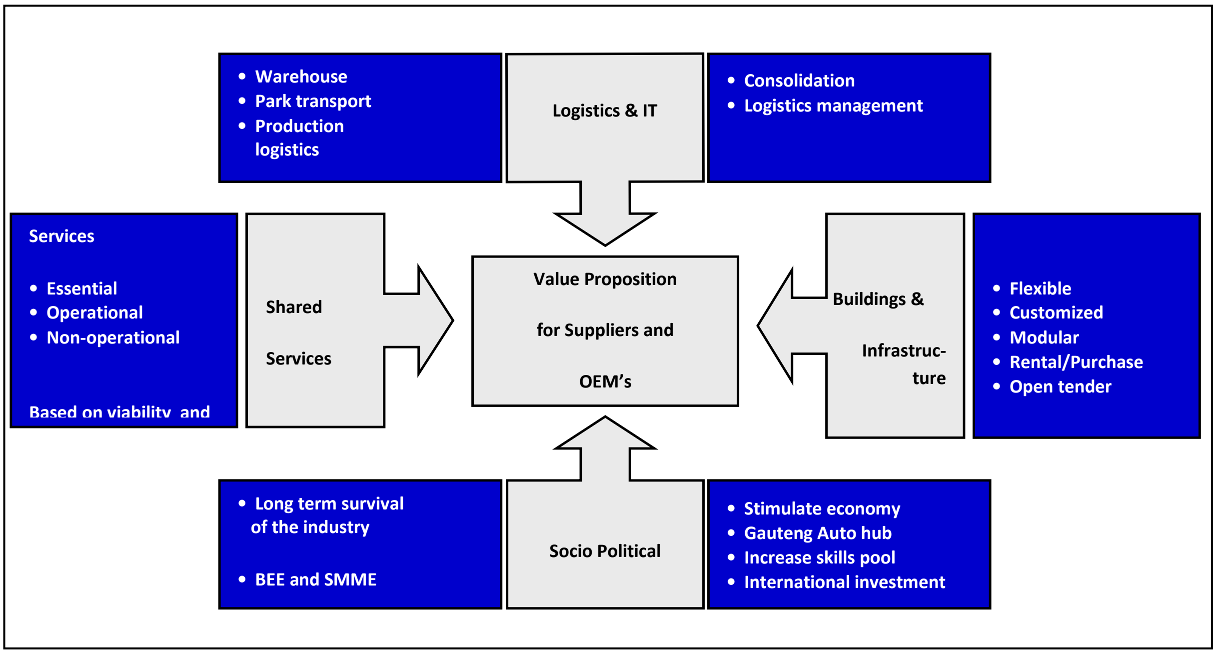



Source: Compiled for the purposes of this study; Adopted from Reichart and Holweg (2004: 20)

From a supplier perspective, where central manufacturing facilities are concerned, the ASP provides customised turnkey production buildings and a full service package for component manufacturers and assemblers, in a secure environment within close proximity of the Rosslyn OEMs. Economies of scale are addressed, in an attempt to balance fluctuations in demand. The combination of manufacturing facilities, which means reduced overhead and leaner management levels, the benefit derived from shared services, buildings and infrastructure are also features of the ASP. Logistics considerations for the suppliers will essentially focus on securing logistics savings through transportation savings and savings in logistics infrastructure. Transport savings are to be secured through proximity to local customers and immediate access to the rail system, enabling the consolidation of both incoming and outgoing goods. Further logistic savings would come from savings in logistic infrastructure, including reduced space, less materials handling equipment and sharing IT facilities.

The above drivers also form the key components of the ASP value proposition as depicted in Figure 5.10. The value proposition was designed to support business case development for the prospective tenants, focusing on potential cost saving.

Figure 5.10 – The automotive supplier park value proposition and benefits model




Source: Simeka TWS Communications (2003)

When compared with the value add continuum (as discussed in Chapter 4) it can be argued that the tenants currently located in the ASP vary between level 3 and level 4 value add. The level 1 to level 2 value add is either performed at the supplier's manufacturing facility outside of the ASP, or at a staging area in the OEM assembly plant.

The value proposition also forms the basis for the proposed benefits model. These benefits as described in the consulted sources (e.g. Simeka TWS Communications, 2003; Automotive Supplier Park – Annual Report, 2006 to 2008), can be grouped into ten individual categories (Table 5.6).

Table 5.6 – ASP benefits model categories

| |
|---|
| Original Equipment Manufacturers (OEM) |
| Potential investors |
| Suppliers and Tenants |
| Service providers |
| Unions |
| Emerging businesses |
| Communities |
| Automotive industry |
| Rosslyn and the Greater Tswane area |
| Neighbouring provinces and communities |

Source: Simeka TWS Communications (2003)

### 5.3.1 Immediate beneficiaries

As highlighted in Chapter 1, the focus of this study is on assessing whether benefits realisation has occurred for a selected group of stakeholders, highlighted in Table 5.6.

The group of stakeholders in Table 5.6 is limited to OEMs, suppliers, tenants, and logistics service providers – In this case 'suppliers' are mainly tier-1 suppliers with direct relations with the local OEMs; 'tenants' are suppliers located in the ASP without direct relations with the local OEMs with production mainly due for exports. This group can also be referred to as the *immediate beneficiaries* due to the immediate nature of their access to the proposed benefits. The proposed benefits for each of the stakeholders in the selected group, as described in the consulted sources (e.g. Simeka TWS Communications, 2003; Automotive Supplier Park – Annual Report, 2006 to 2008), are summarised in Table 5.7.

Benefits associated with the remainder of the benefits categories and not tested in this study (as detailed in Chapter 6), but still relevant when considering the macro economic importance of the local automotive industry (as discussed in Chapter 3), are summarised in Table 5.8. This group can also be referred to as *distant beneficiaries* due to the predominant longer-term nature of their benefits realisation cycle.

Table 5.7 – ASP proposed benefits to immediate beneficiaries

| Benefits category | Proposed benefit |
|---|---|
| General | Process improvement |
| | Increased productivity |
| | Increased cost competitiveness |
| | Access to state of the art planning and execution systems |
| | Increased size and quality of the pool of skilled workers |
| Original Equipment Manufacturers (OEM) | Reduced security cost |
| | Reduced inventory cost |
| | Savings in warehouse and storage space |
| | Materials handling equipment cost saving |
| | Increased plant flexibility |
| | Improved supplier service levels |
| | Reduced transportation cost |
| | Improved delivery accuracy |
| | Consolidation of inbound and outbound logistics |
| | Reduced time lost due to production disruptions |
| Suppliers and Tenants | Strengthened strategic position through cost synergies and an enhanced environment |
| | Quality improvements through improved logistics |
| | Reduced insurance cost |
| | Overall reduced production cost |

| | |
|---|---|
| | Easy access to OEM systems |
| | Reduced logistics cost (Inbound and outbound) |
| | Affordable rent for modern buildings in flexible lease arrangements |
| | Enabler of developing and maintaining long-term relationships with OEMs |
| | Reduced production cost per part |
| | Increase stability of supply |
| | Higher levels of skilled manpower will increase the quality of their output and operations |
| Logistics Service Providers (LSP) | Access to the delivery of more value adding opportunities by progressing from warehousing to sequencing and assembly |
| | Introduction of new services will generate new business opportunities both in the creation of the ASP and its operation |
| | Reduced insurance cost |
| | Provision of more economical services because they will be servicing several customers in a shared area (economies of scale) |

Source: Simeka TWS Communications, 2003; Automotive Supplier Park – Annual Report, 2006 to 2008

#### 5.3.1.1 General

The benefits referred to in Table 5.7 contained in the 'General' benefits category (and referred to as 'Vanilla' benefits in the Semi-structured interview questionnaire), are benefits identified to be relevant for each of the three immediate beneficiaries. These benefits are proposed to support both efficiency (cost) and effectiveness (performance) improvements.

The *efficiency benefits* are focused on cost improvement. In this case, increased cost competitiveness relates to improving the various cost drivers of the relevant beneficiary to such an extent, that it allows that beneficiary to be more cost competitive than another OEM, supplier or LSP not supporting or involved in the ASP. A location within the ASP, allows the supplier to benefit from shared services such as security. It allows the supplier to reduce their particular investment and operational costs related to security to such an extent that the cost per unit manufactured is less than the cost per unit manufactured by another company not located in the ASP. In theory, this enables the supplier to pass savings onto their OEM customer, and also ensures a stable future business relationship.

The *effectiveness benefits* are focused on performance improvements. The outcome from process improvements can generally be classified as benefits related to financial results, customer satisfaction, internal business processes, and the learning and growth of the organisation (Statz, 2005: 11). From an OEM perspective, with a supplier located in the ASP, increased satisfaction related to improved delivery accuracy of the supplier can be seen as a process improvement benefit. Increased productivity benefits rely on increased throughput and utilisation rates (Haung, Dismukes, Shi, Qi Su, Razzak, Bodhale and Robinson, 2003: 513). From a supplier perspective, benefits such as increasing the production output with the same input, simply by being located in the ASP, tapping into the logistics synergies and the positive effect of increased labour moral are all worth noting. Access to state of the art planning and execution systems by OEMs, suppliers and LSPs either hosted by the ASP or provided by a preferred service provider create even more benefits. The planned offer of a centralised training facility in the ASP will increase the size and quality of the pool of skilled workers in the motor industry.

Like the ‘General’ benefits, the stakeholder specific benefits are proposed to support both efficiency (cost) and effectiveness (performance) improvements for the each of the immediate beneficiaries (i.e. OEMs, Suppliers and Tenants, and LSPs).

#### 5.3.1.2 Original Equipment Manufacturers

By and large, the ASP promotes being in a position to provide the OEMs with effective approaches to establish valuable changes in their manufacturing strategies to achieve efficiencies (Simeka TWS Communications, 2003). These efficiencies may be derived from factors such as improved factory layout, assembly time, improved quality, consistent on-time delivery and reduced material handling. It also provides cost advantages, improved process stability and process flexibility as the ASP can be seen as a flexible production zone in close proximity to the final assembly line allowing direct supply (in the form of JIT and JIS). This direct supply also results in optimised deliveries, improved process transparency and reduced reaction times to changes in production.

From a physical handling and transportation perspective, the potential benefits are also noteworthy. With suppliers now in closer proximity the reduced supply chain results in reduced transportation costs and improved delivery accuracy, as well as reduced security costs due to a lower overall risk profile. It also results in direct savings in warehousing and storage space as well as reduced inventory investment costs in the form of safety stock. There is also the potential for maximising inbound and outbound logistics that also drives cost savings. This can be obtained by making import containers available to suppliers for exports, instead of returning empty containers to the container yards and incurring turn in fees. Another consideration is that parts supply is stabilised through improved transportation processes, which in turn results in reduced potential for production disruptions.

From an infrastructure viewpoint, the centralised logistics services (referred to by the ASP as the logistics hub) are able to benefit the OEM with synergies created through economies of scale and optimal use of logistics processes. Localising their logistics service providers in close proximity also has the potential to improve service levels.

In conclusion, the OEM will be able to achieve cost optimisation, reliability, flexibility and improved product quality at minimal investment costs.

#### 5.3.1.3 Suppliers and Tenants

For the suppliers and tenants who have bought into the supplier park concept, the ASP has communicated very specific benefits.

One such benefit is an improved opportunity to understand and meet their OEM client’s demand due to the favourable proximity. An opportunity could be, for example, in the form of more flexible production schedules. The ASP is also in the favourable position of being able to attract leading component suppliers by offering affordable rent options in flexible lease agreements, as well as reduced logistics costs associated with the close proximity to their OEM customers.

The ASP also promotes the enablement of suppliers and tenants to benefit from economies of scale with regard to services and the creation of synergies among them by sharing common resources like canteens and clinics.

The ASP is also able to provide savings on inbound and outbound logistics costs, and the opportunity to increase the local demand for their products (i.e. delivery to all OEMs in the area) will potentially reduce production costs per part and increase the stability of supply.

From a qualitative perspective, the ASP promotes the enablement of improved relationship management between the supplier and their OEM customer through more effective interactions and issue resolution. An improved working environment also has the ability to increase worker motivation and improve workforce satisfaction through the attractive ASP environment offering a variety of facilities and services such as health care, security and recreation.

#### 5.3.1.4 Logistics Service Providers

In the case of the LSP, the benefits revolve around growth opportunities. Opportunities to provide additional value adding services to current clients by progressing from transport and warehousing service providers, towards providing sequencing and assembly services and beyond (refer to the value continuum in Figure 5.9), and also providing services to new clients and markets gained through leveraging the credentials gained from operating in the ASP. In short, this growth will enable LSPs to grow their market share and increase their profitability. Finally, because they will be servicing several clients in a shared area, the LSP will be able to provide more economical services that will directly benefit their clients.

### 5.3.2 Distant beneficiaries

The reason the benefits summarised in Table 5.8 are not subjected to more rigorous analysis is not because they are not important. On the contrary, in a developing economy, such as South Africa, the benefits raised in Table 5.8 have a significant impact on economic growth and overall industry sustainability. The researcher simply had to limit the scope of the study and focus on a specific group to ensure undiluted and factual analysis of the benefits to that specific group. The researcher's involvement in the feasibility study not only provided the necessary insight into the concept and its intent, but also personal access to the representatives of the selected companies, and ultimately, access to the information required to reach the study objective. The assessment of benefits realisation is from a supply chain perspective and in only the group of immediate beneficiaries can logistics and supply chain activities be considered primary activities as defined in Porter's value chain (Chapter 2).

Table 5.8 – ASP proposed benefits to distant beneficiaries

| Benefits category | Proposed benefit |
|---|---|
| Potential investors | Derive sustainable profits from investments |
| Unions | Centralised child-care, educational, skills training, health care, recreational and public transport facilities will make the ASP a most attractive and desirable work environment |
| | Affordable housing is available reasonably close to the ASP |
| | Securing of job opportunities through supporting the local |

| | |
|---|---|
| | automotive industry to increase their cost competitiveness |
| | Long term job and wealth creation |
| Emerging businesses | Empowerment enterprises owned and run by previously disadvantaged individuals to benefit from construction and establishment opportunities |
| | Attracting previously disadvantaged entrepreneurs and investors will as investment partners |
| Communities | General economic upliftment and increased opportunities for employment |
| | Revenue from direct and indirect taxes can be utilised to support community upliftment |
| | New business opportunities |
| Automotive industry | Support the retention and expansion of new business opportunities in the South African automotive business so sustaining the automotive industry, which in turn will support the South African economy |
| Rosslyn and the Greater Tshwane area | Improvement of services through the attraction of new industry to the area |
| | Attraction of both local and foreign investment to the area |
| | Attraction of component suppliers who would not have considered locating in the area |
| | Attraction of service providers to improve service delivery to the manufacturers |
| | Attracting business to the area has obvious spin-offs for the surrounding towns of Babelegi, Garankuwa, Soshanguwe and Mabopane, hence increasing new employment opportunities |
| Neighbouring provinces and communities | Job creation through financial support for emerging businesses |
| | Transport model and optimisation to support the transport of people from the neighbouring communities |

Source: Simeka TWS Communications, 2003; Automotive Supplier Park – Annual Report, 2006 to 2008

## 5.4 Summary

Since its inception of the concept in the early nineties, depending on the definition used, around 40-70 supplier parks have been established around the world. These implementations can be found in various forms, from greenfield sites in emerging markets to brownfield sites scattered around Europe and North America. This is a substantial achievement for a concept polarised in opinion by industry specialists from clusters with all the benefits of a locally surrounded production system, to a tool by multinational corporations to de-territorialise and control the 'global commodity chain'. Again, for some they represent new experiments in production and logistics management and for others they are a reversion back to the model of a highly vertically integrated factory except that the ownership is fragmented.

Although similar polarisation can also be found in the definition and differentiation of the concept, it can be concluded however that differentiation is possible along at least three dimensions. It can firstly be differentiated based on spatial integration in conjunction with dedicated infrastructure, secondly based on value chain configuration, and finally based on organisational integration. It is however important to note that the supplier park concepts in different parts of the world vary substantially based on physical layout, synchronisation between the OEM's final assembly line and the suppliers' operations, capital investment, employment governance, and strategic supplier involvement.

Various implementations of international supplier parks were introduced as well as the South African interpretation of the concept in the form of Industrial Development Zones and Logistics and Supplier Parks. This highlighted the fact that the concept is implemented in a variety of forms with each manufacturer not only taking a different approach, but with some also not using the same system for individual plants within their own manufacturing network (Appendix 5A).

In spite of the broad interpretation and application of the concept, the supplier park was defined as a concentration of dedicated production, assembly, sequencing or warehousing facilities run by suppliers or a third party in close proximity (i.e. within 3km) to the OEM plant. The South African picture appears to follow the international trend in the application of the concept being linked to different forms and reference, but it was argued that the RASP – which is approximately 1.3km from the assembly facilities of Nissan/Renault, 3.3km from BMW, 0.5km from TATA, and 35km from Ford – in essence remains true to the definition of being a concentration of dedicated production, assembly, sequencing or warehouse facilities run by suppliers or a third party in close proximity to the OEM plant. It was also concluded that the ASP was unique when compared with the international concept presented, especially when considering the leadership role of the provincial and local governments, and that it served multiple OEMs from a single location (Appendix 5B). The ASP was also evaluated according to specific criteria such as physical layout, synchronisation, capital investment, employment governance and strategic supplier involvement.

The South African automotive industry's focus on competitiveness has been fuelled by low product volumes compared to international standards; assemblers being quite distant from their export markets; long supply lines complicating logistics management and increasing supply chain costs; assemblers facing many newcomers in the form of imported models; and growth in the domestic market remaining essentially limited.

As the OEMs have pushed much of the pre-final assembly work out of their plants, they have found themselves subject to the logistical challenges and constraints of their suppliers. In an effort to manage the impact of these challenges, the assemblers have taken a more active role in how and where their suppliers conduct their operations. OEMs introduced the concept of JIT where components are delivered to the assembly plant within hours of when they are needed, thereby reducing the need for holding buffer inventory. This constant need for a flow of high quality parts has created demand for many more delivery trucks to be part of an ever-increasing logistics delivery system. The resulting congestion, unpredictability of shipping times, and differing inventory requirements has created a system where some suppliers are located very close to an assembly plant, while others are further away - depending on the component and the needs of the automaker. One of the solutions for this tiered system of distance requirements is the Supplier Park concept as found in various forms around the world.

OEMs consider supply strategies vital, because the majority of the value creation activities lie upstream from them. Changes in component production the last decade were as much driven by the alterations in the nature of value chain relationships between assembles and suppliers as by the industry's globalisation. The adoption of a network approach can be defined where organisation now focuses on the value-creating system rather than the company or industry, and were value is co-produced by different parties such as suppliers, partners and even customers. Global networks have replaced local supply linkages. Even when production remains local, design and contract allocation is increasingly global. Global supply networks are becoming steadily more important in the auto industry as assemblers and suppliers develop parallel networks across the globe and supplier parks become important in enabling and supporting the value adding activities of their tenants.

The success of global enterprises now heavily depends on the competitiveness of their clusters of interrelated organisations that add and generate value through cooperation. Likewise, the agility of individual manufacturers depends not just on their own actions and systems but also on those of the interrelated organisations. The industrial development zone and supplier park concepts, in a domestic context, were the outcome of close working relationships from both business and government to facilitate growth in the domestic manufacturing industry. From an automotive perspective the ASP was their response to the recognition that the competition between automotive networks and clusters are becoming paramount to the sustainability of this industry, more specifically in South Africa. The collaboration between government and the private sector with regards to the establishment of the supplier park concept in the South African automotive sector provides proof that these stakeholders are serious about guiding the industry, as an integrated cluster, to new levels of global competitiveness.

It was concluded that the uniqueness of the ASP enabled it to perform a function focussed on promoting and benefitting the South African automotive industry as a whole rather than a single OEM. The critical success factors identified for the implementation of this concept were related on the one hand to the SPDC with the focus on creating sustainable shareholder value.

From a tenant perspective it was identified that the concept has to show financial benefit (i.e. logistics cost reduction through synergies), long term sustainability and expanding potential and that it will be this critical success factor which will be further discussed and evaluated on the hand of semi-structured interviews with key ASP stakeholders

This study focuses on the assessment of whether the immediate beneficiaries have gained the communicated benefits from the ASP. The value proposition of the ASP forms the basis of the proposed benefits model that consisted of ten individual benefits categories. These benefit categories were grouped into immediate beneficiaries and distant beneficiaries. Immediate beneficiaries where defined as those stakeholders who can prove immediate efficiency- and effectiveness benefits from their participation in the ASP concept – such as OEMs, Suppliers and Tenants and LSPs. are of an immediate nature. The benefits for the distant beneficiaries are predominantly of a longer-term nature. These benefits will be assessed and concluded in Chapter 6.

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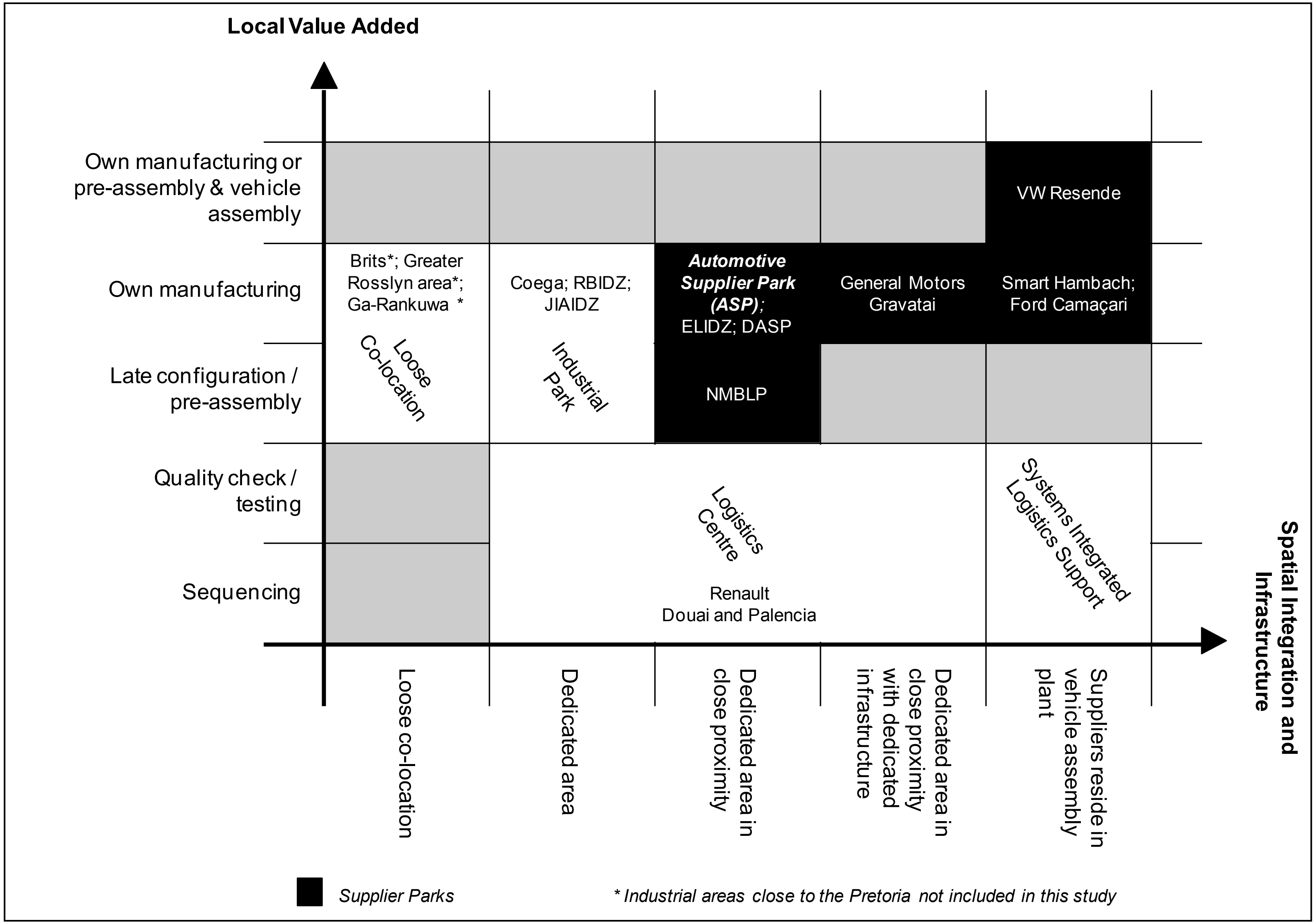
Appendix 5A – Summary of International and South African Perspectives (based on Sako's differentiating factors)

| | Facility | Key Characteristics | Outsourcing | Asset Ownership | Relational Contracts |
|---|---|---|---|---|---|
| International Perspective | **VW Resende (Brazil)** | Pure modular consortium | Total outsourcing of final assembly | Assets and Inventory owned by OEM | OEM has taken leadership role |
| | **Smart Hambach (France)** | Modular consortium with an integrated asset ownership structure | Outsourcing limited to subassembly; OEM controls final assembly | Land, buildings and equipment are owned and managed by OEM | OEM has taken leadership role; Strong relational contracts with a tightly coordinated social system |
| | **Ford Camaçari (Brazil)** | Condominium with suppliers some under a single roof with the OEM | Outsourcing limited to subassembly; OEM controls final assembly | Land and buildings owned by OEM; machinery and equipment are owned by supplier | OEM has taken leadership role; Strong relational contracts with uniform resource system |
| | **General Motors Gravatai (Brazil)** | Typical greenfield approach to establishing a new production and assembly network | Outsourcing limited to subassembly; OEM controls final assembly | Government owned the land and sold it in allotments to the OEM and suppliers | OEM has taken leadership role; Suppliers prohibited from supplying to other automakers from the Gravatai site |
| | **Renault Douai and Palencia (France / Spain)** | Typical brownfield approach; Park is for suppliers that deliver in sequence bulky and difficult-to-transport products that face high variety | Outsourcing limited to subassembly; OEM controls final assembly | Buildings owned by OEM; Supplier negotiates with OEM for other asset investment | No uniform resource system; focussed on cost-cutting motivation for outsourcing |
| South African Perspective | **Coega Industrial Development Zone (Port Elizabeth)** | Non-automotive focussed industrial estate; New deepwater port development alongside the IDZ; Focussed on regional economic development | Planned automotive industry related production activities (exact nature of outsourcing not available at time of writing) | Buildings leased by tenant; Assets and inventory owned by tenant | Government has taken leadership role; No relationship contracts |
| | **Richards Bay Industrial Development Zone** | Non-automotive focussed industrial estate; Focussed on regional economic development | No automotive industry related production activities | Buildings leased by tenant; Assets and inventory owned by tenant | Government has taken leadership role; No relationship contracts |
| | **East London Industrial Development Zone** | Industrial estate aligned with various industries; In close proximity of one OEM; Focussed on regional economic development | Outsourcing limited to subassembly; OEM controls final assembly | Buildings leased by supplier; Assets and inventory owned by supplier | Government has taken leadership role; No relationship contracts; Strategic partnership with one OEM |
| | **Johannesburg International Airport and City Deep Industrial Development Zone** | Non-automotive focussed industrial estate; Focussed on regional economic development | Exact nature of outsourcing not available at time of writing | Exact nature of asset ownership not available at time of writing | Government has taken leadership role; |
| | **Durban Automotive Supplier Park** | Industrial estate aligned with various industries; In close proximity of one OEM; Focussed on regional economic development | Exact nature of outsourcing not available at time of writing | Exact nature of asset ownership not available at time of writing | Government has taken leadership role; No relationship contracts; Strategic partnership with one OEM |
| | **Nelson Mandela Bay Logistics Park (Uitenhage)** | Inland facility (approx. 40km from the port of Port Elisabeth); In close proximity of one OEM | Outsourcing limited to subassembly; OEM controls final assembly | Buildings leased by supplier; Assets and inventory owned by supplier | Government has taken leadership role; No relationship contracts; Strategic partnership with one OEM |
| | **Automotive Supplier Park (Rosslyn)** | Inland facility (approx. 650km from the port of Durban) In close proximity of multiple OEMs; Combination of greenfield and brownfield approach | Outsourcing limited to subassembly; OEM controls final assembly | Buildings leased by supplier; Assets and inventory owned by supplier | Government has taken leadership role; No relationship contracts; Suppliers allowed to supply multiple automakers |

Source: Compiled for the purposes of this study

Appendix 5B – International and South African Perspectives Co-location Grid (based on Reichhart and Holweg's differentiating factors)




Source: Compiled for the purposes of this study; Adopted from Reichhart and Holweg (2004: 20)

# Chapter 6

## Research Methodology, Data Presentation,Analysis, Interpretationand Findings

*This chapter presents, analyses and interprets the data gathered during the semi-structured interviews.*

## Content

## 6.1 Introduction

It is essential that the research methodology adopted to ensure the successful realisation of the study objectives is sound from a research procedure perspective. Creswell & Plano Clark (2007: xv) state that the three broad classes of research methods are quantitative, qualitative and mixed method research. Creswell & Plano Clark (2007: 28-29) continue by describing the aim of quantitative research to be assessing whether the data gathered fits an existing theory, model, framework or explanation. In qualitative research the aim is to determine the views of the contributors about a specific phenomenon or to '…inductively understand the meaning individuals give to a theory'.

## 6.2 Research Methodology

Due to the nature of the research problem, this study follows a mixed method research approach defined by Creswell (2003: 18) as an approach that 'employs strategies of inquiry that involve collecting data either simultaneously or sequentially to best understand research problems'. Data collection in the mixed methods approach involves gathering both numeric and text information so the database contains both quantitative and qualitative information (Creswell, 2003: 20). The qualitative research method is the dominant method used in this study. This method is defined by Straus and Corbin as 'research that produces findings not arrived at by means of statistical procedures or other means of quantification' utilising inductive strategies (Flick, 1998: 2; Creswell, 2003: 212).

Primary information will be collected through semi-structured interviews with carefully selected representatives of the various Rosslyn Automotive Supplier Park (RASP) stakeholder groups. The quantitative and qualitative data will then be linked to identify, select and compare outliers which have three main drivers according to Rossman and Wilson as cited by Miles and Huberman (1994: 41). They firstly enable confirmation of each method through triangulation, secondly, they provide richer detail through elaborate analysis, and, thirdly, they provide a fresh insight through new lines of thinking. So, in an attempt to know more about the identified research problem, the open-ended questions will be complemented by questions with quantifiable results (Flick, 2006: 40).

## 6.3 Research Methodology Application to this Study

The primary objective of this study is to assess the performance of the Rosslyn Automotive Supplier Park concept in terms of the realisation of the value proposition, as communicated to the various stakeholders, from a supply chain perspective. The overall method of design is the use of quantitative data to enrich initial qualitative results.

According to Creswell (2003: 211) there are four decisions that guide the selection of a mixed method strategy. These guiding decisions can be made by answering the following questions:

1. What is the implementation sequence of the quantitative and qualitative data collection?
2. What priority will be given to the quantitative and qualitative data collection and analysis?
3. At what stage will the quantitative and qualitative data findings be integrated?
4. Will an overall theoretical perspective be used?

Considering the above, and with regard to this study, a concurrent transformative strategy, as defined by Creswell (2003: 219), was followed. Key characteristics of this strategy are: (a) the researcher’s use of theory to guide the approach, (b) both qualitative and quantitative data are collected at the same time through the use of both open-ended questions and a quantifiable instrument in the same questionnaire, (c) there may be both an equal or unequal priority to the data types, and (d) integration occurs during the analysis and potentially also the interpretation phases (Creswell, 2003: 219).

The research questionnaire containing these open-ended and close-ended questions is made available in Appendix 6A.

The stakeholders identified included among others, representatives of original equipment manufacturers (OEMs), suppliers, and logistic service providers (LSPs). The semi-structured interview process '…is linked to the expectation that the interviewed subjects' viewpoints are more likely to be expressed in a relatively open ended interview situation than in a standardised interview or a questionnaire' (Flick, 1998: 76). It is imperative to note that a random sample would not have elicited useful responses from participants, given the nature of the formulated problem and the units of analysis being of a very limited and specialised nature.

The researcher's involvement in the feasibility study, initial concept design, and to a lesser extent the implementation of the RASP, as well as his exposure to the subject matter and related industry contacts, have allowed him to perform a careful stakeholder identification and selection process. The researcher is currently not involved with the RASP so an objective approach to the study was maintained.

In a chapter focused on the ethics of qualitative research, Flick (2006: 49-50) cites Northway (2002: 3) in outlining the overall ethics involved in any research. Northway states that every aspect of the research process has ethical implications – from deciding upon the topic, identifying the sample, conducting the research to interpreting the findings.

In order to ensure an ethical approach to the research process, the researcher adopted the following guidelines as described by Flick (2006: 49-50):

- Informed consent

  All participants were consulted prior to making an appointment to conduct the interview to afford them the opportunity to voluntarily give their consent. In preparation for the interview, the initial contact telephone call was followed by an electronic mail message containing the supporting documents (comprising an introduction to the study and a copy of the questionnaire) (Appendix 6B).
- Avoiding harm in collecting data

  In collecting the data there were no instances where any of the participants were exposed to any harm in any shape or form.
- Confidentiality in writing about the research

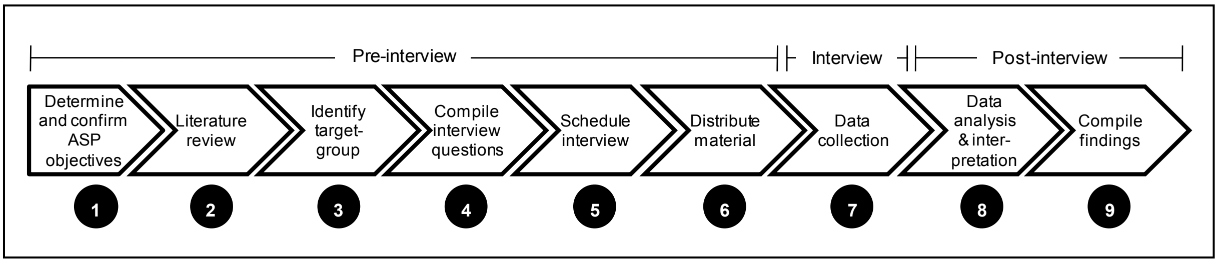
Due to the uncompromising focus on anonymity and confidentiality, the risks of quoting a specific participant's comments (e.g. exposure to potential liabilities) were avoided as far as possible. All participants were assured of confidentiality during the semi-structured interview process. With the respondents' consent all interviews were recorded for reference purposes. The various levels of analysis and deductions were compiled from these recordings. A detailed list of respondents and the above mentioned recordings were made available to the study promoter for reference and safekeeping.

- Doing justice to participants in analysing data
  Based on the premise of anonymity and confidentiality, the possibility of unfair comparisons being drawn between participants and their feedback, which could potentially present them in an unflattering light, was averted.
- The problem of context
  Data obtained from a qualitative research approach, in many cases produces more contextual information about a single participant than quantitative research. The mixed methods approach ensures that it will not be possible to identity a 'real' person by examining the findings in the research report.

### 6.3.1. Research Approach

In support of managing the potential ethical challenges, a clear nine step research process (as depicted in Figure 6.1) consisting of three distinct phases, was followed.

Figure 6.1 – The adopted research process




Source: Compiled for the purposes of this study. Adapted from Flick (2006: 107)

The main objective of the *pre-interview* phase was to collect and analyse various concepts related to the topic of supplier parks. This knowledge was then used to support the development of the questionnaire which in return drove the data generation process.

The pre-interview phase consisted of the following actions:

Step 1: *Determine and confirm the RASP objectives*

A detailed analysis was undertaken to determine and confirm the objectives and proposed business benefits of the RASP. This was done to establish an assessment baseline from which the critical evaluation of the RASP’s ability to realise the value proposition communicated to their stakeholders. The baseline consisted of mainly determining the RASP’s vision and mission, as well as its economic value propositions from both a macro and micro economic perspective. It was decided that the focus of this study would be limited to the evaluation of the micro economic benefits (i.e. benefits to the direct stakeholders excluding any matters of a socio-political nature).

Step 2: *Literature review*

The study is supported by a comprehensive review of literature such as text books, industry publications and periodicals. The literature review was undertaken to gain ‘…insights and information coming from existing literature as context knowledge which [can be used] to see statements and observations in [the] research in their context’ (Fick, 2008: 58-59). The objective of the literature review was to:

- Define logistics and supply chain management, and describe its importance in the modern automotive industry, and
- Define the automotive supplier park concept, its application both locally and internationally, as well as the business methodologies supporting the concept.

Step 3: *Identify target group*

Selecting a random sample of individuals would not have elicited the required insightful responses from participants due to the specialised nature of the subject matter. From the outset it was clear that only a small group of individuals would be able to offer a knowledgeable and objective view gained from their involvement in the feasibility study, design and implementation of the RASP. Acquiring information from a random sample group, who may not all have had an overarching understanding of the RASP from concept to implementation, would not have served the objective of establishing whether the communicated benefits have been attained by the various stakeholders. The researcher’s personal involvement in the feasibility study of the RASP, and his exposure to the subject matter and related industry contacts, allowed him to perform a careful stakeholder identification and selection process.

The four criteria used in the identification and selection of the target group included: (a) a demonstrable level of subject matter understanding, (b) current managerial involvement in the RASP (e.g. tenant), and/or (c) previous managerial involvement in the RASP (e.g. RASP operational management). Finally, (d) a further distinction was made, between those companies and/or individuals involved in the RASP feasibility study and those companies and/or individuals not involved in the RASP feasibility study (only Supplier – E). The criteria were applied across four areas namely Original Equipment Manufacturers (OEMs), Suppliers (Tier-1 only), Logistic Service Providers (LSPs) and Subject Matter Experts (SMEs). In Appendix 6C the represented companies of the target group is plotted against the described criteria.

Step 4: *Compile interview questions*

Considering the research problem and the identified target group, the main objective of the interview questions (as compiled in the questionnaire – Annexure 6A), was to support the interview phase by ensuring that the required data points and additional supporting information and insights were collected.

Apart from the data points required to support the quantitative analysis, it was decided to also include open-ended questions to allow the target group to express their personal views on the subject. A personal interview was scheduled with each of the participants as simply distributing the questionnaire and analysing the responses would not have elicited the required insightful responses.

Step 5: *Schedule interviews*

Initial contact with the target group was made via a telephone call to firstly confirm their willingness to take part in the study, and secondly, to schedule a convenient time and place for the interview.

Step 6: *Distribute supporting material*

The initial contact was followed up with an electronic mail which confirmed the scheduled interview date and time, and attached an introduction to the study and the questionnaire. During all of the contact sessions the respondents were assured of their anonymity in order to ensure that open and honest contributions were collected.

During the *interview* phase the aim was to collect the required data points (quantitative focus) as well as additional information and insights (qualitative focus) from the focus group. The collected data and information formed the basis for data analysis and the process of compiling the findings.

The interview phase of the process consisted of the following:

Step 7: *Data collection*

To collect the required data, the approach of alternating the quantitative and qualitative methods, as defined by Miles and Huberman (1994: 41), was applied. Although personal contact was preferred many of the semi-structured interviews were conducted via telephone due to scheduling and location challenges. In all cases the questionnaire was simply used to guide the interview and not to constrain the natural flow of the conversation. All interviews were recorded to ensure post interview analysis integrity (Recordings are available on request). In only one case was a response to the questionnaire received via electronic mail. In this case, only the quantitative responses were considered. The sources of the collected data are presented in Appendix 6D, while the distribution of the target group is depicted in Figure 6.2.

The focus of the *post-interview* phase was to analyse and interpret the collected data and information in order to compile findings which would successfully address the research problem and objectives as described in Chapter 1.

The post-interview phase of the process consisted of the following:

Step 8: *Data analysis and interpretation*

Data analysis in mixed method research allows for analysis to occur both within the quantitative and the qualitative approach, and also between the two approaches (Creswell 2003: 220). Integration of these data sources occurred during the analysis and interpretation phase. In essence, quantitative data from the questionnaire was compared with qualitative data collected through the open-ended semi-structured interviews completed with the same respondent, as described by Miles and Huberman (1994: 42).

Outliers were identified by comparing the individual quantitative data points with the calculated mean values of the cumulative quantitative data points. The qualitative data from the same respondent was then used to explore, qualify and enrich the identified outliers. The principle of only qualifying outliers is rooted in the fact that analysing outliers can provide great insight into the different perceptions among the respondents to, in this case, the value delivery of the RASP. The same qualitative data was also analysed to identify and explore specific commonalities. Section 6.4 details the results from the data analysis and interpretation phase.

Step 9: *Compile findings*

The final step in the adopted research process focuses on the compilation of findings as detailed in section 6.6.

### 6.3.2. Reliance, Limitations and Enhancement Opportunities

In order to present truthful and unbiased findings, it is of the essence to also highlight the reliance, limitations and enhancement opportunities of the study. Further elaboration on these topics is included in the subsequent sections of this chapter.

**Reliance**

Two pivotal reliance points are firstly the documented unpublished communications blue paper and secondly, the integrity and professionalism of the target group.

The communicated benefits, as documented in the unpublished communications blue paper (Smika, 2003) , (as tested in the study), is not available in the public domain. The document was compiled by a communications company appointed by the RASP to (Smika, 2003: 5)…

> '…provide a comprehensive overview of the Automotive Supplier Park project to enable communications consultants to understand the project as well as the various features that are to be communicated to a diverse range of stakeholders. The practical value of the Blue Paper is that it provides an easy-to-understand template for the content of the communications programme so that any new communicator to the project should be able to shape a communications media release, video etc. appropriate and effective in the specific circumstances, yet closely fitting the overall structure.'

The document was made available to the researcher by a reliable source who was also included in the target group. The source has many years of experience in the automotive industry both locally and globally, with operational experience in similar concepts in other parts of the world. A copy of this document was made available to the study promoter for reference and safekeeping. This reliance was mitigated by ensuring that other supplier park related studies support the RASP specific benefits both from an academic as well as from a practical point of view. Hence the strong reliance on scholars such as Sako, Reichhart, Holweg, Pil and others.

The study and findings also relied heavily on the integrity and professionalism of the various individuals in the target group (detailed in Appendix 6D). This reliance was mitigated by the identification and targeting of specific individuals in the specific companies based on their previous/current involvement in the RASP. A document describing the participants' skills, training and experience was made available to the study promoter for reference and safekeeping (refer to Appendix 6C and Appendix 6D).

**Limitations**

Certain limitations were identified, and these were addressed during the theoretical and physical research for this study.

The quantitative and qualitative data collected during the physical interview process was from a relative small target group. This approach was due to the focused selection criteria, process and nature of the study. Increasing the target group would not have significantly increased the quality of the data. In fact, increasing the target group would have had a negative effect on the data quality as it would have required the inclusion of individuals not familiar with the RASP concept and its possible benefits. By following an academically sound research methodology, this study determines whether the communicated benefits of the RASP have been realised. The decision to exclude the assessing of social, economic and related benefits was not taken lightly. It was however clear from the outset, that the establishment of the RASP was very much related to the government's focus on socio economic growth. Due to this fact, many studies and audits by both public and private enterprises have been conducted to assess the socio economic impact of the RASP. Allowing the dilution of this study's focus on supply chain related benefits by including the assessment of socio economic benefits, would have compromised the objectivity of this study. The subject matter is a potential political minefield so extending the study in these areas would not have been in the interest of the South African automotive and supply chain communities.

**Enhancements**

This study lays the foundation for similar studies in this field. The focus on operational effectiveness and efficiency, however, did not allow for a broader evaluation of the financial benefits related to the RASP. There is therefore a clear opportunity to enhance the finding of this study in two specific areas. One, through further financial performance analysis of the target groups through evaluating various financial ratios; and two, by also including interviews with representatives from the suppliers purchasing division who potentially will give a balanced view of the actual financial benefits of having suppliers in the RASP from a sourcing and procurement perspective.

## 6.4 Data Collection and Presentation

Primary data was collected through semi-structured interviews with targeted participants who currently have a business relationship with the RASP (i.e. OEMs, RASP tenants & LSPs) and/or were involved in the initial RASP feasibility study (i.e. Non-tenants & SMEs). Participants were representatives of Original Equipment Manufacturers (OEMs), automotive Tier-1 suppliers located in the RASP (Tenants), automotive Tier-1 suppliers not located in the RASP (non-tenants), Logistic Service Providers (LSPs), former representatives of the Automotive Industry Development Centre (AIDC), and former representatives of the Supplier Park Development

Company (SPDC) (as summarised in Appendix 6D). Attempts to secure interviews with the current representatives of the RASP and SPDC were not successful. However, this does not detract from the quality of generated data as the objective of the additional interviews would simply have been to enrich the findings by adding their views of the current situation.

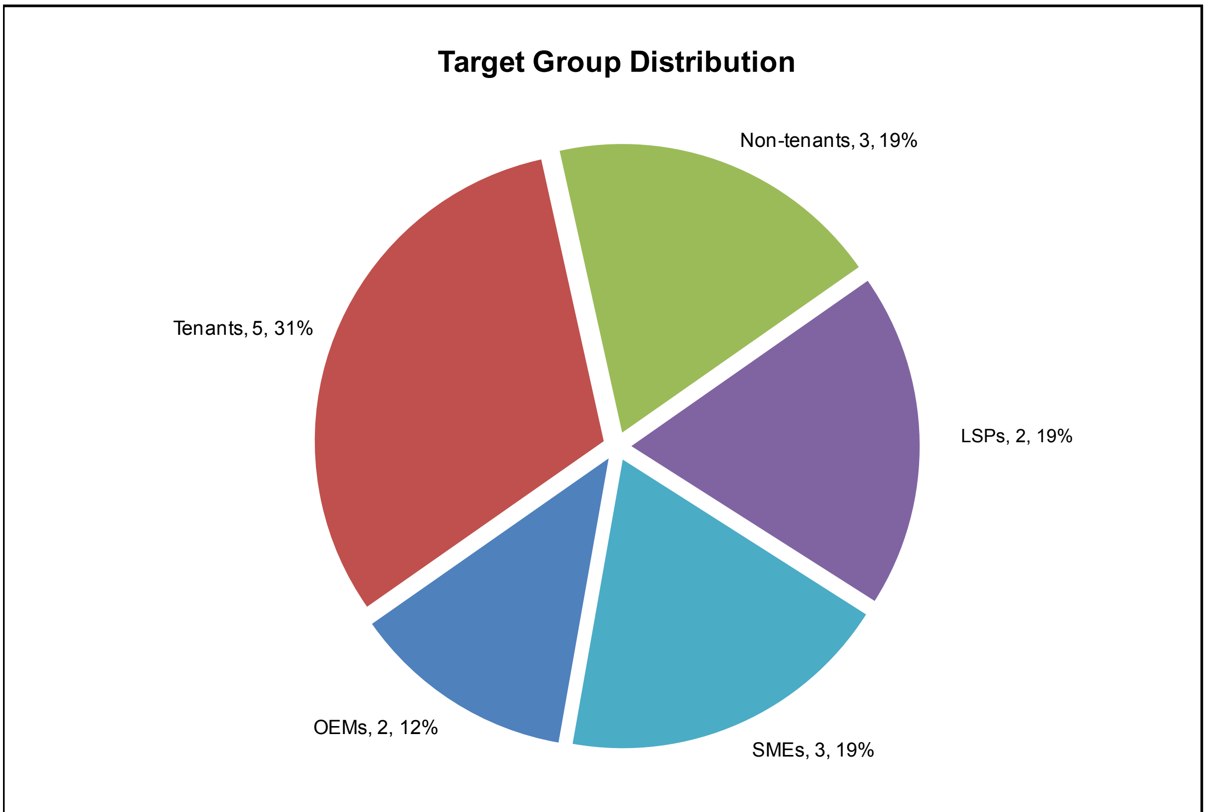
Highlighted as a limitation (see Section 6.3.2.), is the small size of the target group which, in the majority of the cases, only allowed an interview with one respondent from a particular organisation. The reason for consulting such as small number of representatives was to collect the most appropriate feedback, with regard to the initially communicated benefits, from specifically targeted individuals who were part of the initial feasibility study. Targeting and interviewing a larger group would not have supported this objective.

As described in section 6.3, specific criteria were applied to identify the target group of companies. In all cases only one company representative was interviewed. Although this was identified as a possible limitation, it was unavoidable because of the focused nature of the study and the reliance on the candid feedback from those company representatives who were involved in the original RASP feasibility study.

A research questionnaire (Appendix 6A) was developed to assess, by using both quantitative and qualitative methods, how the identified companies benefited from the Automotive Supplier Park in the areas of Logistics & IT, Buildings and Infrastructure, and Shared Services. It consists of six sections. Section – A focuses on the assessment of the common benefits across the target group (excluding Non-tenants and SMEs). Section – B is targeted at only the OEM group to assess the benefits realised through their involvement in and support of the RASP. In Section – C the benefits to the component suppliers who are tenants in the RASP are assessed. The objective of Section – D was to assess the reason why the component suppliers, who were part of the feasibility study, decided not to locate/relocate into the RASP. Section – E assesses the LSP specific benefits realised. Finally, Section – F allows for the SMEs to provide contextual feedback to further qualify and enhance the study.

The distribution of the target group is skewed towards the Tier-1 suppliers who are current RASP tenants (Figure 6.2). The skewed distribution was intentional as the Tier-1 suppliers in the RASP should potentially reap the most significant benefit from their involvement in the RASP. This is due to their positioning and ability to unlock the communicated benefits such as reduced logistics costs, greater building development design and investment flexibility, and sharing communal services with other RASP tenants.

Figure 6.2 – Distribution of the target group




Source: Compiled from data collected through semi-structured interviews

**OEMs (12% of target group)**

Currently the Rosslyn area plays host to three OEMs. Two of these OEMs were part of the RASP feasibility study, and both participated in this study (100% of the OEMs).

**Tenants (31% of target group)**

At present, 11 of the 26 RASP tenants (42% of the tenants) are considered Tier-1 suppliers. The majority of tenants supply parts to OEM's and one tenant is an exclusive supplier of a specific product to a company in Europe. This study targeted five of the 11 Tier-1 component suppliers (45% of the Tier-1 component suppliers) four which were part of the initial RASP feasibility study. These component suppliers provided valuable input into the business case, benefits realisation model and the logistics infrastructure design.

**Non-tenants (19% of target group)**

There are numerous Tier-1 and Tier-2 component suppliers in and around the Rosslyn area. Locally manufactured components are delivered to the OEMs and their Tier-1 suppliers from as far as Durban, but mostly from closer areas such as Brits, Babelegi, Ga-Rankuwa and within Rosslyn. Three Tier-1 suppliers from this group were targeted. These suppliers were specifically selected because of their involvement in the RASP feasibility study. Like the tenant group, the non-tenants were included in very detailed discussions with respect to the RASP's business case, proposed benefits and provided input into the logistics infrastructure design. The component suppliers in this group, despite of having a detailed view of the potential benefits, decided against locating into the RASP. Input from this group supported a balanced view of the impact of the RASP on the wider industry.

**LSP (19% of target group)**

Five companies offering a wide range of import, export and contract logistics services are tenants in the RASP. Two of the five companies were chosen because of their involvement in the RASP feasibility study. As with the tenant and non-tenant group, the selected LSPs were also included in very detailed discussions with respect to the RASP's business case and, proposed benefits, and they provided input into the logistics infrastructure design. Input from this group gave additional perspective on the impact of the RASP on how the LSPs offered support to the wider supplier park concept.

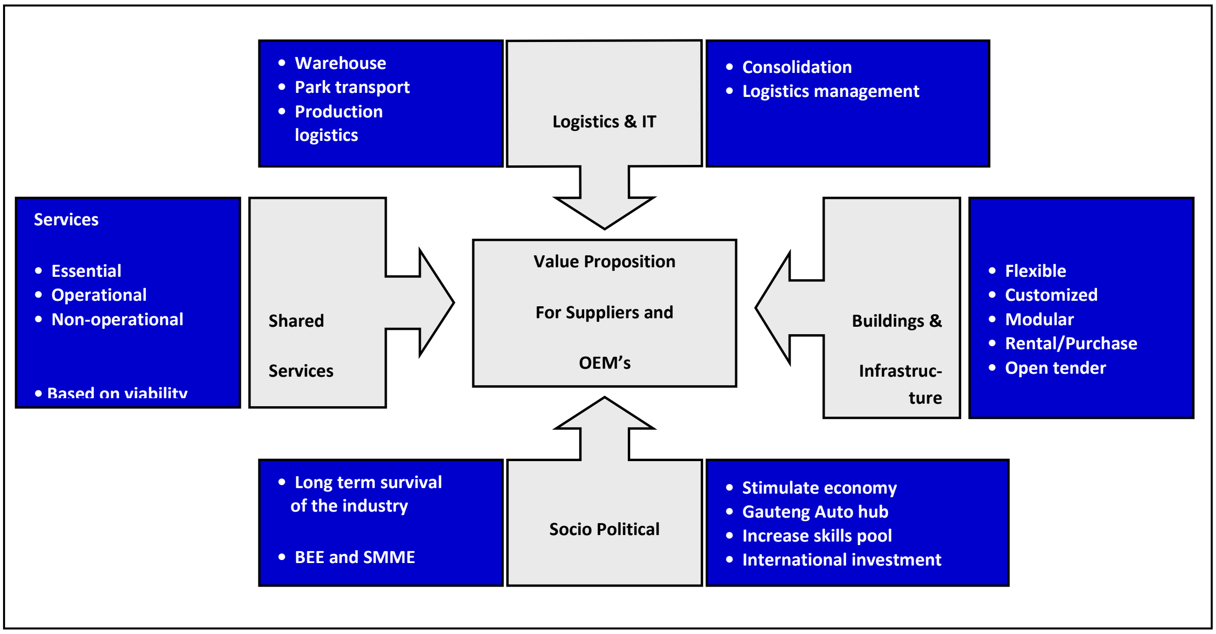
**SMEs (19% of target group)**

Various SMEs were involved in the RASP feasibility study. The selected group of SMEs were, however, also involved in the design, implementation and management of the RASP.

## 6.5 Data Analysis, Interpretation and Findings

As discussed at length in previous chapters, the Automotive Supplier Park Value Proposition is grounded on four focus areas – Logistics & IT, Buildings and Infrastructure, Shared Services, and Socio Political factors (as depicted in Figure 6.3).

Figure 6.3 – The Rosslyn Automotive Supplier Park value proposition




Source: 2003 Unpublished Blue Paper; Annual reports; Industry presentations.

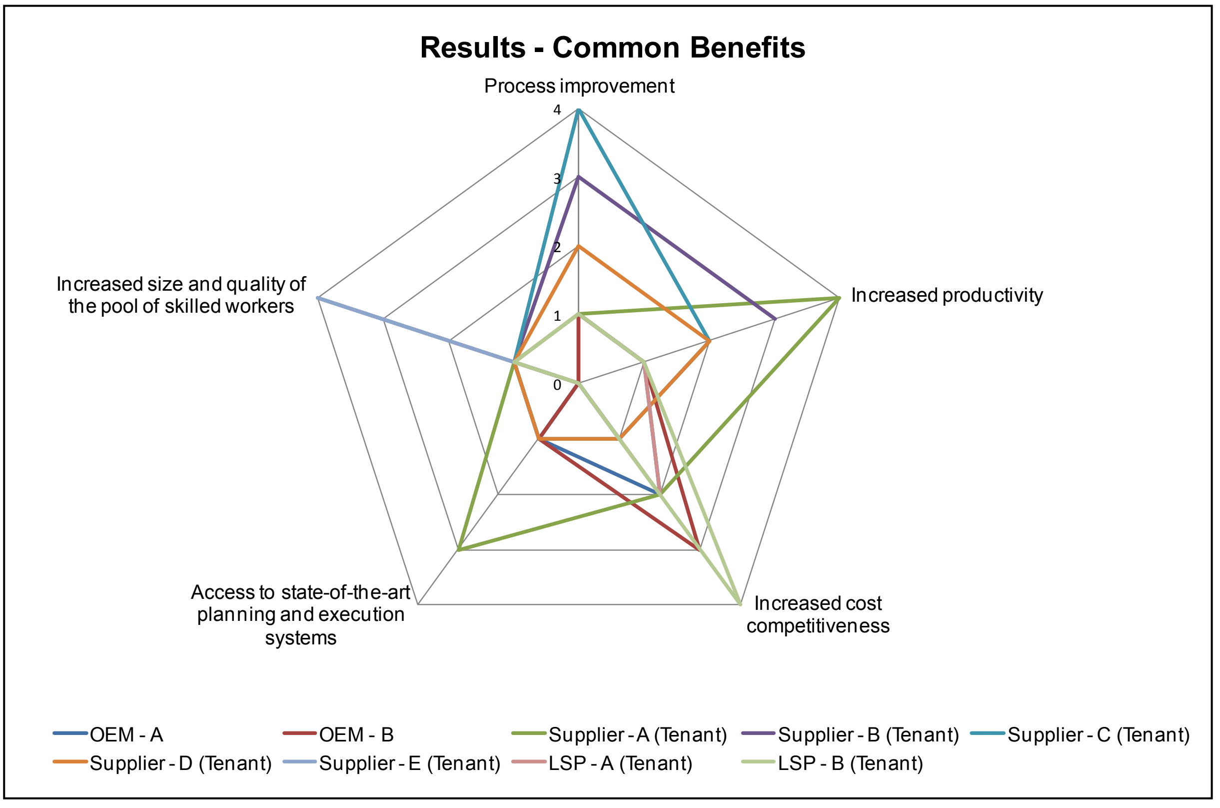
The objective of interpreting the data and information collected from the semi-structured interviews, was twofold – to identify outliers within specific groups (discussed in the remainder of this sections) and to identify commonalities by comparing the feedback between specific groups (discussed in the section entitled – Findings and Summary).

To support the interpretation of the results a brief introduction to each of the companies' core business activities are tabled in Table 6.2. The aim is to provide a clearer understanding of the selected companies and their relation to each other and the RASP.

### 6.5.1 Results – Common Benefits

Common benefits, with reference to this study, can be described as those specific benefits applicable to all the respondents in the focus group. The identified common communicated benefits were limited to *process improvement*, *increased productivity*, *increased cost competitiveness*, *access to state-of-the-art planning and execution systems*, and an *increased size and quality of the pool of skilled workers* (Figure 6.4). Testing for the realisation of common benefits provided the necessary basis for identifying outliers and commonalities between industries *(Questionnaire reference: Section A, Questions 1 to 3).* It is worth noting that the realisation of these benefits was only tested with the OEMs and RASP tenants (i.e. Suppliers and LSPs).

Figure 6.4 – Results – Common benefits




Source: Compiled from data collected through semi-structured interviews

Key: 1 = to no extent, 2 = to a lesser extent, 3 = to a moderate extent, 4 = to a large extent; *Refer to Appendix 6E for detailed scoring*

**Process improvements**

There were varied responses to the question of whether clear process improvements could be attributed to the company's location in the RASP. Three suppliers confirmed increased process improvement which was mainly attributed to the RASP's ability to provide them with custom factory designs supporting optimised production layouts (At least two suppliers were previously located in leased factories with non-ideal layouts in Rosslyn and the surrounding areas). OEMs and LSPs on the other hand expressed little to no process improvement benefits. This indicates a 'siloed' focus on process improvement for specific members of the value chain and prevents the unlocking of benefits across the value chain. This occurs when, process improvement benefits within an organisation do not extend beyond that organisation to other members in the value chain. This view was also supported by comments from industry SMEs who commented that it is not necessary for everyone to have their own separate facility as this leads to suboptimal flows and limited cost and efficiency benefits, and that it's very difficult to change current processes if you simply copy and paste a facility from a previous facility into the RASP. The SMEs noted that a possible option to change this approach would be to persuade suppliers, through robust business cases, to support the concept of shared facilities and for the OEMs to increase their focus on lean production.

**Increased productivity**

The question of whether the respondents experienced increased productivity from being located in or dealing with companies located in the RASP, also produced differing responses. All the OEMs and LSPs expressed very little improvement. Suppliers on the other hand (more specifically Supplier - A) expressed more noticeable improvements in productivity. In the case of Supplier - A, these increases were, however, not attributed to process improvements as would be expected, but rather to improved working conditions which had a positive impact on employee morale. Supplier - A relocated from a sub-standard facility in Ga-Rankuwa to a new custom built facility in the RASP which had a significant positive impact on the image of the company to their customers, peers and contributed to positive employee morale. Supporting this view are findings published in a 2010 economic impact assessment of the RASP. The report states that being a tenant at the RASP '…has not resulted in any significant changes in the speed of production for most tenants'

(KPMG, 2010: 36). The report also states that '…more than 60% of ASP [RASP] tenants, which responded to the survey, revealed that productivity remained relatively the same since being located in the ASP [RASP]' (KPMG, 2010: 36).

**Increased cost competitiveness**

Again, there were varied responses to the question of whether the RASP facilitated increased cost competitiveness among the stakeholders involved. OEMs expressed marginal increases and LSPs expressed noticeable increases in cost competitiveness. In the case of the OEMs this could be an indication that they experienced benefits from having some of their suppliers in closer proximity. OEM - B expressed a more noticeable increase than OEM - A. One interpretation could be that OEMs with less sophisticated manufacturing processes gain more cost benefit from having suppliers in the RASP due to improvements in efficiencies already prevalent in more sophisticated manufacturing processes. Feedback from SME - A however indicates that the response to this question should be read in the context of the difficulty of comparing part prices before the relocation with part prices after the relocation. This was due in part to the introduction of a new product by OEM - A at the time when many of the relocations took place.

In the case of the LSPs, preferential rental agreements (limited to two years) were considered more favourable inside the park than outside. This made the LSPs in the park more competitive when competing for new business opportunities in the area than LSPs outside the park. LSP - B for instance was able to utilise their warehouse facility in the park for the consolidation and distribution of OEM parts and accessories (P&A) rather than investing in a facility more ideally located in the Midrand area. Their approach being to rather spend more on transportation than warehousing, but still benefiting from a total logistics cost perspective.

Three of the four suppliers rated cost competitiveness as low. They attributed this to the fact that rental agreements in the supplier park are significantly higher than outside the park due to the higher quality of infrastructure. This raises the question whether the increases in process improvement and its potential positive impact on the related costs, compensates for the increased rental costs. It must be noted that Supplier - A observed a noticeable increase in cost competitiveness due to economies of scale from the consolidation of production facilities in Johannesburg and Ga-Rankuwa.

**Access to state-of-the-art planning and execution systems**

With regard to access to state-of-the-art planning and execution systems it is clear that there are limited benefits from the RASP’s ICT facilities, with only Supplier - A expressing a moderate benefit. This is unfortunate as according to SME - A, the access to state-of-the-art planning and executions systems (also referred to as ICT systems) was, along with logistical synergies, a major selling point of the concept to potential tenants. This sentiment was supported by SME - C who commented that many business cases revolved around the synergies gained through shared logistics and IT infrastructure, and in many instances, this was also sold to the parent companies that subsequently supported the proposed business case.

**An increased size and quality of available labour force**

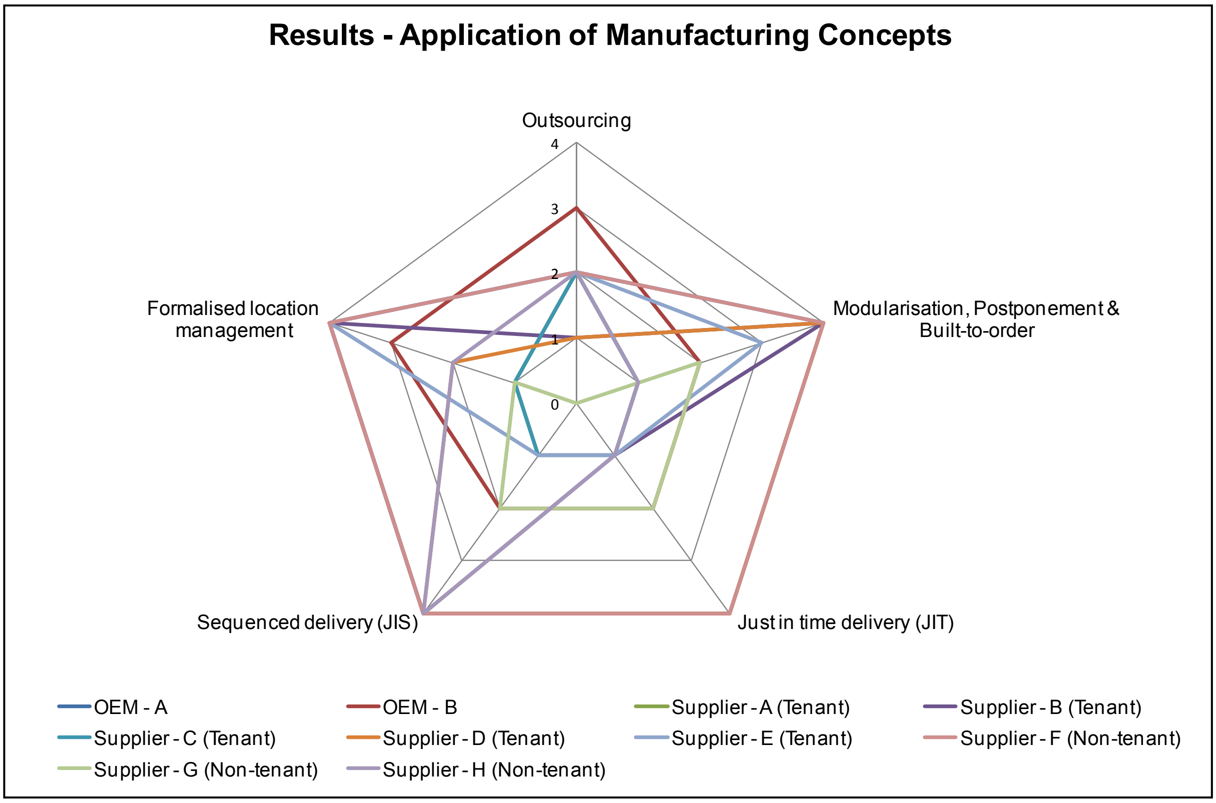
Yet again, varied responses were received to the question of whether the RASP has led to an increase in the size and quality of the available labour force. Only Supplier - E indicated benefiting from having access to a sizeable and quality labour force. Notable is that Supplier - E is the only tenant in the target group who did not use the RASP to either replace or combine previous production facilities, and only manufacture for the export market. In the open ended questions the representative of Supplier - E expressed the benefit of having access to, for example skilled welders, as a significant benefit in supporting a speedy start-up with minimal exposure to learning curve related challenges and thus supporting the increased return-on-investment (ROI).

Considering the responses to the questions on common benefits, it can be concluded that it is mainly the suppliers who have benefited from their location within the RASP. It is important to note that none of these benefits can be attributed to synergies with respect to logistics and/or IT systems. So, it can thus far be argued that the common benefits tested would have been attainable were the suppliers located in any industrial park and not specifically the RASP.

### 6.5.2 Results – Application of Manufacturing Concepts

There were mixed results from OEMs and their Suppliers on the application of specific manufacturing concepts such as outsourcing, modularisation, JIT, JIS and formalised location management *(Questionnaire reference: Section B, Question 3; Section C, Question 16; Section D, Question 16)* (Figure 6.5). It is worth noting that the application of these concepts was only tested with the OEMs, the tenant suppliers and non-tenant suppliers.

Figure 6.5 – Results – Application of manufacturing concepts




Source: Compiled from data collected through semi-structured interviews

Key: 0 = N/A,1 = to no extent, 2 = to a lesser extent, 3 = to a moderate extent, 4 = to a large extent; *Refer to Appendix 6F for detailed scoring*

OEM – A, to a large extent, subscribes to the manufacturing concepts mentioned above and it also forms the basis for their day-to-day manufacturing approach. The results indicate the strategy is the promotion of lean manufacturing principles with the main aim being to minimise inventory levels while maintaining or increasing the availability of the correct items in order to avoid manufacturing disruption. This is not surprising considering their adopted business model which allows the customer to choose from a host of available cost options to personalise their vehicle, and the associated level of manufacturing flexibility it demands.

OEM - B does not demand the same level of sophistication from its suppliers, and relies on properly maintained inventories to accomplish the required levels of availability. This, however, exposes them to greater inventory holding cost. Their approach supports their business model where the personalisation of vehicles is limited in many cases to vehicle colour.

Results from the suppliers showed a greater disparity in the application of these concepts.

In many instances the demand for the establishment of a supplier park is underpinned by the demand for the application of these manufacturing principles within the manufacturing value chain (see Chapter 4), due to the focus on minimising component inventory and the mitigation of risk due to expensive interruptions in parts flow disrupting the assembly process.

What is noteworthy is that both suppliers within the park (Supplier - B and Supplier - D) and outside the park (Supplier - F) subscribe to these manufacturing principles. In the case of Supplier - B and Supplier - D sequencing of parts is completed at the supplier’s manufacturing facility, and the parts are then transported just in sequence to the production line for fitment (i.e. just-in-sequence delivery). In the case of Supplier - F sequencing is completed in a dedicated sequencing area close to the OEM production line based on the production schedule and production call-off. The concept remains similar, but the application is different, and in both instances the practice clearly supports the supplier’s customer service strategy and approach.

In the case of Supplier - B and Supplier - D, it is clear that the OEMs are utilising the RASP as an extension of their own assembly facilities. This supports the business case for the development of a concept such as the RASP when considering the potential synergies. The reality however, is that the potential logistical cost and efficiency benefits (especially transport savings) are inhibited by the fact that no integrated transport practices (such as milk runs) are being applied (as confirmed by LSP - B and SME - C). Also, according to findings published in KPMG report (as mentioned earlier) there haven't been any significant changes in the speed of production for most tenants. This, together with the fact that suppliers are contractually bound to a specific service level irrespective of their physical location (as commented by SME - C), supports the argument that being located inside the RASP doesn't pose a significant logistical or efficiency benefit to the supplier within the RASP when compared with the supplier outside the RASP.

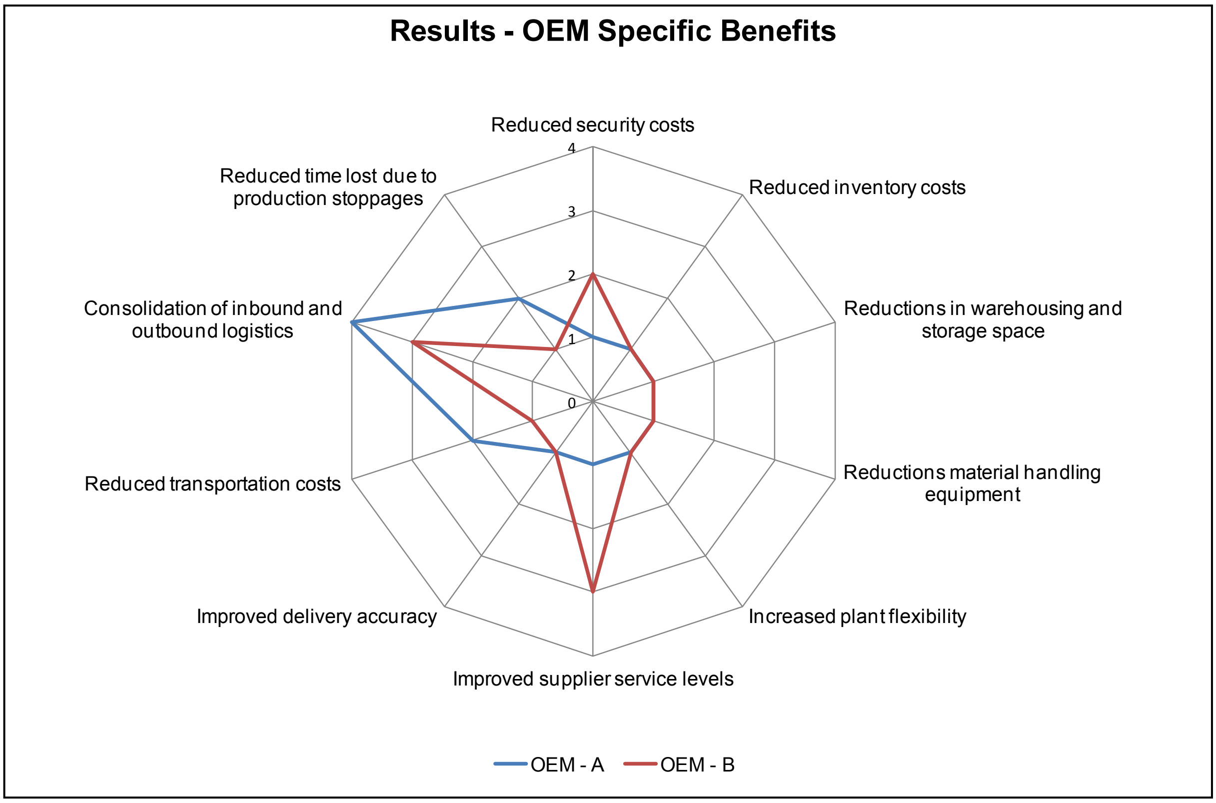
Considering the above, it can be concluded that although certain supplier park supporting principles are being applied there is a significant lack of drive to unlock real supply chain value through the implementation of others. Noteworthy is the fact that the KPMG report states '[pursuing of] Logistics network transport opportunities' is a low priority activity for the way forward based on the feedback from tenants (KPMG, 2010: 62).

### 6.5.3 Results – OEM Specific Benefits

The RASP was designed to function as a Multi-OEM-Multi-Supplier supplier park with a focus of moving value adding activities back up the supply chain. Part of the RASP value proposition focuses on the OEM specific benefits for supporting and promoting the RASP *(Questionnaire reference: Section B).* Figure 6.6 depicts how the realisation of these benefits is perceived by the OEMs.

Both OEMs confirmed that supporting the RASP had not yielded the expected reductions in inventory costs, warehousing costs and space, material handling equipment and increases in plant flexibility. Interestingly enough, OEM - A clearly stated that in their case, plant flexibility due to suppliers being in closer proximity is irrelevant, as their service level demands on suppliers are not influenced by the supplier's location. The responsibility thus lies with the supplier to evaluate and select the most beneficial location in which to establish themselves or relocate to, in order to best manage their costs and provide the service the OEM demands. A supplier park adjacent to the OEM assembly facility with dedicated off-take however enables the OEM to drive their specific efficiency and cost saving strategies. OEM A , a dominant force within the value chain, highlighted that the ideal situation is to have suppliers on-site.

Figure 6.6 – Results – OEM specific benefits




Source: Compiled from data collected through semi-structured interviews

Key: 0 = N/A, 1 = to no extent, 2 = to a lesser extent, 3 = to a moderate extent, 4 = to a large extent; *Refer to Appendix 6G for detailed scoring*

Being a Multi-OEM-Multi-Supplier supplier park, without the dedicated drive and support of a single OEM, no OEM can dictate the location of their suppliers. This marginalises the potential benefit attainable by the OEM. In the case of the RASP, the implementation of the concept did not depend on the financial investment of a particular OEM. The RASP is a Blue IQ initiative, with government not only bearing the macro- and micro economic risk, but also benefiting from the macro- and micro economic successes. These are, amongst others, contributions to GDP growth, job creations and the tax base. It can be argued that the political drive to establish the RASP was greater than the commercial drive (as commented by SME - C). This argument is supported when assessing the 2008 SPDC Annual Report (2008: 13-16) which largely focuses on the macro-and micro economic successes with no mention of contribution to the cost savings and efficiency improvements of its tenants and the automotive industry as a whole. SME - C commented that the SPDC only needs to prove that they used the tax payer's money responsibly and that there is a limited need for them to show profit. This also highlights the fact that the specific driving force is not really to benefit the automotive industry. This is even further exacerbated by the fact that there is an inherent '…lack of an integrated relationship in the SA Auto industry' according to SME - C.

It was observed that there are discrepancies in the OEMs responses to whether or not they have experienced improved supplier service levels. OEM - A responded to the question that they have not experienced improvements to service levels. OEM - B on the other hand expressed a moderate improvement in supplier service levels. As was the case with the business principles described in the previous section, this could be related to the demands in supplier performance being different for OEM - A and OEM - B. In order to gain additional insights into this discrepancy, it is advised that a more comprehensive quantitative evaluation is undertaken in future research projects.

A specific benefit highlighted by OEM - A, is the convenient location of the MSC container depot (approx. 5km away) in comparison to the Pretcon container depot (approx. 20km away). It makes for effortless scheduling of inbound and outbound containers as well as reduced container turn-in and handling fees.

A final noteworthy comment from OEM - A, was that their purchasing department never supported the relocation of any of the Brits suppliers into the RASP due to the negative economic impact this would have on the Brits region.

It can be concluded that although the expected reduction in various logistics costs and increase in plant flexibility have not materialised, other benefits such as some service level improvements and greater convenience in other areas did make their support of the RASP of value. What is of concern is the comment from one of the SMEs addressing a lack of integrated relationships with the South African automotive industry. This combined with political intention to benefit certain regions, will ultimately be to the detriment of the South African automotive industry as a whole.

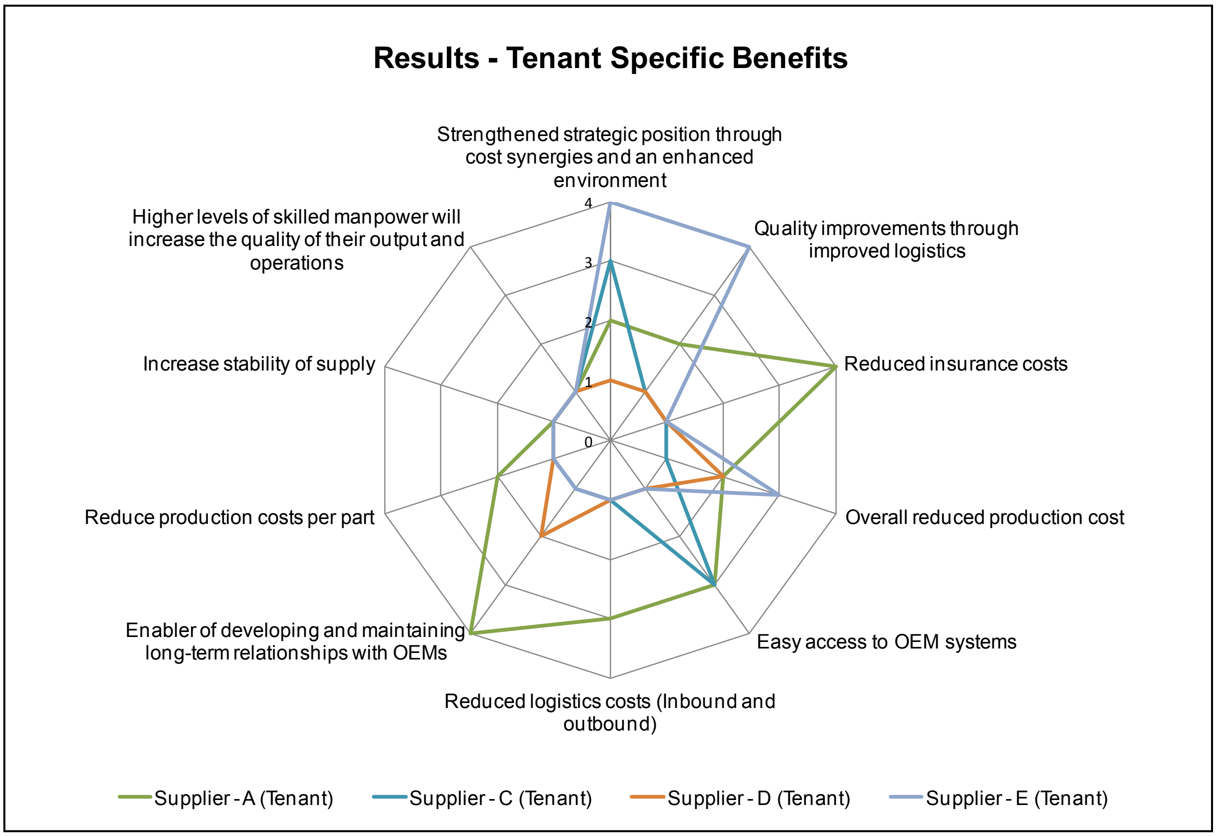
### 6.5.4 Results – Tenant Specific Benefits

The RASP value proposition for suppliers and OEMs (as depicted in Figure 6.3) shows the focus areas of Logistics & IT, Buildings & Infrastructure, Socio Political, and Shared Services. Complementing this, according to the KPMG report, the decision made by a supplier to become a tenant of the RASP, would be based on factors such as the RASP being in close proximity to the OEMs, improved networking opportunities and its ICT services (KPMG, 2010: 3).

The potential benefits for suppliers (Figure 6.7) follow these focus areas *(Questionnaire reference: Section C)*.

The results from Suppliers - C, - D & - E are very similar with representatives from all three companies highlighting limited benefist experienced with regard to reduced logistics costs, reduced production cost, increased stability of supply, access to higher levels of skilled manpower, and reduced insurance cost. It is clear that from an operational cost and productivity perspective four of the five suppliers interviewed expressed benefits to a lesser or no extent. Again, this corresponds with the findings from the KMPG report highlighted earlier with regard to the conclusion that there was no positive impact on production efficiency. Even more noteworthy is that, again according to the findings in the KPMG report, '…the general feeling among many tenants was that they do not benefit from the logistics of the design or cost of operating from within the RASP. However, in terms of the positioning of the RASP, most tenants felt that significant benefits were seen through the convenience of being situated in close proximity to their customers and suppliers as well as having access to main roads and railway lines, also situated in close proximity of the RASP.'

Figure 6.7 – Results – tenant specific benefits




Source: Compiled from data collected through semi-structured interviews

Key: 0 = N/A, 1 = to no extent, 2 = to a lesser extent, 3 = to a moderate extent, 4 = to a large extent; *Refer to Appendix 6H for detailed scoring*

There are, however, exceptions, because when considering the outliers, it is noteworthy that Supplier - A expressed a reduction in operational costs, and that the RASP is considered to be, to a large extent, an enabler of developing and maintaining long-term relationships with OEMs. Supplier - A was the only supplier interviewed who expressed a benefit with regard to reduced insurance costs, logistics costs, and production costs per part. This can most likely be attributed to the fact that Supplier - A consolidated two production facilities situated in Ga-Rankuwa and Johannesburg into a single facility in the RASP.

Also an outlier worth noting is that Supplier - E confirmed the benefits of a strengthened strategic position through cost synergies and an enhanced environment, as well as quality improvements through improved logistics. Due to

Supplier - B negating to comment on the specific benefits its feedback could not be included in the overall data assessment.

Comments from SME - C with regard to increased productivity as a associated with a reduction in absenteeism was confirmed by both Supplier - A and Supplier - D with the latter highlighting a reduction from an absenteeism rate of five percent to zero percent.

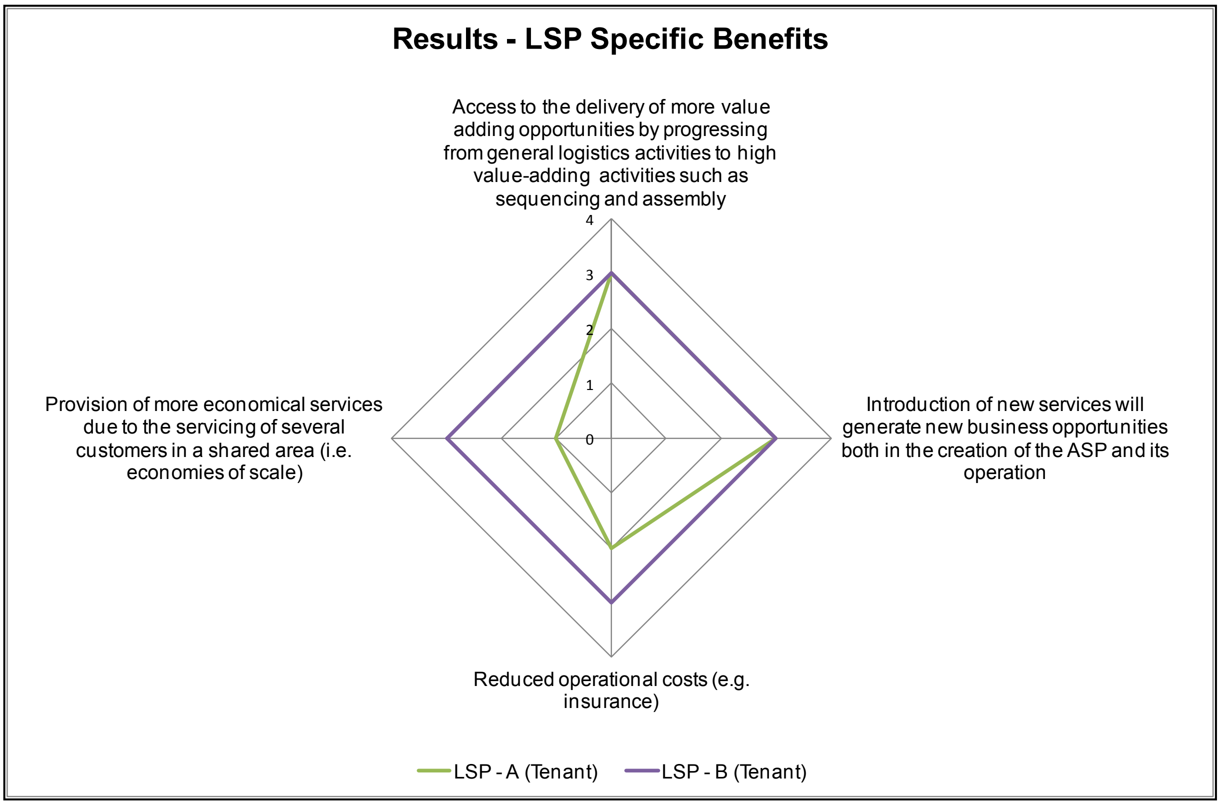
Considering that one of the key pillars for the business case of the RASP concept to its tenants was the minimisation of logistic costs and improving logistic efficiencies, in isolation this might indicate that the RASP did not fulfil its mandate. There were however exceptions with some tenants expressing a marginal reduction in operational costs, support in terms of developing and maintaining long-term relationships, a strengthened strategic position through cost synergies and an enhanced environment, which resulted in productivity improvements associated with a reduction in absenteeism. Taking this into account, overall, tenants were satisfied with their decision to locate into the RASP.

### 6.5.5 Results – LSP Specific Benefits

Both LSP - A and - B expressed their support for the benefit of having access to the delivery of more value adding opportunities, as well as the introduction of new services through which new business opportunities can be created *(Questionnaire reference: Section E)*(Figure 6.8), with LSP - B indicated that they have experienced reduced operational costs by being located in the RASP. It is however important to note that unlike LSP - A, LSP - B further experienced benefits related to economies of scale such as the provision of more economical services due to the servicing of several customers in a shared area such as the RASP.

Both LSP - A and LSP - B had similar remarks with regard to the initial benefits case, (the grounds for their involvement in the RASP) never materialising. Feedback from LSP - A clearly highlighted them never achieving the original objective of combining inbound and outbound cargo volumes to and from the RASP to support the various business cases. This notion was also confirmed by the representative of LSP - B who noted that ‘The original concept was never followed’ and ‘We had to make the business case work for ourselves'. LSP - A went even further to state that other than having a strategic benefit through being in close proximity to current and prospective clients, they have gained business opportunities by diverting from the original scope of work and that they have not experienced any image or rental benefit. LSP - A concluded that the preferred supplier status bestowed on them didn't provide them with the necessary exclusivity of service to realise the cost saving potential.

Figure 6.8 – Results – LSP specific benefits




Source: Compiled from data collected through semi-structured interviews

Key: 0 = N/A, 1 = to no extent, 2 = to a lesser extent, 3 = to a moderate extent, 4 = to a large extent; *Refer to Appendix 6I for detailed scoring*

Based on the above it can be concluded that, although both LSPs continue to support the RASP in spite of the limited benefit materialising from the initial business case, they had to search beyond the initial scope for opportunities to gain a greater benefit from their involvement in the RASP.

## 6.6 Summary

This study follows a qualitative dominant mixed method approach to gather, analyse and interpret the collected data. It's an approach that is based on strategies of inquiry that utilise collecting data either simultaneously or sequentially to gain the best understand of the research problems. The primary objective of this study is to assess the performance of the Rosslyn Automotive Supplier Park concept in terms of the realisation of the value proposition as communicated to the various stakeholders, from a supply chain perspective.

Considering the above and with regard to this study, a concurrent transformative strategy was also followed. Key characteristics of this strategy are: (a) the researcher's use of theory to guide the approach, (b) both qualitative and quantitative data are collected at the same time through the use of both open-ended questions and a quantifiable instrument in the same questionnaire, (c) there may be both an equal or unequal priority to the data types, and (d) integration occurs during the analysis and potentially also the interpretation phases.

In support of managing the potential ethical challenges, a clear nine step research process consisting of three distinct phases, was followed.

A pre-interview phase was undertaken consisting of (1) confirming the RASP objectives, (2) reviewing literature on supplier park related topics, (3) indentifying the target group, (4) compiling the interview questionnaire, (5) scheduling the interviews with the specifically targeted individuals representing the four stakeholder groups, and (6) distributing the study material in preparation for the interviews.

The interview phase consisted of completing the various (7) interviews and collecting the required qualitative and quantitative data.
The post-interview phase focused on the (8) analysis and interpretation of the collected data and (9) compiling the findings.

Primary information was collected during semi-structured interviews with specific representatives of the various Rosslyn Automotive Supplier Park (RASP) stakeholder groups. The quantitative and qualitative data was then linked to identify, select and compare outliers, and has three main drivers. Firstly, it enables confirmation of data through triangulation. Secondly it provides a fresh insight through new lines of thinking, and thirdly it provides richer detail through elaborate analysis. So, in an attempt to know more about the identified research problem, the open-ended questions were complemented by questions with quantifiable results.

The identified stakeholders included among others, representatives of original equipment manufacturers (OEMs), suppliers, and logistic service providers (LSPs). The semi-structured interview process is linked to the expectation that the interviewed subjects' viewpoints are more likely to be expressed in a relatively open design interview situation than in a standardised interview or a questionnaire. It is imperative to note that a random sample would not have elicited useful responses from participants, given the nature of the formulated problem and the units of analysis being of a very limited and specialised nature.

The researcher's involvement in the feasibility study, initial concept design, and to a lesser extent, the implementation of the RASP, as well as his exposure to the subject matter and related industry contacts, allowed him to perform a careful stakeholder identification and selection process. The researcher is currently not involved in the RASP so an objective approach to the study has been maintained.

In order to present truthful and unbiased findings, it is of the essence to also highlight the reliance, limitations and enhancement opportunities of the study. Two pivotal reliance points and related mitigating actions were highlighted – (1) the documented unpublished blue paper and (2) the integrity and professionalism of the target group. Highlighted study limitations were firstly the relatively small target group from which data was collected although this was necessary as increasing the target group would have had a negative effect on the data quality. Using a larger group would have required the inclusion of individuals not familiar with the RASP concept and its possible benefits Secondly the design of the study led to the exclusion of any socio political related benefits. Enhancements to the study could be (1) in the form of a broader evaluation of the financial benefits related to the RASP, and (2) by also including interviews with representatives from purchasing who could potentially give a balanced view of the actual financial benefits of having suppliers in the RASP from a sourcing and procurement perspective.

The RASP's value proposition is grounded on four focus areas – Logistics & IT, Buildings and Infrastructure, Shared Services, and Socio Political factors. This value proposition and accompanied general and stakeholder group specific benefits were tested with the target group.

The feedback from the target group revealed the following:

- There was a limited focus on process improvement for specific members of the value chain which prevents the unlocking of benefits across the value chain,
- Being a tenant at the RASP has not resulted in any significant changes in the speed of production for most tenants,
- The increases in process improvement and its potential positive impact on the related costs, does not necessarily compensate for the increased rental costs to put the tenants in a better competitive position overall,
- With regard to access to state-of-the-art planning and execution systems it is clear that there are limited benefits from the RASP's ICT facilities, with only one tenant expressing a moderate benefit,
- Although certain supplier park supporting principles are being applied there is a significant lack of drive to unlock real supply chain value through the implementation of others,
- OEM specific: Although the expected reduction in various logistics costs and the increase in plant flexibility have not materialised, other benefits such as some service level improvements and greater convenience in other areas did make the OEMs support of the RASP worthwhile, ,
- Tenants specific: Considering that one of the key pillars for the business case of the RASP concept to its tenants was the minimisation of logistic costs and improving logistic efficiencies, in isolation this might indicate that the RASP did not fulfil its mandate. There were however exceptions with some tenants expressing a marginal reduction in operational costs, support in terms of developing and maintaining long-term relationships, strengthened strategic

position through cost synergies and an enhanced environment, which resulted in productivity improvements associated with a reduction in absenteeism.

- LSP specific: Based on the above it can be concluded that, although both LSPs continue to support the RASP in spite of the limited benefit materialising from the initial business case, they had to search beyond the initial scope for opportunities to gain benefit from their involvement in the RASP

From the above it is clear that forming a conclusion of the success of the RASP in providing its tenants and the greater South African automotive industry with the necessary benefits, would not be a simple matter. In Chapter 7 the study is summarised and the necessary conclusions, based on the literature review and semi-structured interviews, are presented.

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# Appendix 6A – Research questionnaire

**Semi-structured Interview Questionnaire**

***All Stakeholders***

**Name:**

**Company:**

**Designation:**

**Voicetracer file no:**

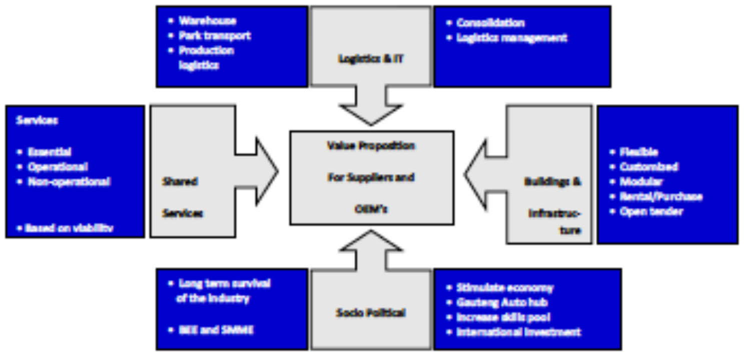
**Study Objective**

The primary objective of this study is to **assess the performance** of the Rosslyn Automotive Supplier Park (ASP) concept in terms of the **realisation of the value proposition** as communicated to the various stakeholders, from a **supply chain perspective**.

**ASP Critical Success Factors***

The critical success factors identified for the implementation of this concept were two fold. **One, from an investment point-of-view** the focus has to be on realising shareholder value through maximising space utilisation and generating critical mass. As is the case with any other business concept, the real value is measured by the return on investment to the shareholders. **Secondly, from an operational point-of-view** it was identified that the concept has to show financial benefit (i.e. logistics cost reduction through synergies), long term sustainability and expanding potential.

**ASP Value Proposition***






*Source: 2003 Unpublished Blue Paper; Annual reports; Industry presentations; www.supplierpark.co.za

**Questions**

**A. General**

1. Was your organisation involved in the initial concept feasibility study?

2. Do you and/or your organisation actively support and promote the ASP concept (i.e. in the case of OEMs, do you promote that your suppliers be located in the ASP, etc.)?

3. As part of its value proposition model, the ASP has a set of common benefits. To what extent have you benefited from the ASP in terms of:

   *(1 = to no extend, 2 = to a lesser extend, 3 = to a moderate extend, 4 = to a large extend)*

   a. Process improvement

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Explain:

b. Increased productivity

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Explain:

c. Increased cost competitiveness

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Explain:

d. Access to state-of-the-art planning and execution systems

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Explain:



e. Increased size and quality of the pool of skilled workers

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Explain:

## B. OEM

1. What specific potential benefits (based on the value proposition presented to you) attracted you to support the ASP?

2. As part of its value proposition model, the ASP has a set of 'OEM specific' benefits To what extent have you benefited from the ASP in terms of:

   a. Reduced security costs

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Explain:

   b. Reduced inventory costs

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Explain:

   c. Reductions in warehousing and storage space

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Explain:



   d. Reductions material handling equipment

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Explain:

   e. Increased plant flexibility

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Explain:

   f. Improved supplier service levels

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Explain:

   g. Improved delivery accuracy

g. Improved delivery accuracy

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Explain:

h. Reduced transportation costs

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Explain:

i. Consolidation of inbound and outbound logistics

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Explain:

j. Reduced time lost due to production stoppages

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Explain:



3. To what extent do you subscribe to the following principles, or require it from your suppliers / service providers who are in the park:

*(1 = to no extend, 2 = to a lesser extend, 3 = to a moderate extend, 4 = to a large extend)*

a. Outsourcing

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Details (e.g. UTi – Warehousing – In the ASP):

b. Modularisation, Postponement & Built-to-order

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Details (e.g. Venture – Bumper assemblies – Not in the ASP):

c. Just in time delivery

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Details (e.g. SAS – Cockpit – In the ASP):

d. Sequenced delivery (JIS)

| | | | |
|---|---|---|---|
| 1 | 2 | 3 | 4 |

Details (e.g. SAS – Cockpit – In the ASP):

e. Formalised location management

| | | | |
|---|---|---|---|
| 1 | 2 | 3 | 4 |

Details (e.g. dedicated team in Germany):

4. Any other general comments related to the ASP concept and the current workings of the Rosslyn ASP?

## C. Supplier (Tenant)

1. What products and/or services does your organisation provide?

2. Who are your major clients?

3. Where are the majority of your clients situated?

4. Since when have your organization been conducting business from the ASP?

5. Is your organization involved in similar set-ups in other parts of the world? If yes, where?

6. Where did you move from when you initially moved into the ASP?

7. What support (e.g. tax benefits, lease benefits, etc.) did you receive when moving into the ASP?

8. Did you develop a business case to support the decision making process?



9. What were the two main reasons for your organisation's decision to move into the ASP?

10. Was the decision made locally or internationally?

11. How integrated are you within your company's international supplier network (i.e. do you export locally manufactured components)?

12. Did the OEM influence your decision to move to the ASP?

13. What support have you received from the ASP (SPDC & AIDC) while located in the ASP?

14. What other potential benefits (over and above the two main drivers mentioned in question 9) will attract you to the ASP?

15. As part of its value proposition model, the ASP has a set of 'Supplier specific' benefits. To what extent have you benefited from the ASP in terms of:

    *(1 = to no extend, 2 = to a lesser extend, 3 = to a moderate extend, 4 = to a large extend)*

a. Strengthened strategic position through cost synergies and an enhanced environment

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Explain:

b. Quality improvements through improved logistics

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Explain:

c. Reduced insurance costs

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Explain:

d. Overall reduced production cost

| 1 | 2 | 3 | 4 |
|---|---|---|---|



Explain:

e. Easy access to OEM systems

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Explain:

f. Reduced logistics costs (inbound and outbound)

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Explain:

g. Enabler of developing and maintaining long-term relationships with OEMs

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Explain:

h. Reduce production costs per part

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Explain:

i. Increase stability of supply

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Explain:

j. Higher levels of skilled manpower will increase the quality of their output and operations

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Explain:

16. To what extent do you subscribe to, or require from your supplier / service provider the following principles:

*(1 = to no extend, 2 = to a lesser extend, 3 = to a moderate extend, 4 = to a large extend)*

a. Outsourcing



| 1 | 2 | 3 | 4 |
|---|---|---|---|

Details:

b. Modularisation, Postponement & Built-to-order

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Details:

c. Just in time delivery

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Details:

d. Sequenced delivery (JIS)

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Details:

e. Formalised location management

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Details:

17. Any other general comments related to the ASP concept and the current workings of the Rosslyn ASP?

18. Considering what you have learned from your experience, would you have made the same decision to move into the park?



**D. Supplier (NON-tenant)**

1. What products and/or services does your organisation provide?

2. Who are your major clients?

3. Where are the majority of your clients situated?

4. Was your organisation involved in the initial ASP concept feasibility study?

5. Was moving into the ASP a consideration for your organisation?

6. What were the main reasons for your organisation's decision not to move into the ASP?

7. Is your organization involved in similar set-ups in other parts of the world? If yes, where?

8. From which location do you currently supply your Gauteng client base? Since when have you been situated in this location?

9. Will you consider re-locating to the ASP at any point in the near future?

10. If so, will you need to develop a business case to support the decision making process?

11. Considering the business case, what will be the two main drivers for your decision to relocate (e.g. reduced logistics costs, strategic benefit, social benefit, etc.)?

12. Will such a decision be made locally or internationally?

13. How integrated are you within your company's international network (i.e. do you export locally manufactured components)?

14. Will the OEM influence your decision to move to the ASP?

15. What other potential benefits (over and above the two main drivers mentioned in question 11) will attract you to the ASP?



16. To what extent do you subscribe to, or require from your supplier / service provider the following principles:

*(1 = to no extend, 2 = to a lesser extend, 3 = to a moderate extend, 4 = to a large extend)*

f. Outsourcing

| | | | |
|---|---|---|---|
| 1 | 2 | 3 | 4 |

Details:

g. Modularisation, Postponement & Built-to-order

| | | | |
|---|---|---|---|
| 1 | 2 | 3 | 4 |

Details:

h. Just in time delivery

| | | | |
|---|---|---|---|
| 1 | 2 | 3 | 4 |

Details:

i. Sequenced delivery (JIS)

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Details:

j. Formalised location management

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Details:

17. Any other general comments related to the ASP concept and the current workings of the ASP?

18. Considering what you have learned from your experience, would you have made the same decision to NOT move into the ASP?



**E. LSP**

1. What services does your organisation provide in the ASP?

2. Was your organisation involved in the initial concept feasibility study?

3. Since when have your organization been conducting business from the ASP?

4. Why did your organisation consider moving into the ASP?

5. Where did you move from when you initially moved into the ASP?

6. What support (e.g. tax benefits, lease benefits, etc.) did you receive when moving into the ASP?

7. Is your organization involved in similar set-ups in other parts of the world? If yes, where?

8. Did you develop a business case to support the decision making process?

9. Considering the business case, what was the two main drivers for your decision to move into the ASP (e.g. reduced logistics costs, strategic benefit, social benefit, etc.)?

10. Was the decision made locally or internationally?

11. What business factors influenced your decision to move to the ASP?

12. What other potential benefits (over and above the two main drivers mentioned in question 9) have attracted you to the ASP?

13. Have the locality of the ASP benefited you?

14. What support have you received from the ASP (SPDC & AIDC) while located in the ASP?

15. As part of its value proposition model, the ASP has a set of 'LSP specific' benefits. To what extent have you benefited from the ASP in terms of:



*(1 = to no extend, 2 = to a lesser extend, 3 = to a moderate extend, 4 = to a large extend)*

a. Access to the delivery of more value adding opportunities by progressing from general logistics activities to high value-adding activities such as sequencing and assembly

| | | | |
|---|---|---|---|
| 1 | 2 | 3 | 4 |

Explain:

b. Introduction of new services will generate new business opportunities both in the creation of the ASP and its operation

| | | | |
|---|---|---|---|
| 1 | 2 | 3 | 4 |

Explain:

c. Reduced operational costs (e.g. insurance)

| | | | |
|---|---|---|---|
| 1 | 2 | 3 | 4 |

Explain:

d. Provision of more economical services due to the servicing of several customers in a shared area (i.e. economies of scale)

| 1 | 2 | 3 | 4 |
|---|---|---|---|

Explain:

16. Any other general comments related to the ASP concept and the current workings of the Rosslyn ASP?

17. Considering what you have learned from your experience, would you have made the same decision to move into the park?



**F. SPDC / AIDC**

1. What was the initial aim of the ASP for each of the stakeholder groups (i.e. investors, OEMs, tenants and LSPs)?

2. What makes the ASP unique to South Africa?

3. What potential benefits were communicated to each of the stakeholder groups?

4. Who are your major investors?

5. As part of its value proposition model, the benefits of the ASP to the investors are the sustainable profits from their investments. Has the ASP attained this objective?

6. What definite benefits have been obtained by each of the stakeholder groups?

7. As part of its value proposition model, the benefits of the ASP to the greater automotive industry is to assist in retaining and building new business opportunities in the South African automotive business so sustaining the automotive industry, which in turn will support the South African. Has the ASP attained this objective?

Appendix 6B – Electronic mail message to identified research participants

Dear Sir,

Thank you very much for agreeing to spend a couple of minutes with me with regards to the above subject. Your input will be utilised to achieve the primary objective of this study, which is:

> '…to **assess the performance** of the Rosslyn Automotive Supplier Park concept in terms of the **realisation of the value proposition** as communicated to the various stakeholders, from a **supply chain perspective**'.

Further to our discussion earlier today and in preparation for our session scheduled for 14:00 on 20 May, please find attached an introduction to the study and the proposed questionnaire.

Kind regards,
Anton Nieuwoudt

Appendix 6C – Represented companies of the target group plotted against the described criteria

| Company | Demonstrated understanding of subject matter | Involvement in the RASP feasibility study, design and/or implementation | Current senior managerial level involvement at the target group company | Previous managerial involvement at the RASP |
|---|---|---|---|---|
| OEM – A | ● | ● | ● | |
| OEM – B | ● | | ● | |
| Supplier – A | ● | ● | ● | |
| Supplier – B | ● | ● | ● | |
| Supplier – C | ● | | ● | |
| Supplier – D | ● | | ● | |
| Supplier – E | ● | | ● | |
| Supplier – F | ● | ● | ● | |
| Supplier – G | ● | ● | ● | |
| Supplier – H | ● | ● | ● | |
| LSP – A | ● | ● | ● | |
| LSP – B | ● | ● | ● | |
| SME – A | ● | ● | ● | ● |
| SME – B | ● | ● | ● | ● |
| SME – C | ● | ● | ● | ● |

Appendix 6D – Detail of target group

| Company / Stakeholder | Relation to the RASP | Level of Representative | Location | Core Business in South Africa |
|---|---|---|---|---|
| OEM – A | Original equipment manufacturer | Senior Management | Rosslyn | Assembler of passenger vehicles for the local and international markets |
| OEM – B | Original equipment manufacturer | Senior Management | Rosslyn | Assembler of light commercial vehicles for local and international markets |
| Supplier – A | Tenant: Tier-1 automotive supplier | Executive | RASP | A privately owned South African company, specialising in manufacturing and exporting exclusive automotive leather interior trim components to the middle and luxury automotive sectors |
| Supplier – B | Tenant: Tier-1 automotive supplier | Senior Management | RASP | A leading supplier of automotive seating and electrical power management systems |
| Supplier – C | Tenant: Tier-1 automotive supplier | Senior Management | RASP | A joint venture between manufacturing products and systems centred around automotive acoustics and thermal management |

| Company / Stakeholder | Relation to the RASP | Level of Representative | Location | Core Business in South Africa |
|---|---|---|---|---|
| Supplier – D | Tenant: Tier-1 automotive supplier | Senior Management | RASP | A joint venture manufacturing and supplying complete front end and cockpit modules to OEM – A |
| Supplier – E | Tenant: Tier-1 automotive supplier | Senior Management | RASP | Manufacturing and export of complete muffler systems to the heavy commercial vehicle market |
| Supplier – F | Non-tenant: Tier-1 automotive supplier | Executive | Brits | Manufacturer and supplier of plastic fuel tanks to various OEMs in Rosslyn, Durban, Uitenhage and Port Elizabeth. |
| Supplier – G | Non-tenant: Tier-1 automotive supplier | Executive | Durban | Manufacturer and supplier to OEM and aftermarket of automotive air-conditioning and engine cooling components and systems |
| Supplier – H | Non-tenant: Tier-1 automotive supplier | Senior Management | Rosslyn | Manufacturer and supplier of integrated plastic systems for local OEMs and export markets |
| LSP – A | Tenant: Logistic Service Provider | Executive | RASP | A leading provider of integrated logistic services |

| Company / Stakeholder | Relation to the RASP | Level of Representative | Location | Core Business in South Africa |
|---|---|---|---|---|
| LSP – B | Tenant: Logistic Service Provider | Senior Management | RASP | A company offering a wide range of global integrated logistics to a customer base that stretches worldwide |
| SME – C | Supplier Park Development Company (SPDC) | Former Senior Management | RASP | Supplier Park Development Company (Pty) Ltd manages the RASP and operates as a commercial entity and is fully owned by Blue IQ Investment Holdings (Pty) Ltd. |
| SME – A & SME – B | Automotive Industry Development Company (AIDC) | Former Senior Management | RASP | The AIDC works in partnership with business, Local-, Provincial- and National Government, Tertiary and Further Education Institutions and other national and international organisations to provide technical services to the automotive industry across all tiers of suppliers and assemblers |

Source: Compiled for the purposes of this study

Appendix 6E– Scoring – Common benefits

| Company | Process improvement | Increased productivity | Increased cost competitiveness | Access to state-of-the-art planning and execution systems | Increased size and quality of the pool of skilled workers |
|---|---|---|---|---|---|
| OEM – A | 1 | 1 | 2 | 1 | 0 |
| OEM – B | 1 | 1 | 3 | 1 | 0 |
| Supplier – A (Tenant) | 1 | 4 | 2 | 3 | 1 |
| Supplier – B (Tenant) | 3 | 3 | 0 | 1 | 1 |
| Supplier – C (Tenant) | 4 | 2 | 1 | 1 | 1 |
| Supplier – D (Tenant) | 2 | 2 | 1 | 1 | 1 |
| Supplier – E (Tenant) | 0 | 0 | 1 | 0 | 4 |
| LSP – A (Tenant) | 1 | 1 | 2 | 0 | 1 |
| LSP – B (Tenant) | 1 | 1 | 4 | 0 | 1 |

Source: Compiled for the purposes of this study

Appendix 6F – Scoring – Application of manufacturing concepts

| Company | Outsourcing | Modularisation, Postponement & Built-to-Order | Just-in-Time (JIT) | Sequenced deliveries (JIS) | Formalised Location Management |
|---|---|---|---|---|---|
| OEM – A | 2 | 4 | 4 | 4 | 4 |
| OEM – B | 3 | 2 | 2 | 2 | 3 |
| Supplier – A (Tenant) | 2 | 1 | 1 | 1 | 1 |
| Supplier – B (Tenant) | 1 | 4 | 1 | 4 | 4 |
| Supplier – C (Tenant) | 2 | 1 | 1 | 1 | 1 |
| Supplier – D (Tenant) | 1 | 4 | 4 | 4 | 2 |
| Supplier – E (Tenant) | 2 | 3 | 1 | 1 | 4 |
| Supplier – F (Non-tenant) | 2 | 4 | 4 | 4 | 4 |
| Supplier – G (Non-tenant) | 0 | 2 | 2 | 2 | 1 |
| Supplier – H (Non-tenant) | 2 | 1 | 1 | 4 | 2 |

Source: Compiled for the purposes of this study

Appendix 6G– Scoring – OEM specific benefits

| Company | Reduced security costs | Reduced inventory costs | Reduced ware-houseing and storage space | Reduced material handing equip-ment | Increased plant flexibility | Improved supplier service levels | Improved delivery accuracy | Reduced trans-portation costs | Conso-lidation of inbound and outbound logistics | Reduced time lost due to produc-tion stop-pages |
|---|---|---|---|---|---|---|---|---|---|---|
| OEM – A | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 4 | 2 |
| OEM – B | 2 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 3 | 1 |

Source: Compiled for the purposes of this study

Appendix 6H – Scoring – Tenant specific benefits

| Company | Strength-end strategic position | Quality improve-ments | Reduced insurance costs | Overall reduced produc-tion costs | Easy access to OEM systems | Reduced logistics costs | Enabler to long term relation-ship develop-ment | Reduced produc-tion costs per part | Increased stability of supply | Increased quality of output |
|---|---|---|---|---|---|---|---|---|---|---|
| Supplier – A (Tenant) | 2 | 2 | 4 | 2 | 3 | 3 | 4 | 2 | 1 | 1 |
| Supplier – B (Tenant) | Not available | Not available | Not available | Not available | Not available | Not available | Not available | Not available | Not available | Not available |
| Supplier – C (Tenant) | 3 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 1 |
| Supplier – D (Tenant) | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 1 |
| Supplier – E (Tenant) | 4 | 4 | 1 | 3 | 1 | 1 | 1 | 1 | 1 | 1 |

Source: Compiled for the purposes of this study

Appendix 6I – Scoring – LSP specific benefits

| Company | Access to the delivery of more value adding opportunities | Introduction of new services will generate new business opportunities | Reduced operational costs | Provision of more economical services |
|---|---|---|---|---|
| LSP – A (Tenant) | 3 | 3 | 3 | 3 |
| LSP – B (Tenant) | 3 | 3 | 2 | 1 |

Source: Compiled for the purposes of this study

# Chapter 7

## Summary & Conclusion

*This chapter summarises the study; it also contains conclusions and identifies areas for future research.*

## Content

## 7.1. Background

The importance of the automotive industry in the global economy, likewise its importance in the South African economy, was outlined in Chapter 1. Also considered were the recent developments which have placed the industry under renewed competitive pressure. These pressures have forced local and international stakeholders to review their strategies towards economies of scale, costing structures and export contracts. Hence, the focus on logistics and supplier parks to unlock value from these strategies from a South African perspective.

## 7.2. Objectives of the study

In view of the problem definition outlined in Chapter 1, the primary objective of the study was to assess the performance of the Rosslyn Automotive Supplier Park in terms of the realisation of the value proposition as communicated to the various stakeholders, from a supply chain perspective.

The secondary objective was to expand the body of knowledge on supplier parks within the South African business environment.

## 7.3. Research methodology

In order to achieve the objectives of the study, comprehensive research in the fields of supply chain management and logistics management was undertaken. This involved a detailed review of various academic literature, articles, Internet sources and unpublished sources. The assessment of the mechanisms driving and supporting the management of logistics- and supplier parks internationally, in particular, was a challenge due to the limited availability of information. Hence, the use of a limited array of writings from specific academics was used to manage the potential impact on the quality of deliverables.

In addition to the above, a qualitative dominant mixed method approach to gather, analyse and interpret the collected data, was used. Primary information was collected during semi-structured interviews with specific representatives of the various Rosslyn

Rosslyn Automotive Supplier Park (RASP) stakeholder groups. The quantitative and qualitative data was then linked to identify, select and compare outliers. The identified stakeholders included among others, representatives of original equipment manufacturers (OEMs), suppliers, and logistic service providers (LSPs). The researcher's involvement in the feasibility study, initial concept design, and to a lesser extent the implementation of the RASP, as well as his exposure to the subject matter and related industry contacts, have allowed him to perform a careful stakeholder identification and selection process. The researcher's current non-involvement in the RASP supported an objective approach to the study.

## 7.4. Topics covered in the study

Supply chain management has become a central part of many companies' competitive and growth strategies in the global business environment. The increasing complexity and pace of change have a dramatic impact on the successful management of today's companies. The competitive edge of yesterday becomes the minimum service requirement of tomorrow. This is mainly due to the sophistication and knowledge of today's consumers. Consumers are more demanding and informed than ever before. This demands from management, a fresh approach to both strategy formulation and execution.

**Chapter 2**

Supply chain management is concerned with more than just the movement of materials from point A to point B. The goal of supply chain management is the creation of value for the supply chain member organisations with a particular emphasis on the end customer in the supply chain. In other words, turning supply chains into value systems. In a world with growing complexity but abundant opportunities accelerated by globalization and information technologies, companies need to integrate themselves into the supply network. They must carefully manage the complexity that ensues, align their business strategy with supply chain operation, leverage information technology with process improvement, and pioneer operational innovation for superior firm performance. Companies also need to rigorously manage critical operational performance metrics, such as customer service, responsiveness, supply chain costs, asset utilization, product quality, and operational flexibility, in order to achieve overall business success.

**Chapter 3**

Within the automotive value chain, the OEM-Supplier relationships have changed considerably in recent decades and assemblers are increasingly focusing on their core competencies. This has led to the fostering of relationships with their supply chain partners which will support their increased levels of outsourcing and modular production combined with Just-in-Time (JIT) deliveries, ultimately leading to an increased demand for logistical coordination of manufacturing processes. Seen in light of this, the Supplier Park allows the concentration of dedicated production, assembly, sequencing and warehousing facilities managed by suppliers or a third party in one location, or at least within close proximity to OEMs, in order to achieve synergies. It improves the production environment and services, lowers costs and exploits the latest advances and practices in the automotive manufacturing chain.

Logistics management is defined as the part of the supply chain which is concerned with activities related to the flow of goods, services and information from point of origin to point of consumption with fulfilling the requirements of the end customer as its main focus. Supply chain management encompasses a broader scope of activities to ultimately integrate supply and demand management across companies, focusing on the various relationships within this extended network of organisations. It was also briefly noted that even though other functional areas such as finance, operations and marketing management have made an important contribution to the evolution of supply chain management, it is in fact logistics and purchasing that form the backbone of the supply chain management discipline as it is known today. On an operational level, logistics management provides the organisation with the tools required to realise substantial cost reduction and efficiency improvement objectives. The key to attaining these objectives is by way of the integrated logistics and total cost management. The optimisation of logistics activities are viewed from a holistic perspective due to their interrelationship, rather than optimising the individual logistics activities in isolation. Here the focus should be on minimizing the total cost of transportation, warehousing, inventory, order processing and information systems, and lot quantity, while achieving a desired level of customer service. The typical automotive supply chain consists of both upstream and downstream networks. Supplier parks in many instances form an integral part of many OEMs' upstream supply- and value chains.

Globally automotive is a multi-billion Euro industry. By employing more than five percent of the worlds' labour force, it has become a cornerstone of many economies. The 2008-2009 downturn in the global economy due to the financial crisis – compacted by volatile oil prices – had a dramatic impact on the global and local automotive landscape. Arguably the biggest impact was in the form of reduced export of vehicles and related automotive components and services. Locally, some impeding factors came in the form of interest rate hikes in the short and medium term which slowed consumer spending, as well as the replacement of the current MIDP in 2013 by the APDP which created some uncertainty amongst local players. Supply chain management can be seen as a cross-functional integrative concept that seeks to develop a system wide view, and bridge the gap between the competitive strategies of production (supply) and marketing (demand). The supplier park theoretically bridges this gap between supply and demand. This is most applicable in cases where complexities of the automotive supply chains are compounded by the high demands for flexibility and customisation by customers. The inbound process is a complex network of forecasting, planning, sourcing, ordering, scheduling and time management. Concepts such as Just-in-Time, Just-in-Sequence and Modular Supply are seen as key enablers by managers of these processes. Effective implementation of these concepts allow modern OEMs to concentrate their efforts on their core business. Managing these already complex global networks of suppliers and service providers is compounded by South Africa's compromising distance from both its international supply and demand base and further aggravated by the limiting logistics infrastructure. There is a direct influence by the main industry drivers on the logistics and supply chain strategies. This is followed by the OEMs and their suppliers, steering the actual operations of the organisation and the extended supply chain to meet specific supply chain objectives. Suppliers face similar challenges to their assembler customers and the industry has evolved to include not only niche domestic suppliers but also billion Euro global mega-suppliers capable of providing complete systems. This can pose complex and costly internal integration and external collaboration challenges. In light of this the supplier park plays a key part in the supplier's functional and supply chain strategies, with an emphasis on focused channel strategy and design.

**Chapter 4**

The establishment of supplier parks are supported by drivers such as logistical cost reduction, labour cost reduction and efficiency improvements. As OEMs also see benefits in modular supply and a shift in the automotive value chain, there are apparent operational advantages of co-locating suppliers of those modules, and there are distinct advantages of a formal supplier park over loosely co-located supplier clusters. The outsourcing of various responsibilities, as pursued by both OEMs and their suppliers, are supported by the supplier park concept which provides the enabling infrastructure and services to drive and support the cornerstone initiatives. Supplier parks also support the pursuance of manufacturing strategies such as modularisation, postponement and build-to-order because some level of co-location and clustering is necessary to successfully achieve these strategies. Location management forms the catalyst for the co-location of OEMs and suppliers in close proximity especially in new-entrant countries and developing economies where the infrastructure is not available. Global supply networks are replacing local linkages and are becoming increasingly important in the auto industry as assemblers and suppliers develop parallel networks across the globe, and supplier parks become even more important in enabling and supporting the value adding activities of their tenants. A company's value chain is embedded in a larger system of activities that include the value chains of its upstream suppliers and downstream customers or allies engaged in getting its products/services to the end user. In view of these value systems, creating collaborative partnerships with upstream suppliers is important because anything a company can do to reduce its suppliers' costs or improve suppliers' effectiveness can enhance its own competitiveness. Supplier parks are defined as a concentration of dedicated production, assembly, sequencing or warehousing facilities run by suppliers or a third party in close proximity to the OEM plant. The supplier park provides the opportunity to manage these upstream value chains and their associated costs. The value add within a supplier park environment are grouped into five levels of activities. The main and also most obvious drivers of how much value add is to be performed inside the supplier park or close to the assembly plant are the existence of central manufacturing facilities, economies of scale and logistics considerations.

**Chapter 5**

Since its inception in the early nineties around forty to seventy supplier parks (depending on the definition used) have been established around the world. These implementations can be found in various forms, and differentiation is possible along at least three dimensions – spatial integration in conjunction with dedicated infrastructure, value chain configuration and organisational integration. The supplier park concepts in different parts of the world vary substantially based on physical layout, synchronisation between the OEM's final assembly line and the suppliers' operations, capital investment, employment governance, and strategic supplier involvement. The various international and local implementations of the supplier park concept highlighted the fact that the concept is implemented in a variety of forms with each manufacturer not only taking a different approach, but with some also not using the same system for individual plants within their own manufacturing network. In spite of the broad interpretation and application of the concept, the supplier park is defined as a concentration of dedicated production, assembly, sequencing or warehousing facilities run by suppliers or a third party in close proximity (i.e. within 3km) to the OEM plant. The South African scenario appears to follow the international trend in the application of the concept being linked to different forms and references. The Rosslyn Automotive Supplier Park (RASP) – which is approximately 1.3km from the assembly facilities of Nissan/Renault, 3.3km from BMW, 0.5km from TATA, and 35km from Ford – in essence remains true to the definition of being a concentration of dedicated production, assembly, sequencing or warehouse facilities run by suppliers or a third party in close proximity to the OEM plant. The RASP is also unique when compared to the international concept presented, especially when considering the leadership role of the provincial and local governments, and that it serves multiple OEMs from a single location. The South African automotive industry's focus on competitiveness has been fuelled by low product volumes compared to international standards; assemblers being quite distant from their export markets;

long supply lines complicating logistics management and increasing supply chain costs; assemblers facing many newcomers in the form of imported models; and growth in the domestic market remaining essentially limited. As the automakers have pushed much of the pre-final assembly work out of their plants, they have found themselves subject to the logistical challenges and constraints of their suppliers. Automotive assemblers thus consider supply strategies vital, due to the majority of the value creation activities lying upstream from them. Changes in component production during the last decade were as much driven by the alterations in the nature of value chain relationships between assembles and suppliers as by the industry's globalisation. The success of global enterprises now heavily depends on the competitiveness of their clusters of interrelated organisations that add and generate value through cooperation. Likewise, the agility of individual manufacturers depends not just on their own actions and systems but also on those of the interrelated organisations. From an automotive perspective the development of the RASP in 2004 was the local industry's response to the recognition of the fact that the competition between automotive networks and clusters are becoming paramount to the sustainability of this industry, more specifically in South Africa. The uniqueness of the RASP enabled it to perform a function focused on promoting and benefitting the South African automotive industry as a whole rather than just a single OEM. The value proposition of the RASP forms the basis of the benefits model that consists of immediate beneficiaries and distant beneficiaries.

**Chapter 6**

The RASPs value proposition is grounded on four focus areas – Logistics & IT, Buildings and Infrastructure, Shared Services, and Socio Political factors. This value proposition and accompanied general and stakeholder group specific benefits were tested with the target group. The feedback from the target group highlighted the following: 1) A limited focus on process improvement for specific members of the value chain which prevents the unlocking of benefits across the value chain, 2) Being a tenant at the RASP has not resulted in any significant changes in the speed of production for most tenants, 3) The increases in process improvement and its potential positive impact on the related costs, does not necessarily compensate for the increased rental costs to put the tenants in a better competitive position overall,

4) With regard to access to state-of-the-art planning and execution systems it is clear that there are limited benefits from the RASP's ICT facilities, with only one tenant acknowledging a moderate benefit, 5) Although certain supplier park supporting principles are being applied there is a significant lack of drive to unlock real supply chain value through the implementation of others, 6) Although the expected reduction in various logistics costs and increase in plant flexibility have not materialised other benefits such as some service level improvements and greater convenience in other areas did make the OEMs support of the RASP worthwhile , 7) Considering that one of the key pillars for the business case of the RASP concept presented to its tenants was the minimisation of logistic costs and improving logistic efficiencies, in isolation this might indicate that the RASP did not fulfil its mandate. There were however exceptions with some tenants expressing a marginal reduction in operational costs, support in terms of developing and maintaining long-term relationships, a strengthened strategic position through cost synergies and an enhanced environment, which resulted in productivity improvements associated with a reduction in absenteeism, and 8) Based on the above it can be concluded that, although both LSPs continue to support the RASP in spite of the limited benefit materialising from the initial business case, they had to search beyond the initial scope for opportunities to gain the potential benefit from their involvement in the RASP.

**General**

It is evident from the above that all the objectives of the study have been met. Chapters 2-4 provided an essential background to the study, focusing on relevant supplier park related supply chain management and logistics management topics. Chapter 5 details and compares the application of the supplier park concept both internationally and locally (secondary objective), while Chapter 6 critically assessed the performance of the Rosslyn Automotive Supplier Park concept in terms of the realisation of the value proposition as communicated to the various stakeholders (primary objective).

## 7.5. Overall conclusion

The decision to assess the feasibility and later implement the Rosslyn Automotive Supplier Park Rosslyn (RASP) was driven by the necessity to develop the South African automotive industry and to improve the local industry's global competitiveness. This Blue IQ initiative was, supported by the Department of Trade and Industry (DTI), to promote the South African automotive industry due to its local economic importance. The role of the RASP in supporting both macro (such as GDP growth and sustainable job creation) and micro (such as tax income generation for the local Tswane council as well as local small medium and micro enterprise development) economic strategies, cannot be underestimated.

OEM-Supplier relationships have changed considerably in recent times with assemblers now increasingly focusing on their core competencies. In many instances this has led to the fostering of relationships between supply chain partners which supports increased levels of outsourcing and modular production combined with Just-in-Time (JIT) deliveries, ultimately leading to an increased demand for logistical coordination of manufacturing processes. In light of this, the supplier park concept allows the concentration of dedicated production, assembly, sequencing and warehousing facilities managed by suppliers or a third party in a single location or at least within close proximity to OEMs in order to achieve synergies. It has the potential to improve the production environment and services, lower costs and take advantage of the latest advances and practices in the automotive manufacturing chain.

What makes the RASP unique from other local and similar international incarnations is that while various stakeholders (i.e. OEMs, suppliers, logistics service providers, etc.) were involved in the conceptualisation phase, the RASP is managed as a separate entity without any direct relation to other companies in the automotive industry. The objective nature of this approach enables the RASP to provide a truly unique solution to all companies in the local automotive industry, without prejudice and non-business influences. This allows the RASP to provide services to any automotive supplier, irrespective of their OEM customer, the percentage of local content in their final product, or whether their production is for local consumption or manufactured for the export market. In many ways the RASP can also be seen as the initial ‘blueprint’ for other similar initiatives in South Africa and has realised significant macro- and micro economic benefits. Other South African supplier park and industrial development zone initiatives were able to build on the lessons learned from the RASP to develop a more unique and focused value proposition to their intended customers. Many of the more recently implemented supplier parks and industrial development zones have an improved conceptualisation, better implementation and are more effective in serving their intended purpose(s).

The feedback from the various study participants in the assessment of the communicated core value proposition, has made it is possible to summarise the findings in three distinct categories.

**Pockets of benefits**

Considering the feedback with regard to the common benefits, it can be deduced that it is mainly suppliers that have benefited from their location within the RASP and that very few of these benefits can be attributed to synergies with respect to logistics and/or IT systems. Thus, little to no common benefits were identified across the value chain, but pockets of benefits occurred mostly as a result of the companies’ own initiative. Although certain supplier park supporting principles are being applied there is a significant lack of drive to unlock real supply chain value. There are a number of dormant opportunities, like ‘milkrun’ type delivery systems and shared warehouse and staging facilities, where additional evaluation could lead to a plan to unlock more of the potenial benefits.

**Beyond the business case**

Although the expected reduction in various logistics costs and increase in plant flexibility have not materialised, other benefits such as service level improvements and greater convenience in other areas did make the support of the RASP worthwhile. Highlighted benefits were not gained from the expected sources, as presented in many of the business cases, which supported the location decision. The unlocking of unexpected sources of benefits beyond the business cases provided the actual value. These benefits were more qualitative rather than quantitative in nature.

**Dovetailing vision with focus**

One of the key pillars for many of the business cases of the RASP concept to its tenants was the minimisation of logistic costs and improving logistic effectiveness, and viewed in isolation, this might indicate that the RASP did not fulfil its mandate. Dovetailing this operational focus with the broader vision of supporting the wider South African automotive industry through the building of relationships and looking beyond the political contention to benefit certain regions, will provide greater insights into the challenges faced.

From the outset of this study it was clear that reaching a definitive conclusion on the success of the RASP to deliver the communicated benefits would be challenging. The feedback from the various individuals interviewed delivered some very insightful results which has lead to the conclusion that, from a purely logisticals perspective the RASP has delivered little of the value it originally intended to achieve (i.e. supporting the immediate beneficiaries to become more competitive by providing a logistics infrastructure from which they could drive competitive advantage). From a greater supply chain perspective it did however help the immediate beneficiaries to unlock unexpected benefits like increased productivity associated with lower levels of absenteeism, and placed them in an improved networking and relationship building position (something which most likely would have been achievable in any industrial park environment). Also, considering the broader vision to benefit the South African automotive industry it has succeeded in becoming the catalyst for the implementation of similar concepts, each of which could utilise the insights gained from the RASP, to implement an improved solution. However seen in isolation the objective of benefiting the regional automotive sector (i.e. Gauteng based OEMs, suppliers and LSPs) didn't transpire in the various interviews and wasn't supported by the data. So, the RASP had limited success in supporting its immediate beneficiaries to leverage logistics and supply chain solutions to improve competitiveness. It did however unlock unexpected benefits and also acted as the blue-print for similar concepts which will support the South African automotive industry in its drive towards increased global competitiveness.

In conclusion, from a pure theoretical and academic supply chain perspective it is clear that the RASP still has a long way to go before it will unlock the core benefits commonly found in these types of facilities around the world – for example reduced logistics costs and increased plant flexibility.. Also it was clear that the communicated benefits originally used to drive and support the business cases of the various tenants, in many cases did not materialise. However the fact that none of the tenants who moved into the facility have endeavoured to pursue other location opportunities, suggests that moving into the RASP was a good business decision. Herein lays the RASP's biggest appeal. The fact that the qualitative benefits of being located in the RASP – such as operating from a world class facility with new and well maintained infrastructure, more favourable working conditions, an improved and professional corporate image, amongst others – have made the tenants view the RASP as a long term partner in achieving sustainable business benefit from the relationship .From a broader perspective, to support the local automotive industry to become more competitive, the RASP cannot be seen as a key contributor – the feedback from the members of the local value chain does not support the notion of a more competitive industry for all its stakeholders. Although the RASP can be seen as the initial blueprint for many similar concepts implemented across the country, (and those individuals who had the vision and skills to make this happen deserve the necessary credit), it is now in the hands of the new order of leaders to support their tenants and the automotive community in the region to unlock more of the communicated benefits and so drive the RASP to the next level of maturity.

## 7.6. Future Research

This study lays the foundation for similar studies in this field. The focus on operational effectiveness and efficiency, however, did not allow for a broader evaluation of the financial benefits related to the RASP. There is therefore a clear opportunity to enhance the findings of this study in two specific areas. One, through further financial performance analysis of the target groups through evaluating various financial ratios; and two, by also including interviews with representatives from the suppliers purchasing division who potentially will give a balanced view of the actual financial benefits of having suppliers in the RASP from a sourcing and procurement perspective.