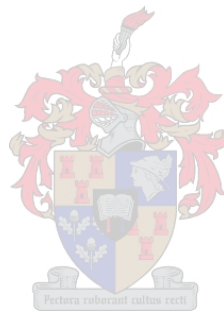


**A MODEL FOR THE SUSTAINABILITY  
OF LOCAL SUPPLIERS  
IN THE SOUTH AFRICAN AUTOMOTIVE VALUE CHAIN**

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Dissertation presented for the degree of Doctor of Philosophy (PhD)  
(Business Management and Administration)

at the  
University of Stellenbosch Business School  
Faculty of Economic and Management Sciences  
Stellenbosch University

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December 2011

## ABSTRACT

What factors influence the economic sustainability of local suppliers in emerging markets in the automotive value chain? The answer to this question is not only influenced by the direct and indirect customers of the automotive component suppliers, but it is also influenced by factors on the macro-, meso- and micro-levels of the supplier's environment. In order to investigate the research objective, the South African automotive industry is chosen as a case study in the global automotive value chain.

The literature review indicates that variables that influence the economic sustainability of suppliers can be found on the global and regional levels of the automotive industry, as well as on the industry and corporate value chain levels. As the theory does not offer a holistic approach for a problem solution, the identified factors are assembled in a conceptual model that measures the economic sustainability of automotive component suppliers with respect to financial dimensions. The conceptual model is structured according to the macro-, meso- and micro-level influences, and also recognises the impact of governance structures on the government, market, industry and corporate levels.

The suggested conceptual model is subsequently tested for totality and alignment with industry features using qualitative methods and is furthermore validated by using quantitative modelling data from primary research in the supplier component industry. The analysis of the quantitative data shows that the majority of factors influencing the economic sustainability of local component suppliers can be found on the micro- and meso-levels (corporate value chain and industry value chain), whereas the qualitative data implies that economic sustainability is mainly influenced by factors on the macro- and meso-levels (industrial policy and labour market). This finding shows that there is a discrepancy between the measurable influences and the automotive component suppliers' perception of the research problem. Nevertheless, it can be stated that the conceptual model, as supported by the stakeholder group, can be used for further research.

Alongside the development of the conceptual model, the industry data is used for a discussion about the status of the South African automotive component supplier industry in order to point out strengths and issues as well as to identify factors that should change or improve to enable a viable future for suppliers.

Keywords: automotive, supplier, economic sustainability, emerging markets, South Africa, globalisation, value chain, governance, market access

## TABLE OF CONTENTS

Abstract .....	ii
Table of contents .....	iii
List of figures .....	vii
List of tables.....	ix
List of acronyms and abbreviations .....	xi
Declaration.....	xiii
Acknowledgements.....	xiv
Chapter 1 Orientation .....	1
1.1 Introduction.....	1
1.2 Problem statement.....	3
1.3 Research question.....	4
1.4 Research objectives.....	4
1.5 Research design and methodology.....	5
1.6 Boundaries and limitations of the research .....	6
1.7 Chapter outline .....	9
Chapter 2 Literature review: globalization in the automotive industry and the statu of the South African automotive industry.....	13
2.1 Introduction.....	13
2.2 Globalisation trends in the automotive industry .....	13
2.2.1 Trends in the automotive industry .....	13
2.2.2 Distinctive aspects of globalisation.....	20
2.2.3 The location of production.....	22
2.3 The South African automotive environment .....	24
2.3.1 The current status of the South African automotive industry .....	24
2.3.2 An industry analysis of South Africa's automotive sector .....	26
2.3.3 The history of the South African automotive industry .....	29
2.3.3.1 The beginnings and the period before 1995.....	29
2.3.3.2 The Motor Industry Development Programme .....	32
2.3.4 Future challenges for South Africa's automotive industry.....	38
2.3.4.1 South Africa's automotive industry in an advanced emerging market.....	38
2.3.4.2 The Automotive Production Development Plan (APDP).....	42
2.3.4.3 Structural issues in South Africa's automotive value chain.....	45
2.4 Synthesis.....	48

---

Chapter 3 Literature review: automotive value chains and global value chain governance.....	50
3.1 Introduction.....	50
3.2 Automotive value chain and supply chain .....	50
3.2.1 Value chains and networks .....	50
3.2.2 Fragmentation and economic geography.....	53
3.2.3 The automotive upstream value chain .....	55
3.3 Global value chain governance.....	61
3.4 Synthesis.....	68
Chapter 4 Literature review: market access in emerging markets.....	70
4.1 Introduction.....	70
4.2 Perspectives of local automotive suppliers in emerging markets.....	70
4.3 South Africa as an emerging market in the global automotive value chain .....	74
4.4 Upgrading and positioning of local automotive suppliers in the value chain .....	76
4.5 Synthesis.....	82
Chapter 5 Development of the conceptual model.....	83
5.1 Introduction.....	83
5.2 Conclusions of the literature research.....	83
5.3 The conceptual model.....	88
5.3.1 System and governance levels .....	88
5.3.2 Variables.....	90
5.3.3 Model.....	94
5.3.4 Research questions .....	96
5.4 Synthesis.....	97
Chapter 6 Research design and methodology.....	98
6.1 Introduction.....	98
6.2 Research design.....	98
6.3 Research methodology.....	100
6.3.1 Literature review .....	100
6.3.2 Qualitative research.....	100
6.3.2.1 Validation discussions .....	100
6.3.2.2 Focus group and interviews .....	101
6.3.3 Quantitative research.....	104
6.3.3.1 Introduction.....	104

---

6.3.3.2	Survey .....	104
6.3.3.3	Set-up.....	105
6.3.3.4	Sampling .....	105
6.3.3.5	Response rate .....	106
6.3.3.6	Questionnaire .....	107
6.3.3.7	Data collection .....	113
6.3.3.8	Data analysis .....	114
6.4	Synthesis.....	115
Chapter 7	Findings.....	116
7.1	Introduction.....	116
7.2	Focus group.....	118
7.2.1	Introduction.....	118
7.2.2	Conceptual model.....	118
7.2.3	Issues.....	120
7.2.4	Synthesis.....	121
7.3	Semi-structured interviews.....	123
7.3.1	Introduction.....	123
7.3.2	Conceptual model.....	123
7.3.3	Issues.....	123
7.3.4	Synthesis.....	124
7.4	Survey .....	126
7.4.1	Introduction.....	126
7.4.2	Descriptive Statistics.....	126
7.4.2.1	Introduction.....	126
7.4.2.2	Profile of South African Automotive component suppliers .....	127
7.4.2.3	Government influences.....	131
7.4.2.4	Market influences.....	134
7.4.2.5	Industry influences.....	136
7.4.2.6	Corporate influences.....	140
7.4.2.7	Synthesis.....	144
7.4.3	Correlations .....	147
7.4.3.1	Introduction.....	147
7.4.3.2	Macro-level.....	147
7.4.3.3	Meso-level .....	150

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7.4.3.4	Micro-level .....	154
7.4.3.5	Synthesis .....	159
7.4.4	Qualitative Comments.....	164
7.4.4.1	Introduction.....	164
7.4.4.2	Factors .....	164
7.4.4.3	Strengths .....	165
7.4.4.4	Issues .....	166
7.4.4.5	Synthesis .....	167
Chapter 8	Conclusion.....	168
8.1	Introduction.....	168
8.2	The evaluation of the model.....	169
8.3	Implications for theory.....	171
8.4	Implications for practice .....	172
8.5	Limitations and implications for further research .....	174
Appendix and Attachments	.....	175
Bibliography	.....	193

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## LIST OF FIGURES

Figure 1.1: The automotive power play .....	1
Figure 2.1: NAFTA light vehicle assembly capacity utilisation (Feb 2008 vs. Feb 2009).....	15
Figure 2.2: European Union light vehicle assembly capacity utilisation (2007 vs. 2009).....	15
Figure 2.3: Supplier EBIT profitability by region 2009 vs. 2007 .....	16
Figure 2.4: How profitable do you think the global automotive manufacturing, supplier and dealer industries will be over the next five years? .....	17
Figure 2.5: How important are the following issues to the global auto industry today? .....	18
Figure 2.6: Do you expect suppliers to increase their investment over the next two years? .....	18
Figure 2.7: Increase in global platform volumes .....	19
Figure 2.8: The BRIC automotive markets will grow strongly through 2014.....	20
Figure 2.9: What are the cost-saving opportunities for auto manufacturers and suppliers? .....	24
Figure 2.10: Static uni-directional MIDP incentive model.....	32
Figure 2.11: Changing strategic perspectives on the ownership of component suppliers .....	34
Figure 2.12: Impact of liberalisation and alignment on suppliers of Toyota SA .....	36
Figure 2.13: Independent variables identified in the literature review .....	49
Figure 3.1: Porter's value chain.....	51
Figure 3.2: The traditional automotive value chain .....	52
Figure 3.3: Functional vs. process organisation in the automotive value chain.....	53
Figure 3.4: The co-location grid.....	54
Figure 3.5: The nested geographic and organisational structure of the automotive industry.....	55
Figure 3.6: The vehicle and components value chain.....	56
Figure 3.7: Company positioning in the supply chain .....	57
Figure 3.8: Value transfer activity (modular supply chain) .....	58

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Figure 3.9: Characteristics of different levels of modularisation .....	59
Figure 3.10: Primary drivers of supply chain strategy for automotive and industrial manufacturers	60
Figure 3.11: Automotive supply chain objectives.....	61
Figure 4.1: Changing assembler-supplier relations .....	73
Figure 4.2: Global sourcing from developing-country partners .....	74
Figure 4.3: A typology of upgrading strategies .....	79
Figure 4.4: Summary of innovation processes and the interrelation of concepts, actors and their interactions .....	80
Figure 4.5: Positioning of emerging-market companies.....	81
Figure 4.6: Independent variables identified in the literature review .....	82
Figure 5.1: Migration towards supply chain focus.....	89
Figure 5.2: Conceptual model layers.....	90
Figure 5.3: General overview of the structure of the variables used in the conceptual model.....	91
Figure 5.4: Conceptual model with independent variables and layers .....	92
Figure 5.5: The measures for economic sustainability.....	94
Figure 5.6: Conceptual model without independent variables .....	95
Figure 5.7: Conceptual model including independent variables.....	96
Figure 7.1: Patterns of the conceptual model.....	117
Figure 7.2: Qualitative comments of focus group participants with regard to issues of the South African automotive industry.....	122
Figure 7.3: Qualitative comments of interview participants with regard to issues of the South African automotive industry.....	125
Figure 7.4: Profile of the survey respondents.....	127
Figure 8.1: The model for the sustainability of local suppliers in the South African automotive value chain.....	170



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## LIST OF TABLES

Table 2.1: Companies typically move through five stages of localisation.....	23
Table 2.2: PESTLE analysis .....	27
Table 2.3: SWOT analysis of South African automotive industry.....	28
Table 2.4: Changing ownership structure of South African-based vehicle manufacturers.....	33
Table 2.5: Ownership status and technology used by SA-based component manufacturers supplying SA-based assemblers (n = 4) (percentage of purchase value).....	35
Table 2.6: Local content levels of new models introduced from September 1995 to 1998.....	37
Table 2.7: Stages in the development of vehicle production in South Africa.....	42
Table 2.8: Summary comparison of MIDP and APDP .....	44
Table 2.9: Measurable objectives and medium-term output targets; subsector customised programmes.....	45
Table 4.1: Governance and upgrading: Clusters vs. value chains .....	78
Table 5.1: Different GVC schools of thought .....	88
Table 6.1: Survey response rate .....	106
Table 6.2: Variables and related questions and measures in the questionnaire .....	108
Table 7.1: Variables and attributes of the conceptual model .....	117
Table 7.2: Average financial performance values for South African automotive component suppliers .....	141
Table 7.3: Differences in groups according to ownership status of the financial performance of South African automotive component suppliers .....	142
Table 7.4: Financial performance measures of South African automotive component suppliers in relation to revenues .....	142
Table 7.5: Differences in financial performance of internationally tied and nationally tied South African automotive component suppliers.....	143

Table 7.6: Differences in financial performance of South African automotive component suppliers according to main customers .....	143
Table 7.7: Differences in financial performance of South African automotive component suppliers according to product categories .....	144

## LIST OF ACRONYMS AND ABBREVIATIONS

AIA	Automotive Investment Allowance
AIDC	Automotive Industry Development Centre
AIS	Automotive Investment Scheme
APDP	Automotive Production Development Program
ASEAN	Association of Southeast Asian Nations
BRIC	Brazil, Russia, India, China
CAPEX	Capital expenditure
CKD	Completely knocked down
COMESA	Common Market for Eastern and Southern Africa
CONNEPP	Consultative National Environment Policy Process
DTI	Department of Trade and Industry
EU	European Union
FDI	Foreign direct investment
FTA	Free trade agreement
GATT	General Agreement on Tariffs and Trade
GDP	Gross domestic product
GNI	Gross national income
GVC	Global value chain
GVCG	Global value chain governance
JIS	Just in sequence
JIT	Just in time
JV	Joint venture
LAA	Local Assembly Allowance

LDC	Least developed country
MERCOSUR	Mercado Común del Sur (Southern Common Market)
MIDP	Motor Industry Development Program
MNC	Multinational corporation
NAACAM	National Association of Automotive Component and Allied Manufacturers
NAAMSA	National Association of Automobile Manufacturers of South Africa
NAFTA	North American Free Trade Agreement
NEPAD	New Partnership for Africa's Development
OEM	Original equipment manufacturer
OES	Original equipment supplier
ppm	Parts per million
PAA	Productive asset allowance
ROI	Return on investment
SADC	Southern African Development Community
SME	Small and medium-sized enterprises
TNC	Transnational Corporation
USB	University of Stellenbosch Business School
WIP	Work in progress/work in process
WTO	World Trade Organization

## DECLARATION

By submitting this research report electronically, I, Christian Nitschke, declare that the entirety of the work contained therein is my own, original work, that I am the owner of the copyright thereof (unless to the extent explicitly otherwise stated) and that I have not previously in its entirety or in part submitted it for obtaining any qualification.



Christian Nitschke

December 2011

## **ACKNOWLEDGEMENTS**

I would like to take this opportunity to thank everyone who has supported and encouraged me throughout my PhD studies.

I would like to thank my parents for their support throughout my studies and my paths up until today. Their guidance and encouragement helped me to find my way. In addition, I would like to thank Tanja for always supporting me emotionally, and for her help in terms of proofreading my dissertation.

Furthermore, I would like to thank Patrick Lavery and Roger Pitot from the National Association of Automotive Component and Allied Manufacturers (NAACAM) and Lance Schultz and Grant Minnie from the Automotive Industry Development Centre (AIDC), who were all very supportive in terms of aligning the research strategy and providing access to the South African automotive industry.

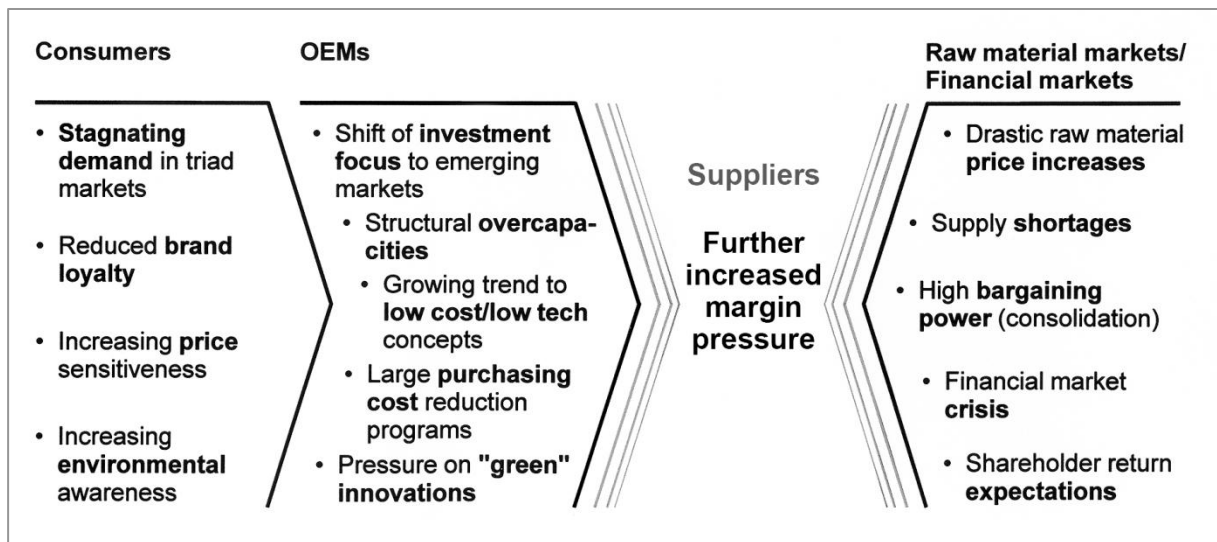
The people of the University of Stellenbosch have helped me to gain new insights. My fellow PhD students always had an open mind and Dr John Morrison as well as Professor Herbst guided me to a purposeful dissertation. I would like to thank Professor Kidd for his help in the statistical analysis of my data. Dr Jan Havenga, my supervisor for the PhD studies, has always offered help and supported me during the development of the dissertation. I would like to express my thanks for supporting me.

## CHAPTER 1

### ORIENTATION

#### 1.1 INTRODUCTION

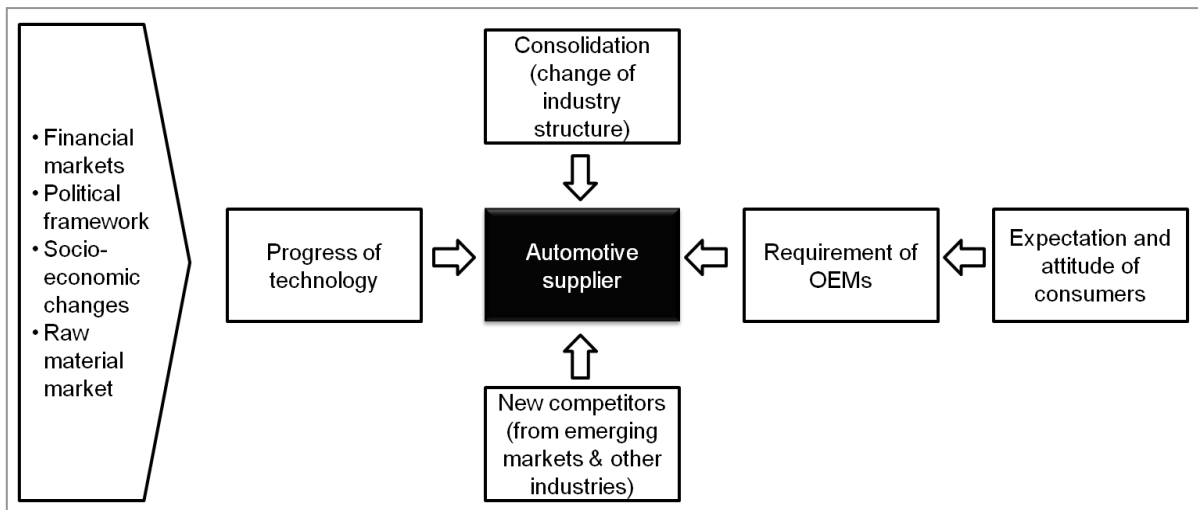
Viewing changes in the upstream automotive value chain from a global perspective, research identifies suppliers to be in a 'sandwich' position. Suppliers are sandwiched on one side by direct and indirect customers (i.e. OEMs and consumers) and on the other by financial and raw-material markets (Roland Berger & Rothschild, 2008: 3; 2009: 20). Figure 1.1 shows how suppliers are sandwiched in this position.



**Figure 1.1: The automotive power play**

Source: Roland Berger & Rothschild, 2008: 3

Horváth & Partner (February 2010: 1) extend this two-dimensional depiction by adding technological development, consolidation in the industry structure and socio-economic and policy changes to this discussion. These further dimensions are illustrated in Figure 1.2.



**Figure 1.2: Framework of the automotive supplier industry**

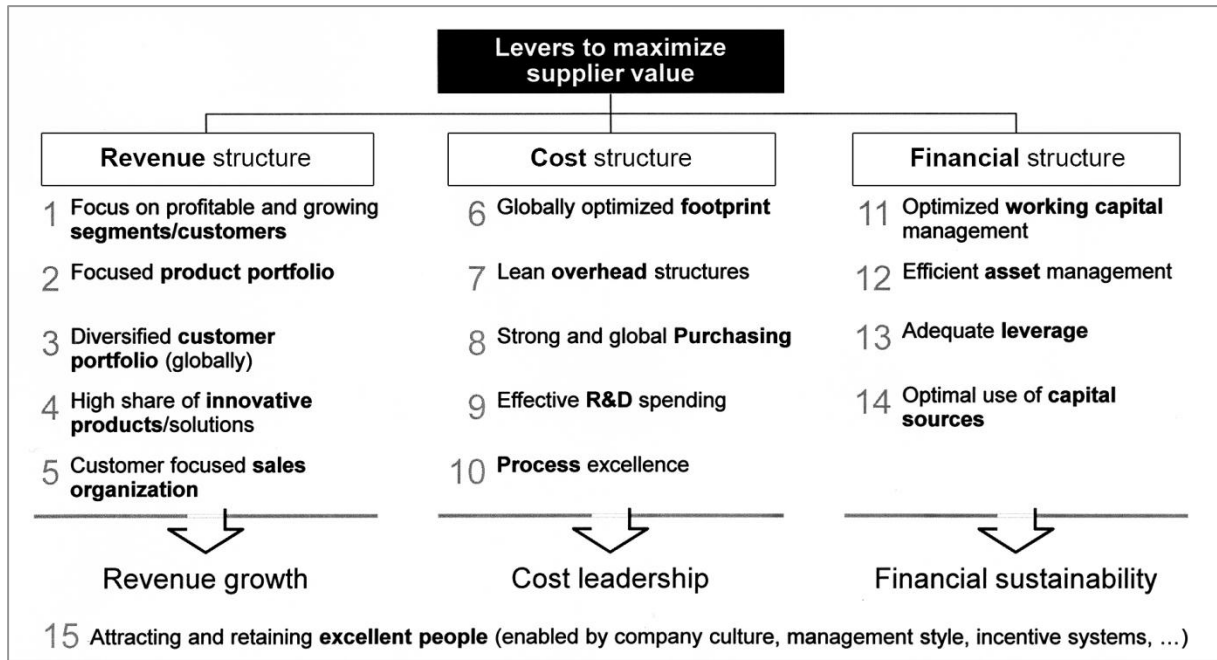
Source: Researcher's own illustration based on Horváth & Partner, February 2010: 1

The 'automotive power play' leads to the matter of how automotive suppliers will sustain their profitable role in the upstream value chain. The Global Automotive Supplier Study 2008 by Roland Berger and Rothschild (2008) identifies 15 levers relating to financial, cost and revenue structures that suppliers can use to face current and future challenges. These are illustrated in Figure 1.3. Based on these arguments for economic supplier sustainability, which focus on the firm-level perspective, the question is which additional factors at the meso- and macro-levels may influence the economic sustainability of suppliers in the automotive value chain? (Horváth & Partner, February 2010: 1, 5).

One of these meso- or macro-level factors may be the influences of global fragmentation of production and sales for suppliers. As original equipment manufacturers (OEMs) move to regional business models in their new locations they need to examine their existing supplier strategies and work with a choice of three strategies (KPMG, 2009a: 10):

- 1) Moving existing suppliers along with the OEM to low-cost regions
- 2) Encouraging established suppliers to invest in local JVs or partner with local companies to benefit from low-cost manufacturing
- 3) Identifying local suppliers in low-cost regions that are capable of replacing existing suppliers (Deloitte, 2009).





**Figure 1.3: Levers for automotive suppliers**

Source: Roland Berger & Rothschild, 2008: 17

## 1.2 PROBLEM STATEMENT

The global automotive industry is going through an intensive transitional change from the geographic point of view. Production has more than doubled since 1975 – despite the recent downturn due to the financial crisis – which is mostly dependent on the emerging markets. The fragmentation of production into these new markets not only affects the car makers (OEMs), but also influences the suppliers. This is because the suppliers are forced by the lead firms to follow their customers. The automotive industry shows some distinctive features in terms of globalisation, like the high concentration of lead firms and the strong regional patterns combined with an absence of technological standards due to the various markets.

Taking this issue further by looking at emerging markets, then the following question arises: What about the local supplier industry in these countries in the era of globalisation? Most of the stakeholders in the automotive value chain in emerging countries are concerned with issues like follow sourcing where international mega-suppliers and OEMs move to emerging markets in order to set up their supply chain (Schlie & Yip, 2000: 344) to take advantage of the developing markets. It is unclear whether local suppliers in these countries have a future from an economic perspective and whether they can sustain their access to the globalised automotive value chain – especially when trade barriers like import regulations and duties are being minimised (Humphrey, Lecler & Salerno, 2000: 42–43).

South Africa's automotive industry began in the early 1920s and was characterised by a series of local content programmes until 1995. The Motor Industry Development Program (MIDP) opened the South African market to the international markets. This event brought changes in the ownership of the OEMs, and exposed the local suppliers to global value chains. It is uncertain how the growth story of the industry can continue under the new government programme (the Automotive Production Development Program) and how structural issues in the local value chain can be resolved.

### 1.3 RESEARCH QUESTION

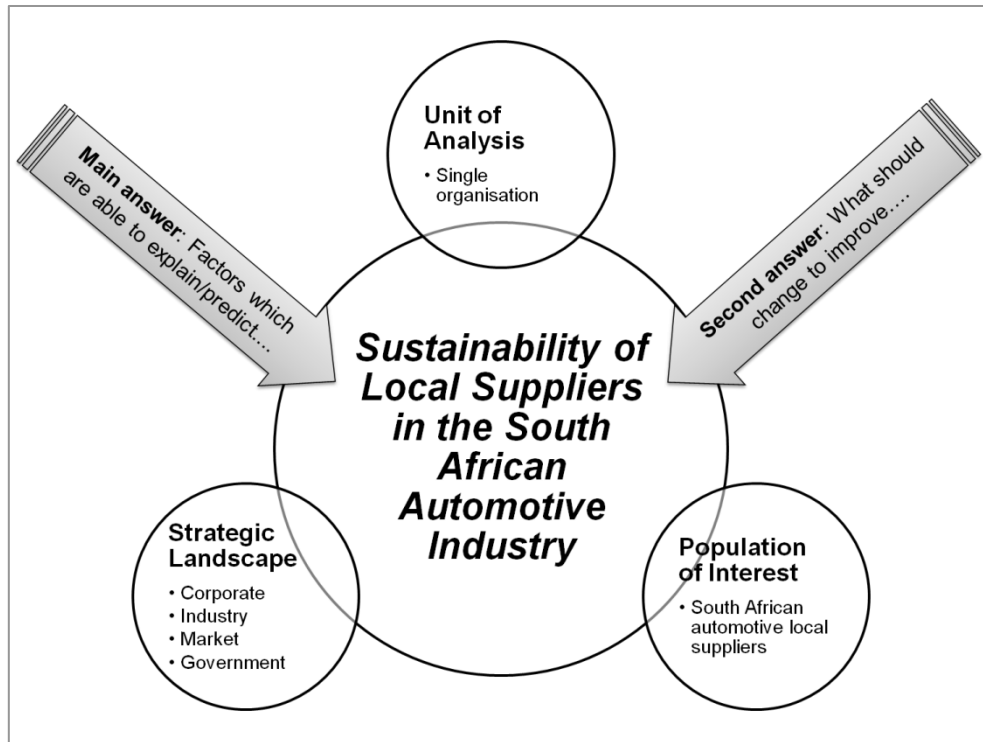
The problem statement illustrated that local suppliers in emerging markets face various challenges. It is uncertain whether local suppliers in emerging markets can secure or build up competitiveness. In order to be able to investigate this phenomenon the following research question needs to be answered: What factors are influencing the economical sustainability of local suppliers in emerging markets in the automotive value chain? It is proposed that these factors cannot only be found at the corporate level (e.g. operational performance measures), but that they are also located at the industry, market and government levels.

Following the initial research question the secondary research question asks what factors should change and enhance the sustainability of local suppliers. The answer to this question leads to an indication of what factors do have the highest influence on the economical sustainability and also proves or disproves whether general theoretical concepts can be applied the South African automotive supplier industry.

### 1.4 RESEARCH OBJECTIVES

The focus of this research is the sustainability of local suppliers in the value chain of the South African automotive industry. The factors that influence the economic sustainability of these entities are investigated. As this matter is twofold in terms of the opportunities and threats offered by the economic environment on the one hand and the strengths and weaknesses of local suppliers on the other, it is important to investigate the different layers of competitiveness and consolidate the findings in a model that explains the economic sustainability of local suppliers in a developing market. The model also aims to predict factors that lead to the improvement of the strategic position of suppliers and the economic environment.

Figure 1.4 summarises the research objectives in conjunction with the unit of analysis, population of interest and strategic landscape.



**Figure 1.4: Research objectives**

## 1.5 RESEARCH DESIGN AND METHODOLOGY

The research design follows a pragmatic approach and includes deductive as well as inductive sections. By integrating different perspectives the dichotomy of the research problem in terms of theoretical and practical influences can be acknowledged.

The literature review leads to a conceptual model which is influenced by the different pillars of the research problem. Namely, these are the global automotive value chain, the theoretical concepts of value chain and value chain governance and the issue of market access of local suppliers in emerging markets. This complexity of the research, which derives from the nature of the research problem, is overcome using a triangulated approach. A qualitative section informs and partially confirms the findings from the literature review and the conceptual model. Subsequently, a quantitative approach uses modelling data to further validate the conceptual model.

The qualitative section consists of semi-structured interviews and a focus group. The data that is generated through these methods is used to align theory and practice and to consider special circumstances in the industry and in the research environment.

The quantitative section is accomplished through primary research. A survey is carried out among the units of analysis in order to gather the modelling data. The quantitative data is then analysed by using descriptive statistics and inferential statistics to investigate the factors that correlate to the measures of economic sustainability.

The described research design and methodology will be discussed in detail in section 6. This section is also more empirically focussed as the results of the literature review and the development of the conceptual model will bring more clarity to the nature of the research.

## 1.6 BOUNDARIES AND LIMITATIONS OF THE RESEARCH

The following paragraphs point out some specifics of the research strategy and give some implications about the boundaries and limitations of the research.

It seems unfeasible to research this question in highly dynamic markets because of their on-going development and need for consolidation; therefore, it is more appropriate to investigate the issue of local supplier sustainability in an environment that has exceeded the first boom phase and where development and consolidation have already taken place (KPMG, 2009b: 3). Another factor influencing the validity of the research is that the big emerging markets like China and India operate in a heavily protected environment with high duty tariffs and strict local content requirements – which do not always comply with current World Trade Organization regulations (Sturgeon & van Biesebroeck, 2009: 22). These measures blur an objective picture of the development of the automotive value chain, as strong governmental regulations influence the decisions of lead firms. It can, therefore, be argued that once a settlement of the automotive industry has been recognised the pressures of trade liberalisation will cause political decision makers to decrease the protection.

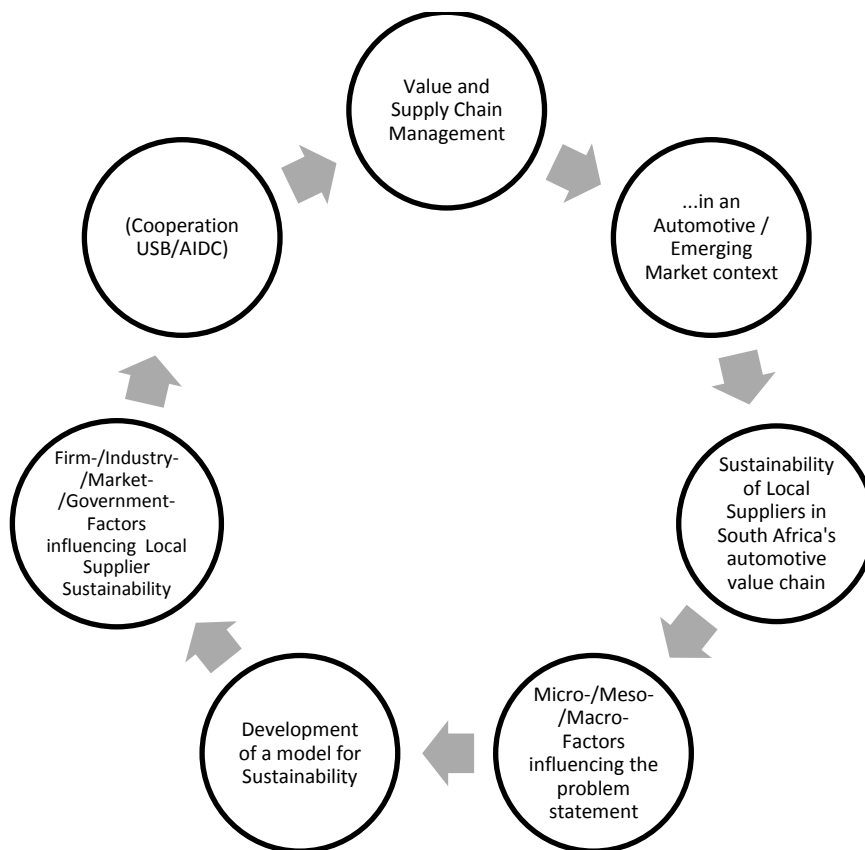
So why is South Africa used as a ‘case study’ for this research? The relevance of South Africa derives from the fact that the automotive industry was (re-)introduced to the global automotive value chain in 1995 with the start of the Motor Industry Development Program and the abolition of local content requirements (Black, 2009: 484). The Motor Industry Development Program also included an import-export complementary scheme that allowed the OEMs to earn duty rebates for imports in exchange for exported vehicles. The result was a structural change in the industry, as the ownership of all OEMs that were located in South Africa was taken over by their parent companies (Black, 2001: 791). The relevance of South Africa for the field of research also derives

from the fact that the industry in South Africa is in a transitional phase. This means that the car manufacturers are fairly to fully integrated into the global operations of their parent companies, but local content remains moderate due to cost factors and overall production costs are in the medium range due to the country's high logistics costs (Black, 2001: 792).

The applied research cycle is illustrated in Figure 1.5. It starts with the dominating blocks of theory that describe and partially explain the research problem. These theories include value chain and supply chain management. Value chain and supply chain theory are important to understand the nature of the research problem, as the automotive industry is a leading industry in developing and adopting sophisticated new approaches in these fields of research on the one hand, and it shows distinctive features compared to other industries with regard to value and supply chain management. Therefore, it is essential to analyse the theory in an automotive context to understand the specifics of value and supply chain management in the automotive industry. Vuori and Piik (2009: 21–22) justify this approach in their work on the co-evolution of academic research and industry practice in the US car industry. They state that academic research functions as a retrospective sense maker, as an idea amplifier and legitimator and, lastly, as a trigger of developments in the industry. Therefore, it is appropriate to see the research problem in the context of industry practice.

The other block of theory relates to the measures of sustainability for local suppliers in emerging markets. These measures mainly consist of market access for firms and emerging-market specifics, which will be linked to the theory of value and supply chain management in the automotive industry. The findings of the theoretical approaches will be applied to the research problem of local supplier sustainability in emerging markets in the automotive value chain.

The next two steps will deduct the micro-/meso-/macro-factors of sustainability and develop a model that describes and explains the research problem. This model will be used to investigate the significant factors by means of a survey. These factors, it is proposed, consist of different levels – the firm, industry, market and governmental levels. It was decided to work in close collaboration with the National Association of Automotive Component and Allied Manufacturers and the Automotive Industry Development Centre to ensure an alignment of research and practice.



**Figure 1.5: Applied research cycle**

The following items define boundaries of the research in terms of practicability:

- Immediate practical application of the research problem is needed to reduce the complexity of the research environment. In this case, the research environment – which is the entire automotive industry – is characterised by high levels of uncertainty, rapid change and high numbers of interactions, which lead to a high level of complexity (Mulenburg, February 2008). Therefore, theory will be seen in an automotive context during the course of the research and references to general theory will be identified from the problem solution and the practical application.
- Another boundary of the research is the focus on the vehicle assembly and parts sector. This emphasis can be justified, as these segments of the automotive value chain can be easily separated from end markets, unlike retail sales, after sales and services. Another argument for narrowing down the research problem besides the complexity issues is the fact that automotive value chains are producer-driven and dominated by the OEMs, which function as lead firms (Sturgeon, Memedovic, van Biesebroeck & Gereffi, 2009: 18).

- As the automotive industry in South Africa is of major public interest due to the high contribution of economic well-being (see Section 2.3) it is also important to take into account the relationship between academic research and practical industry consulting. This form of public relationship is needed to ensure an alignment between the purposes of the research and the need for solutions in the industry. However, this alignment does not influence the validity of the academic approach – the intention to achieve both goals does not sacrifice the academic objectivity and validity of the research.

## 1.7 CHAPTER OUTLINE

This section gives an overview of the research strategy framework and points out the structure of the research. Each chapter is explained with regard to its content and relevance. In addition to this introduction every chapter opens with a classification for the course of research and concludes with the research findings.

After having introduced the research problem, the objectives and the framework in the orientation chapter the next three chapters review the existing literature. The literature review is divided into three chapters because of the complexity of the research problem. These three chapters are subsumed in Chapter 5 – a conclusion of the literature research regarding the research problem and the development of the conceptual model.

The first chapter of the literature review (Chapter 2) elaborates on the automotive industry in terms of globalisation trends and the supplier industry. This is important, as globalisation not only influences the location of production of the OEMs, but it also it has significant influences on the supplier industry. Therefore, distinctive aspects of globalisation in the automotive value chain are discussed. Furthermore, the impacts of the location of production and the competitive pressures facing automotive suppliers are assessed. After providing a global view of the automotive industry in the introduction and having pointed important trends with regard to the research problem, the environment of the chosen case study is discussed. The South African automotive environment is analysed with respect to the development and current status of the industry landscape. As regulation is a significant feature of the industry, the history and future of governmental influences are discussed. Additionally, structural issues in the South African automotive value chain are examined in order to qualify the case for further analysis.

The next chapter of the literature review (Chapter 3) discusses value and supply chains because the research subject is embedded in the domain of the automotive value chain and the supply chain. As the automotive industry is distinct from most other industries, important concepts like fragmentation, modularisation and risk management are examined in this context. In addition,

general theory about value and supply chains is reviewed. The concept of global value chain governance forms the third part of this chapter. The chapter ends with a discussion of the validity of the global value-chain-governance approach for the research problem.

Chapter 4 summarises the third objective of the literature review and discusses local supplier sustainability from two different angles. The first point of view examines emerging market specifics with respect to entry barriers and upgrading opportunities of a local supplier industry to a global value chain like the automotive industry. The second discussion looks at the issue of market access, which is seen as a crucial factor for long-term sustainability. The prerequisites for participation in global production networks are examined and how these capabilities and requirements can be accomplished from a strategic point of view.

The development of the conceptual model in Chapter 5 wraps up the literature review on the one hand and discusses the issue of the relevant theoretical approaches for the conceptual model on the other. Thus, the overarching theoretical concepts are analysed in a systematic approach in order to identify gaps in the existing literature. This is done in preparation for the development of the conceptual model. Additionally, the variables for the conceptual model are pointed out in this chapter. The chapter concludes with the conceptual model, which will serve as a basis for the further course of research. The postulation is a model that indicates the macro-, meso- and microeconomic factors for competitiveness of local suppliers in developing markets. In order to develop the model, variables and attributes for the research problem are described and analysed. These variables and attributes are then translated into a model that describes and explains the sustainability of local suppliers in the South African automotive value chain from a corporate point of view.

In Chapter 6 the research design and methodology are described and explained. The research design comprises semi-structured interviews and focus groups in preparation for the testing of the conceptual model and in aiding the design of the survey. The testing of the conceptual model is accomplished through a survey carried out in the South African automotive industry. This task is described in the second part of Chapter 6 as part of the discussion of the research methodology. The survey is conducted using a web-based questionnaire sampling the entire South African automotive supplier industry. This section also describes how the data collection and analysis were conducted and how the qualitative and quantitative data was gathered via interviews, focus groups and a web-based survey.

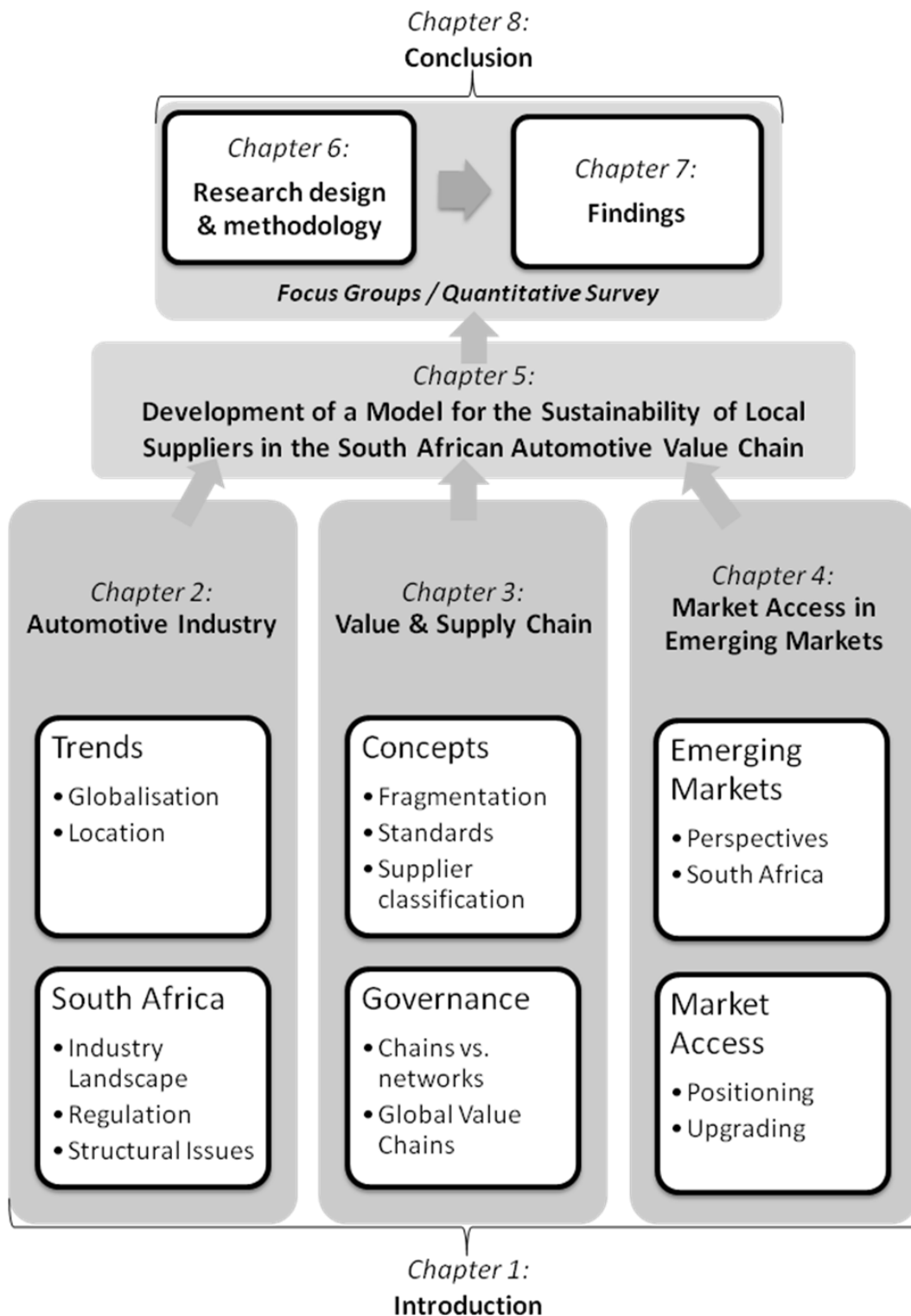
The findings section (Chapter 7) discusses the data from the quantitative and qualitative research in order to refine and validate the conceptual model. Additionally, the data captured in the survey is



used to investigate the relevant factors for the economic sustainability of automotive component suppliers. Therefore, the quantitative data is analysed using descriptive and inferential statistics.

The conclusion in Chapter 8 is given in two parts. Firstly, the conceptual model is evaluated with the results and data of the survey and if necessary the model is modified to take the findings into account. Secondly, the findings and the model are used to give implications for theory and practice with regard to the changing global automotive value chain and the key success factors of local suppliers in emerging markets. Finally, implications/opportunities for further research are pointed out.

Figure 1.6 shows an overview of the research strategy and outlines the flow of the chapters.



**Figure 1.6: Research strategy framework**

## **CHAPTER 2**

# **LITERATURE REVIEW: GLOBALIZATION IN THE AUTOMOTIVE INDUSTRY AND THE STATUS OF THE SOUTH AFRICAN AUTOMOTIVE INDUSTRY**

### **2.1 INTRODUCTION**

This chapter discusses two important topics in the research problem on the macro-level. Firstly, it elaborates on the automotive industry with respect to trends in globalisation and the influences on the supplier industry. This is important, as globalisation not only influences the location of production of the OEMs, but also has significant influences on the supplier industry. Therefore, distinctive aspects of globalisation in the automotive value chain will be discussed. Furthermore, the impacts of the location of production and the competitive pressures for automotive suppliers will be assessed.

After providing a global view of the automotive industry in the introduction and pointing out important trends with regard to the research problem, the environment of the chosen case study will be discussed. Concerning this, the South African automotive environment is analysed with respect to the development and current status of the industry. As regulation is a significant feature of the industry, the history and future of governmental influences will be discussed. Additionally, structural issues in the South African automotive value chain will be examined in order to qualify the case for further analysis.

### **2.2 GLOBALISATION TRENDS IN THE AUTOMOTIVE INDUSTRY**

#### **2.2.1 TRENDS IN THE AUTOMOTIVE INDUSTRY**

Global vehicle production has more than doubled since 1975. Due to the emerging markets – especially China and India – annual average growth rates of 3 per cent in the period 1990 to 2005 have been measured (Sturgeon *et al.*, 2009: 11). An interesting fact is that seven countries accounted for 80 per cent of world production in 1975, whereas 11 countries accounted for the same share in 2005 (Sturgeon *et al.*, 2009: 11). China's share of production rose especially, from 3 per cent in 1997 to 22 per cent in 2009 (Bailey *et al.*, 2010: 311). This shows that production is spreading into new markets for two main reasons:

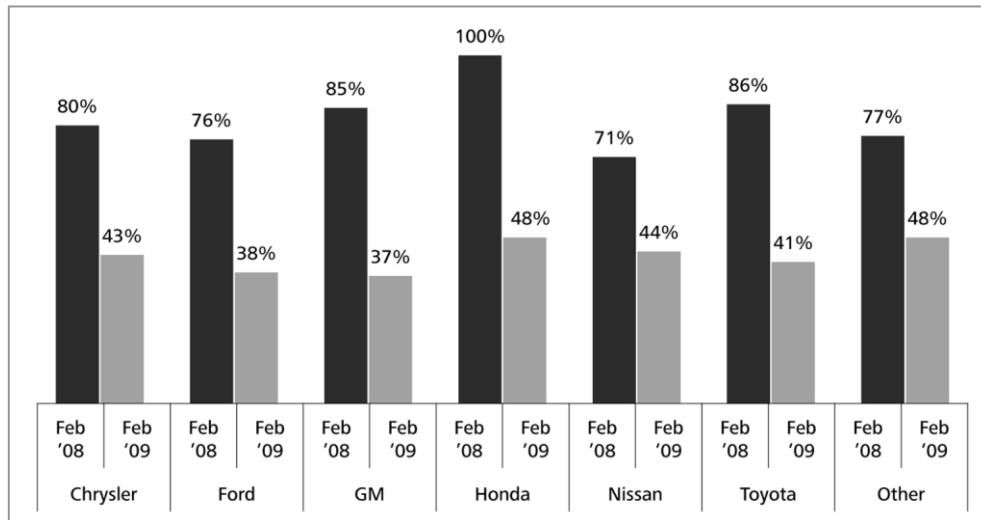
- Companies want to take advantage of new sales opportunities.
- Companies want to profit from lower production costs in the new markets.

Veloso, Henry, Roth & Clark (2000: 37) support this by arguing that the spread in production derives from new investment opportunities in Eastern Europe and Asia – again, especially China and India. He furthermore comments on the global challenge for assembly productivity, which is caused by increasing efficiencies of the world leaders in automotive production (e.g. Toyota).

The geographic transition of the automotive industry is also caused by market differences. Emerging markets require car makers to alter their design and technological features to meet demand and regulations in the specific areas (Bailey *et al.*, 2010: 313). Therefore, they also have to invest in affiliated design centres that help them to tailor vehicles to the national and regional markets (Sturgeon *et al.*, 2009). However, the home market still remains important for many companies. As all of the leading OEMs have extended their markets by producing and selling vehicles in a growing number of countries, the concentration of production and sales still remains in the home locations, which is only changing gradually. Only the Japanese car makers are an exception to this pattern, as they successfully penetrated the European (Nissan) and the North American (Toyota, Nissan and Honda) markets (Sturgeon *et al.*, 2009).

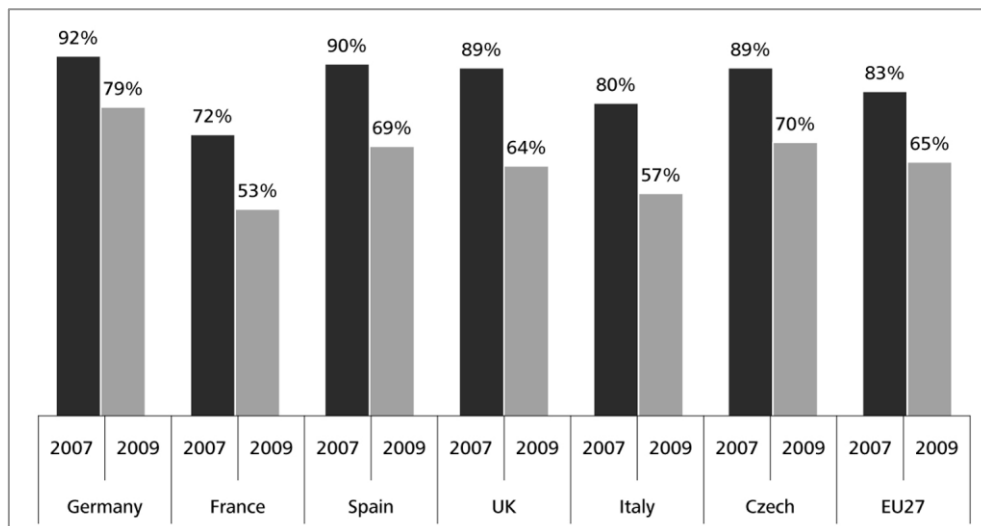
As stated above, it is interesting to view the globalisation trends on the one hand and the importance of regional integration of production on the other hand. The substance of regional production derives from political and strategic dimensions as well as from cultural, technical and economic factors. As powerful local lead firms and industry associations combined with large-scale employment and high rates of unionisation possess quite a strong political influence in their home countries, most of the OEMs have chosen to restrict exports ‘voluntarily’ and set up local production to forestall political backlash (Sturgeon *et al.*, 2009: 15). This argument is supported by Veloso *et al.* (2000: 37), who state that a local supplier base is of advantage for the automotive OEMs, because of increased buying power in respective countries. Hence, a local supplier base – often forced by local content requirements – can only be installed by setting up production in the new, emerging markets. Other factors, more technical and economic in nature, include the fact that there are certain bulky vehicle parts (e.g. seats, transmission, etc.) which on the one hand are costly to transport over long distances and on the other hand need to be delivered in the just in sequence/just in time (JIS/JIT) systems of the OEMs. The latter issue can be countered by reliable infrastructure and developed logistics capabilities. However, the transport of heavy and voluminous goods via sea freight still remains costly and unpredictable. Coming back to the regional integration and intensifying globalisation in the automotive industry, there are also still some national and local elements that are defining factors, such as consumer tastes, purchasing power and public policy. These factors include environmental regulations as well as the need to adapt vehicles to poorer quality of fuel in developed countries (Sturgeon *et al.*, 2009: 17).

Despite the long-term structural adjustments, the development of the automotive industry for the years 2008/2009 shows a quite marked picture. Coming from an all-time high in production in the years 2006/2007, the year 2008 brought serious disruption to the success story of rising production and sales. The capacity utilisation figures for light vehicles in the North American Free Trade Agreement area (NAFTA) and Europe illustrate this matter clearly by the comparison of data before and during the crisis (see Figures 2.1 and 2.2).



**Figure 2.1: NAFTA light vehicle assembly capacity utilisation (Feb 2008 vs. Feb 2009)**

Source: Ward's Auto, 2009



**Figure 2.2: European Union light vehicle assembly capacity utilisation (2007 vs. 2009)**

Source: Ward's Auto, 2009

The figures show evidence that capacity utilisation shrank to levels where profitable operations are marginal. This not only had impact on the OEMs, but also influenced the supplier business. The study of Roland Berger & Lazard (2010: 8) shows the impact of the overcapacity on the EBIT (Earnings before interest and taxes) margin of automotive suppliers in three of the big automotive markets (see Figure 2.3). These shrinking supplier margins led to a number of bankruptcies as equity ratios went down. And resorting to stronger suppliers by the OEMs to secure delivery and limit the exposure to high-risk suppliers increased pressure in the supplier environment.

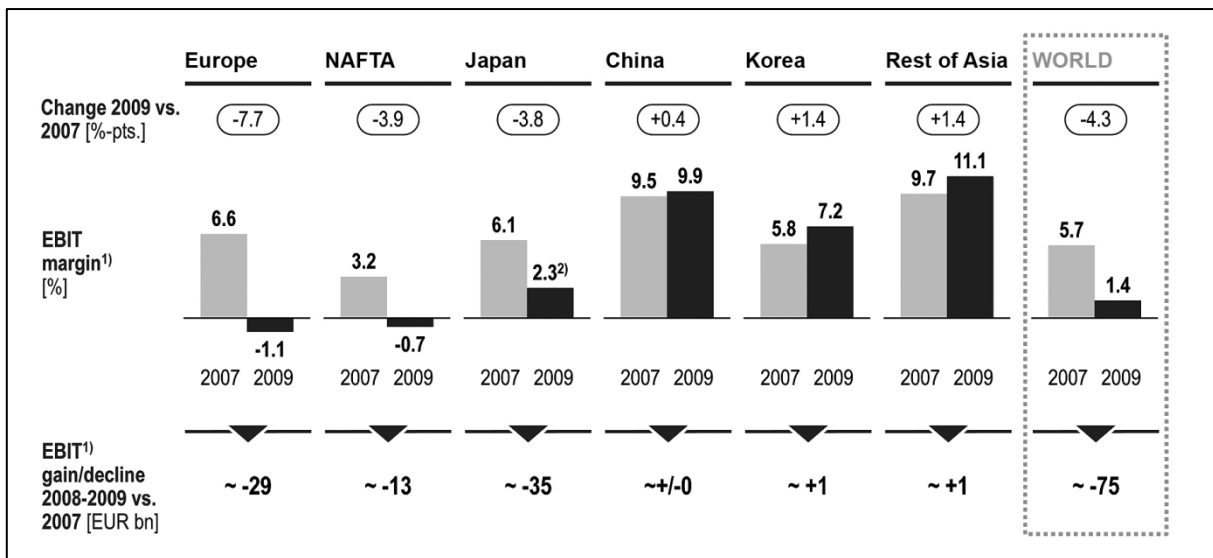
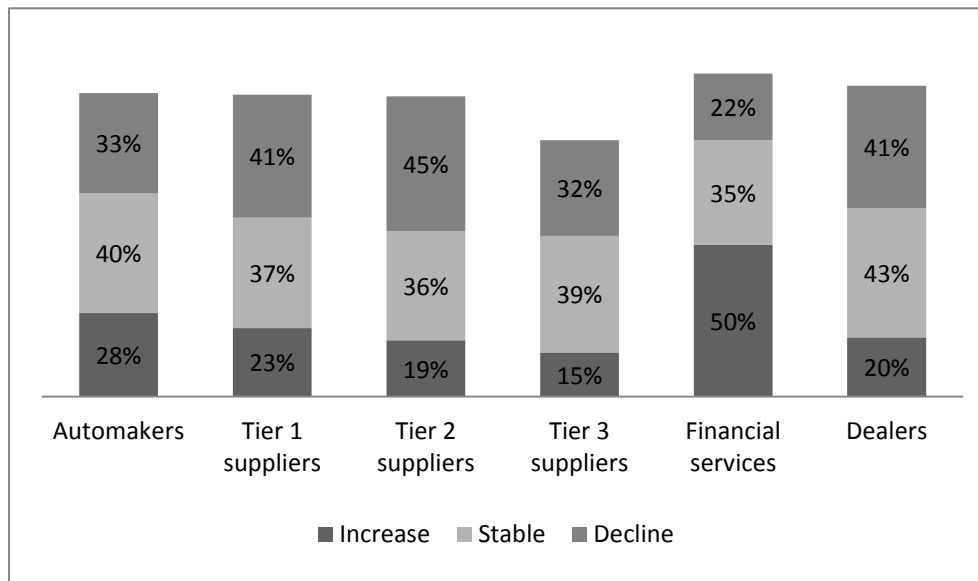


Figure 2.3: Supplier EBIT profitability by region 2009 vs. 2007

Source: Roland Berger & Lazard, 2010: 8

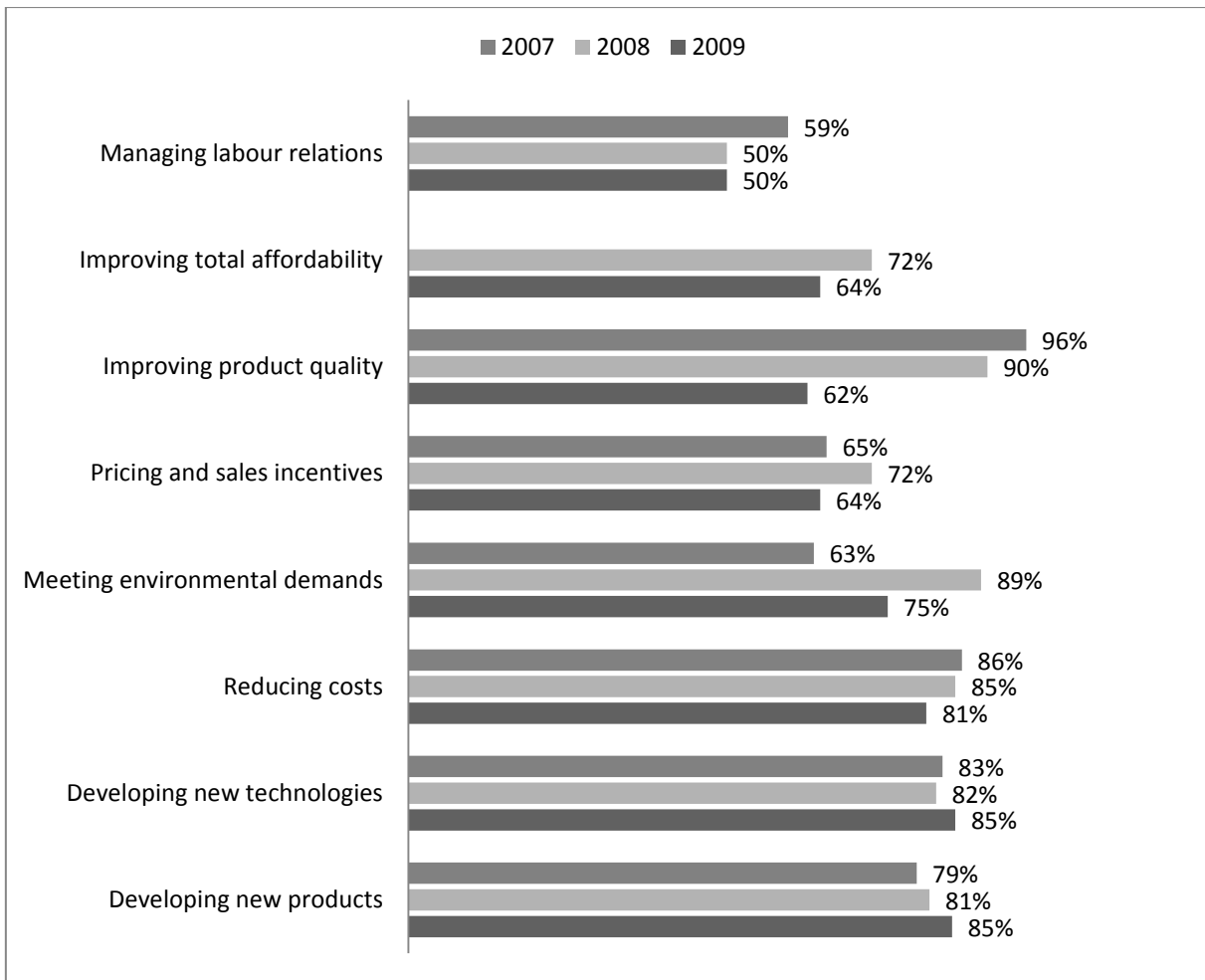
The turnaround of the automotive industry in 2010 in terms of global car production put the revenues of the automotive suppliers quickly back to pre-crisis levels. In line with revenues, the profit margins of the suppliers reached former heights, and even above (Roland Berger & Lazard, September 2010: 2). Though revenues and profits are back 'on track', structural issues like the increase in factor costs and price pressures from the OEMs can be recognised in the industry. Therefore, it is expected that margins will be under threat in 2011 and beyond, and structural underperformers in the supplier industry will fail when volumes decline again (Roland Berger & Lazard, September 2010: 2). This matter is supported by a KPMG (2010) study which points out that especially upper value chain profitability is expected to decrease and tier-3 suppliers will be under threat from a profitability point of view (see Figure 2.4).



**Figure 2.4: How profitable do you think the global automotive manufacturing, supplier and dealer industries will be over the next five years?**

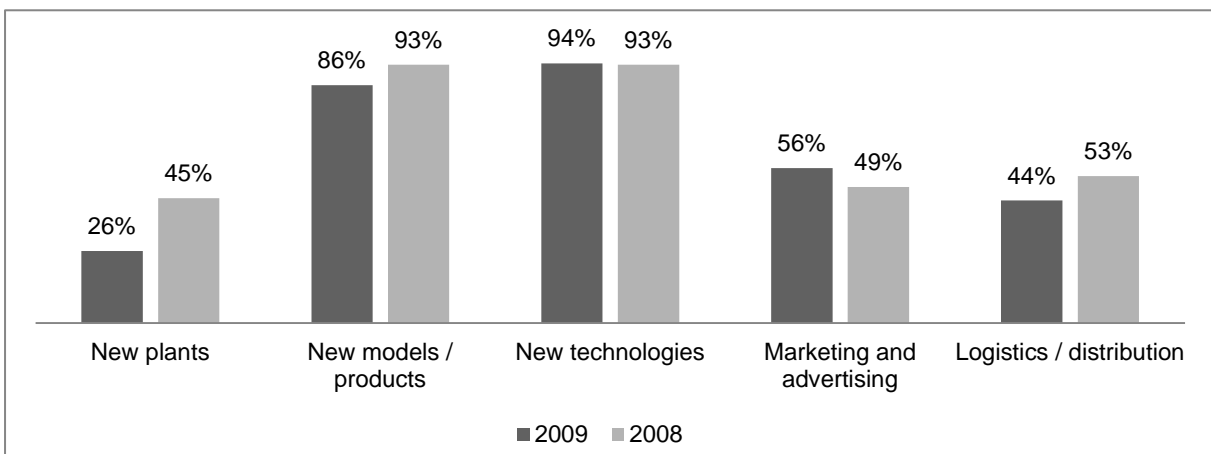
Source: KPMG, 2010: 12

As technology in the automotive industry changes quickly due to regulations (mostly safety- and environmental-related) the industry focuses on new products and innovation (KPMG, 2010: 22, 34). This effect is illustrated by Figure 2.5. Consequently, the companies – whether OEMs or suppliers – are facing tremendous investments in new products and associated technologies, which puts further pressure on the financial stability of the automotive value chain (see Figure 2.6).



**Figure 2.5: How important are the following issues to the global auto industry today?**

Source: KPMG, 2010: 22

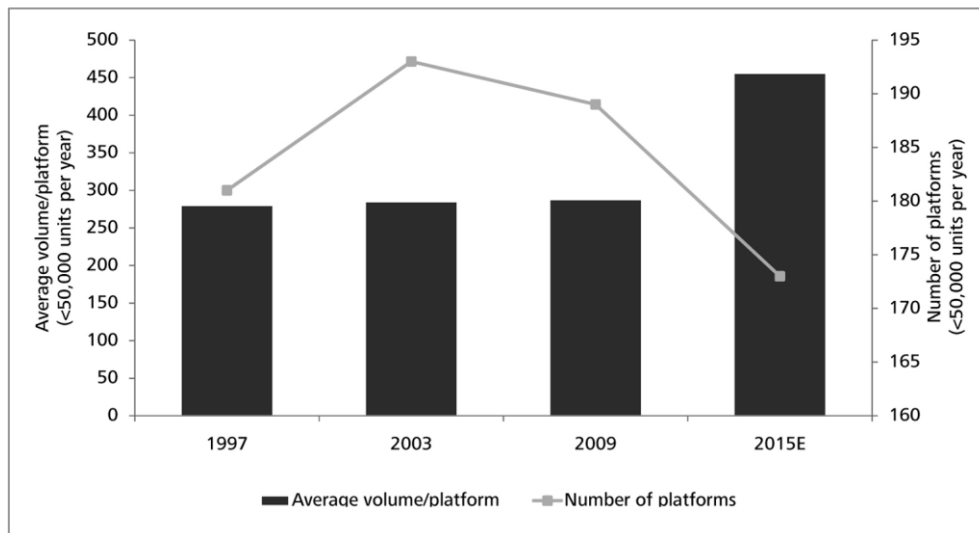


**Figure 2.6: Do you expect suppliers to increase their investment over the next two years?**

Source: KPMG, 2010: 32



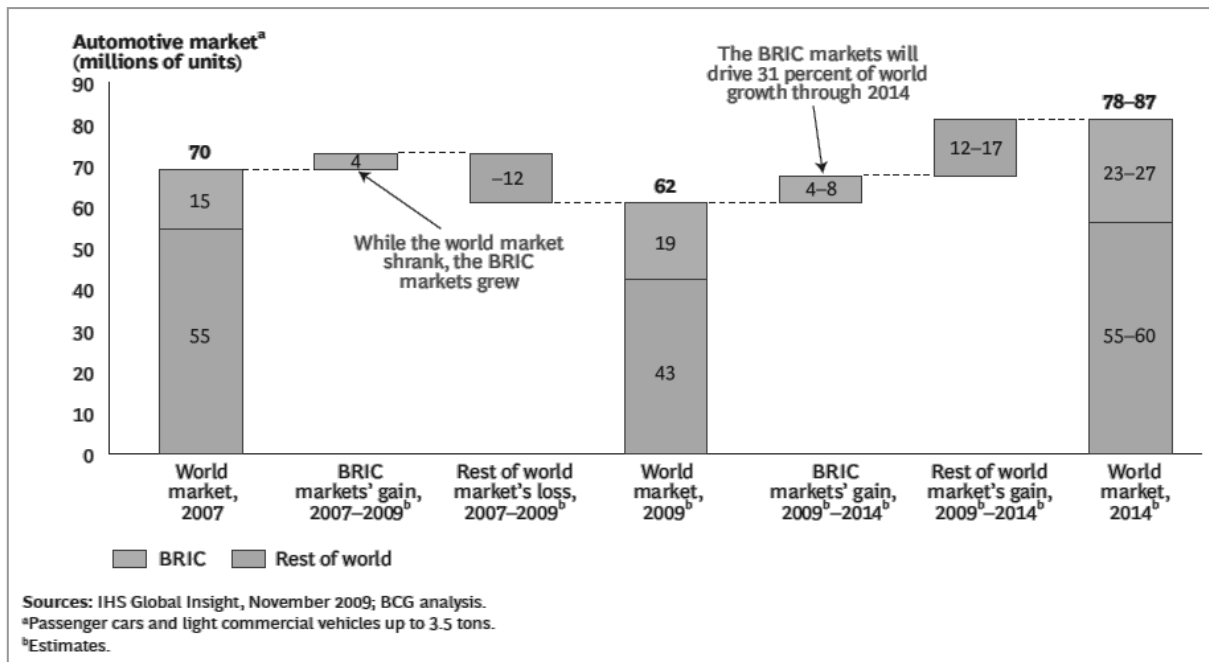
Another global trend which is worth depicting in the context of the research problem is that OEMs are trying to bundle their production on platforms. This is because they are looking for economies of scale due to the crucial constraint of cost competitiveness (Sturgeon & Florida, November 2000: 53). For instance, Honda is producing three dimensionally distinct versions of the Accord on their flexible common platform. This leads to unique market versions whereby 60 per cent of parts are common (Deloitte, 2009). The trend is expected to continue over the years, as Figure 2.7 shows.



**Figure 2.7: Increase in global platform volumes**

Source: CSM Worldwide, 2009

Despite the crisis in 2008/2009 and the recovery in 2010, the automotive industry is looking at some challenging issues, mainly derived from globalisation and emerging markets. For at least a decade, automotive OEMs have been widening their operations directly or indirectly to the booming markets in Asia and the other BRIC (refers to the countries Brazil, Russia, India and China) countries while trying to participate in the growth opportunities as well as in the prospect to operate at lower production costs (see Figure 2.8). The move to lower-cost regions is driven by two factors, as stated above: cost and demand. This fact can be understood by the term 'global footprint'. A global footprint means that OEMs aim to link their production and sales in markets with high growth rates. The emerging markets are characterised not only by an expanding population and market growth rates high in the two digits, but these markets also continue to be attractive as labour cost remains a fraction of that in the developed world – but this is only important as long it works with productive capital (Veloso *et al.*, 2000: 17).



**Figure 2.8: The BRIC automotive markets will grow strongly through 2014**

Source: Boston Consulting Group, January 2010: 7

Influences on the structure of the automotive industry are also recognised by trading blocs (e.g. North American Free Trade Agreement (NAFTA), European Union (EU), Association of Southeast Asian Nations (ASEAN) and the Mercado Común del Sur (MERCOSUR, the Southern Common Market)), which will drive continued development of regional production systems as the risk of exchange rate exposure and rising transportation cost pose a threat (Veloso *et al.*, 2000: 37). Within these blocs the migration to lower-cost locations will continue (e.g. Europe and Eastern Europe). This strategy will also be used by OEMs to leverage their operations and sales in the trading blocs as they build up plants in the low-cost regions to produce and market their goods under a foreign label.

Additionally, the feature of consolidation will be ongoing as new markets evolve to mature states, and the emerging markets (especially China and India) will continue to build up their own resources to play a role in the world market. Further consolidation will increase scale, streamline distribution, boost asset efficiency and give access to limited markets (Deloitte, 2009).

## 2.2.2 DISTINCTIVE ASPECTS OF GLOBALISATION

The automotive industry shares some features of globalisation with other globalised industries and some other features are distinctive to the car business.

The automotive industry has several similarities with industries like electronics, apparel and consumer goods. General similarities between these industries concern foreign direct investment, global production and cross-border trade. Foreign direct investment is given to engage local markets and to export back to the developed markets. A second common feature is that suppliers from developed countries emerged to multinational companies that installed their operations in emerging markets. This includes foreign direct investment as well as trade with those markets to benefit from the low-cost environment, but also to serve the OEMs with products and services (Sturgeon *et al.*, 2009).

The automotive industry is distinctive because of its high degree of lead-firm concentration. Though the firm structure is not as extreme as in the commercial aircraft industry, the level of dominance by lead firms is high compared to other industries. One of the problems originating from this concentrated firm structure is that industry standards are still underdeveloped, as 11 firms from three countries dominate production in the main markets (Barnes & Morris, 2008; Kaplinsky, 2010; Nadvi, 2008; Ponte & Gibbon, 2005). A second distinctive feature is that final assembly has been kept closely to the end markets as a result of political sensitivities. Saturated home markets and the imperative of 'build where they sell' also influenced broadening production and the global footprint of the OEMs (Sturgeon *et al.*, 2009; Sturgeon, Van Biesebroeck & Gereffi, 2008). A third attribute exclusive to the automotive industry is the strong regional structure. This only affects the OEM landscape, but also the suppliers, which are orientating their facilities along with the large manufacturers to ensure proximity and the ability to react fast. In contrast to this regional pattern of integration are some other high-volume industries, such as electronics and apparel, which have installed global-scale patterns of integration in their industries (Sturgeon *et al.*, 2008). A fourth unique characteristic of the car industry is that there are a few generic parts or subsystems that can be used in a variety of end products. This is mainly due to the absence of standards across the lead firms. The outcome is that most of the parts have to be customised for the different makes, which, therefore, necessitates extensive investment in design and production by the suppliers (Hsuan, 1999; Sturgeon *et al.*, 2008). This also implies the need for close collaboration, as the opportunities for modularisation of the value chain are limited due to factors such as engineering and coordination concerns (Fourcade & Midler, 2004: 243–244).

In summary, the automotive industry is divided into regional, national and local value chains incorporated into the global organisational structures and business relationships of the largest firms (Sturgeon *et al.*, 2009).

### 2.2.3 THE LOCATION OF PRODUCTION

The following discussion picks up the issue of the global fragmentation of automotive production and points out the location drivers for suppliers.

The KPMG (2009a) report about the global location strategy of automotive suppliers points out four key indicators. The first driver is growth. The growth differential is a powerful incentive, as decreasing sales growth and shrinking margins in the mature markets make it an imperative to capture revenue opportunities in the emerging markets. The move of the automotive OEMs to these regions also influences the location strategy of first-tier suppliers, as their customers (the automotive OEMs) ask for close proximity and to manufacture in low-cost countries. In particular, suppliers of products who have to deliver just in sequence do not have a 'real' choice with their location strategy when they want to retain the customer. Another factor for growth is the search for new customers. While following existing customers to new regions is one major reason for setting up new production facilities in the emerging markets, another is to win new customers – either in the region or by having another competitive advantage through the new location (KPMG, 2009a: 11). These two motives are often seen in close conjunction, as there is a risk of expanding the business with dependency on a single customer (Maile, 2009).

The second location driver is cost. Automotive customers expect to reduce cost on a yearly basis – a truism in the automotive industry. But the obstacles are not one-sided: before relocating the business, the first option is to optimise production in order to cut costs. The most important cost opportunities for suppliers in new markets are material cost, personnel cost and cost of capital, whereas a threat is posed by the automatically increasing logistics cost (KPMG, 2009a: 14).

A third reason for location decisions is innovation. This is significant not merely for fundamental research, but also for application engineering and process optimisation, which should be located as close as possible to final production. When comparing suppliers from the mature markets to suppliers from the emerging markets it becomes obvious that they have diametrically opposed views of the location of Research and Development (R&D). Emerging-market suppliers intent to spread their innovation work around the globe to capture important trends and technologies, whereas suppliers from the traditional markets tend to stay domestic and only consider the biggest emerging areas as worthwhile to set up Research and Development (KPMG, 2009a: 17).

The fourth location driver is risk. Risk is one of the cost factors considered when making decisions about new locations by automotive suppliers (Maile, 2009). But the risk-calculation is only in a premature state when it comes to detailed evaluation by the suppliers. Whereas political risk is only considered in a risk-adjusted investment strategy, resources and currencies are actively managed by hedging (KPMG, 2009a: 18).

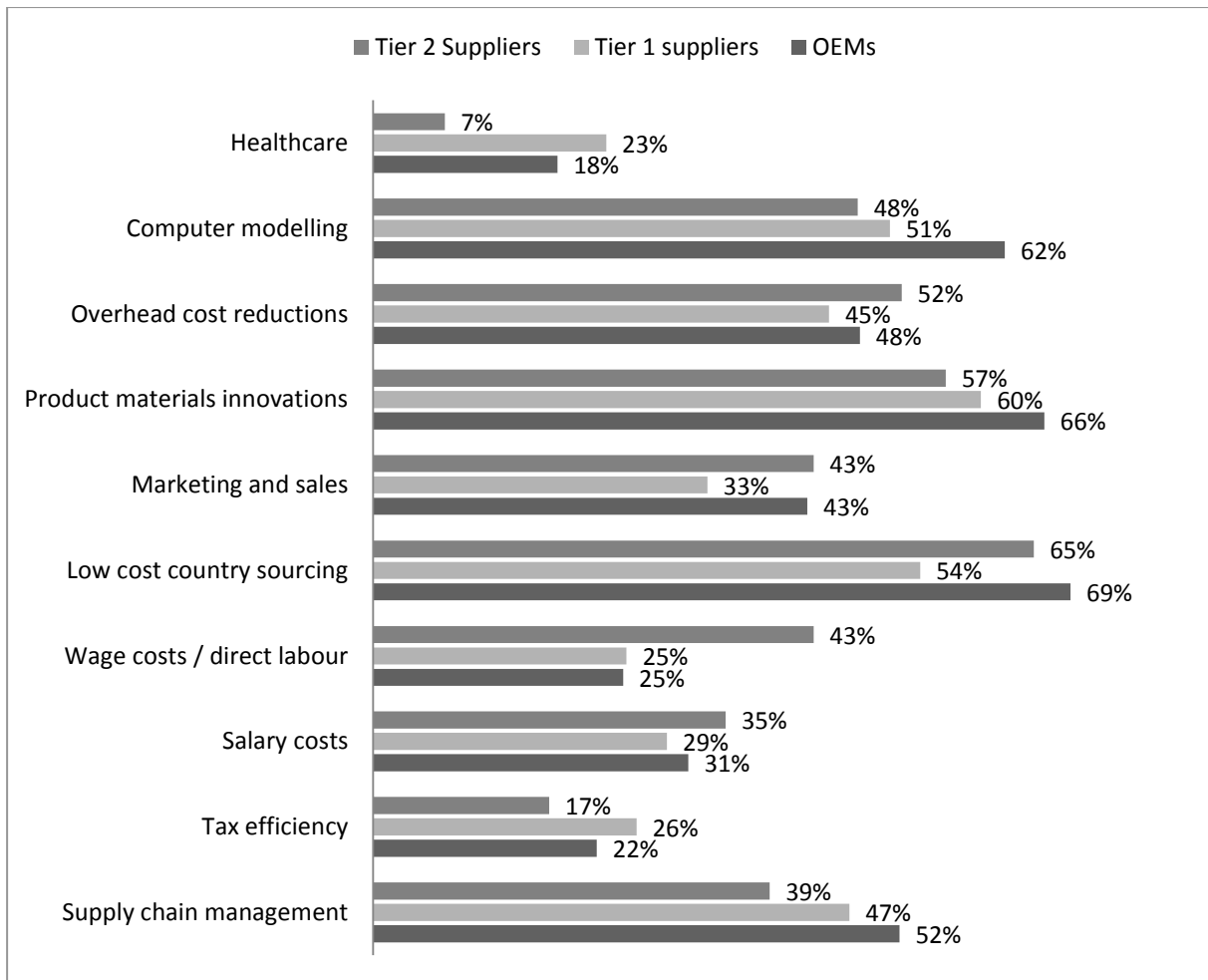
A report by the Boston Consulting Group (January 2010) points out that companies move through five stages when locating the business away from their home base (see Table 2.1). These stages are closely related to the factors mentioned above, and show that companies are well aware of the advantages and risks of going global.

**Table 2.1: Companies typically move through five stages of localisation**

	Home players	Exporters	Explorers	Settlers	Global players
<b>Characteristics</b>	Serve the BRIC markets only through low-volume exports	Minor presence in the BRIC markets; key functions under tight control from headquarters	Some independent presence in some functions; headquarters still exert strong impact on development	Fully independent from headquarters; all key functions managed by local staff and organization	Fully independent from headquarters, with global responsibility for some or all functions
<b>R&amp;D</b>	No presence	No presence; vehicles exported with only minor adaptations	Conduct minor local R&D activities	Conduct major local R&D activities	Maintain major R&D centers with global responsibility
<b>Sourcing</b>	No presence	Source simple parts	Source submodules	Source a wide array of products	Conduct full-scale sourcing to serve the company worldwide
<b>Manufacturing</b>	No presence	CKD production or small local production <sup>1</sup>	Operate one or two full-scale plants	Operate several plants	Operate several large plants for local and export markets
<b>Sales</b>	Low-volume exports	Only key functions localized	Sales network serves tier 1 and tier 2 cities	Sales network serves first- to fifth-tier cities	Sales department also manages exports

Source: Boston Consulting Group, January 2010: 9

The localisation trend is confirmed by a KPMG study (2010) that shows that the lead firms in particular are likely to grow their global sourcing activities (see Figure 2.9). This is mainly due to cost-saving opportunities in the low-cost country areas. Another important trend that can be detected from the study is that productivity issues on the lower tier levels are likely to be overcome by increasing technology and automated production. This phenomenon results in a cut in labour cost in return and shows that lower-tier-level suppliers will optimise their cost structures.



**Figure 2.9: What are the cost-saving opportunities for auto manufacturers and suppliers?**

Source: KPMG, 2010: 16

## 2.3 THE SOUTH AFRICAN AUTOMOTIVE ENVIRONMENT

### 2.3.1 THE CURRENT STATUS OF THE SOUTH AFRICAN AUTOMOTIVE INDUSTRY

The relative importance of the automotive industry as a business sector in South Africa becomes obvious when one reviews some figures. The sector accounts for about 14 per cent of South Africa's manufacturing exports. Seen locally, the automotive sector is a giant contributing about 6.2 per cent to the country's gross domestic product (GDP) in 2010 (the peak had been recognised in 2006, with 7.4 per cent of the country's GDP). The industry employs around 28,000 people directly and another 64,000 in the components industry (NAACAM, 2010; NAAMSA, 2011b). Nevertheless, South Africa can be regarded only as a minor contributor to global vehicle production, as total

vehicle production add was nearly 77 million units worldwide in 2010 and South Africa contributed less than 1 per cent to this figure (NAAMSA, 2011b).

South Africa was one of the best-performing car markets in the world before the financial crisis. New vehicle sales figures soared to record-breaking levels for three years in succession, from 2004 to 2006. In 2006, sales increased by 14.4 per cent to just under 650,000 units (SAinfo, September 2008). The total domestic production of vehicles in 2006 was registered at 588,000 units (NAAMSA, 2011b). Sales and local production started to fall in 2007 and continued to fall in 2008 and 2009 due to the financial crisis. Recent figures from 2010 show an upswing of sales to 492,000 units (+25 per cent compared to 2009) and an increase of local production to 472,000 vehicles (+26 per cent compared to 2009) (NAAMSA, 2011b). In line with the upturn in sales and production, the production capacity levels increased from 60 per cent in 2009 to around 77 per cent in 2010 (NAAMSA, 2011b). It can also be noted that capital expenditure continues to increase after the deferral of various investment projects in 2009. The increase can also be largely attributed to the Automotive Investment Scheme (AIS) which forms part of the Automotive Production Development Program (APDP). Recent figures show that total planned investments are ZAR9 billion in the automotive assembler side and another ZAR4 billion on the component supplier side (NAAMSA, 2011b).

South Africa exports vehicles to over 70 countries, mainly the United States of America (USA), the United Kingdom (UK), Japan, Australia and the European Union. African export destinations include Algeria, Zimbabwe and Nigeria (SAinfo, September 2008). Export figures of domestic production average at 50 per cent in recent years (KPMG, March 2011).

It is expected that the increase in production and sales will continue in 2011 to above 550,000 units (NAAMSA, 2011b). An interesting phenomenon can be observed when looking at the relationship between local production, imports and exports of vehicles. Forecasts state that 65 per cent of the local market is captured by imported vehicles, whereas 52 per cent of the local production is exported (KPMG, March 2011). This trend is expected to continue in 2012 and turn around with the start of the Automotive Production Development Program and the increase in local production and suitable vehicles for the local market. By 2013 a proportion of 50 per cent locally produced vehicles vs. imported vehicles will be achieved (KPMG, March 2011).

The South African government has identified the automotive industry as a key growth sector, with the aim of increasing vehicle production to 1.2 million units by 2020, while significantly increasing local content at the same time. Therefore, the successor of the Motor Industry Development Program was announced in September 2008. Speaking at a briefing at the Union Buildings, Trade and Industry Minister Mandisi Mpahlwa (Makapela, September 2008) said that the new Automotive

Production Development Program, which would run from 2013 to 2020, was designed to sustain and expand the automotive industry's contribution to the South African economy, as well as to deepen its local manufacturing impact. He said the Department of Trade and Industry had been working on the successor scheme since 2005 in a bid to align the incentive to South Africa's World Trade Organization (WTO) commitments, as well as to government's National Industrial Policy Framework.

Looking at the South African automotive market and industry, the Motor Industry Development Program has not only changed the focus of the industry from being inwardly to outwardly orientated, it has also changed the nature of the political relationship between OEMs and domestic automotive component firms. Due to changes in the ownership structure of domestic car manufacturers from being owned locally to being controlled by multinational companies, the industry is now faced with the international environment and global changes in the value chain (Barnes, 2000a; Barnes, 2000b). The fact that South Africa's automotive industry sees itself linked into the global automotive value chain exposes it directly to global competition. On the one hand, this competitive force is responsible for substantial performance upgrades in the South African automotive industry, and on the other hand it limits the opportunities for increases in value addition and output. The benefits to the South African automotive industry of engaging in global value chains are clear, but the long-term sustainability and development of the industry remains in question (Barnes & Morris, 2008: 31).

### 2.3.2 AN INDUSTRY ANALYSIS OF SOUTH AFRICA'S AUTOMOTIVE SECTOR

After having outlined the current status of the South African automotive industry it is important to discuss the obstacles of the environment of the research problem. To pursue this discussion a PESTLE analysis (stands for a Political, Economical, Social, Technological, Legal and Environmental analysis of macro factors) of the South African environment and a SWOT analysis (is a strategic planning method where the Strengths and Weaknesses on the one hand and the Opportunities and Threats on the other hand are discussed) of South Africa's automotive industry will point out the characteristics. Out of this discussion indications for the research problem will be drawn. The discussion will be done on the macro-level using the PESTLE study and on the meso-level using an industry SWOT analysis:

- A PESTLE study is used to characterise the environment in which the industry operates
- A SWOT analysis is used to assess the potentials and challenges of the industry

Table 2.2 summarises the PESTLE analysis for the South African automotive industry and highlights the main implications for automotive suppliers.



Table 2.2: PESTLE analysis

	Factor	Main implication for automotive suppliers
<b>Political</b>	<ul style="list-style-type: none"> <li>- South Africa is an active partner of the New Partnership for African Development (NEPAD), through which it promotes peaceful resolution to conflicts in Africa.</li> <li>- The ANC has dominated South Africa's political landscape by forming consecutive governments since 1994.</li> </ul>	The stable political environment in South Africa combined with the active role of South Africa forming an African political and economic development partnership supports the improvement of stable export markets.
<b>Economic</b>	<ul style="list-style-type: none"> <li>- High international oil prices and the acceleration of food prices contributed to an increase in inflation during 2006 and 2007, from 4.6 to 7 per cent. In spite of the fall in oil and food prices from the second half of 2008, inflation climbed up to 11.9 per cent in 2008.</li> <li>- South Africa's economy grew by 4.9 per cent and 4.8 per cent in 2006 and 2007, respectively, and the country witnessed a healthy growth rate for the fourth consecutive year.</li> </ul>	Inflation and the exchange rate of the South African currency to major trade partners like the US and Europe play a major role in the export business of the South African automotive component suppliers.
<b>Social</b>	<ul style="list-style-type: none"> <li>- In 2007, national healthcare expenditure stood at \$13.4 billion. This was higher than in other countries with a similar level of economic development and similar to that of some high-income countries in Africa and Asia.</li> <li>- The South African population has a literacy rate of 86.4 per cent, and education expenditure has been increasing since 1998.</li> </ul>	The available skill level in South Africa is supposed to rise. Nevertheless, the question is whether they are the right skills and on what level.
<b>Technological</b>	<ul style="list-style-type: none"> <li>- South Africa's gross spending on R&amp;D doubled between 1997 and 2005.</li> <li>- The country's three cellular network operators – Vodacom, MTN and Cell C – provide services to over 39 million subscribers, or nearly 80 per cent of the population.</li> </ul>	<p>The availability of new technology in the country should rise and enable automotive suppliers to increase their technological capabilities as well.</p> <p>The communication infrastructure is on the same level as developed countries, which enables firms to be in the information loop.</p>

	<b>Factor</b>	<b>Main implication for automotive suppliers</b>
<b>Legal</b>	- All non-residents in South Africa are liable to a 12 per cent withholding tax on royalties. However, the tax rate is different if there is an applicable tax treaty.	No implications
<b>Environmental</b>	- South Africa has developed its National Environmental Policy through a comprehensive participatory process known as the Consultative National Environment Policy Process (CONNEPP).	Automotive suppliers will have to cope with environmental regulations. However, this also offers new potential markets and products.

Source: Researcher's own illustration based on Datamonitor, August 2009: 11

Table 2.3 gives an overview of the SWOT analysis of the South African automotive industry and points out the main implications for automotive component suppliers.

**Table 2.3: SWOT analysis of South African automotive industry**

	<b>Factor</b>	<b>Main implications for automotive suppliers</b>
<b>Strengths</b>	<ul style="list-style-type: none"> <li>- Production facilities cater for right-hand-drive (RHD) vehicles, enabling manufacturers to export to other RHD countries</li> <li>- Exporters benefit from the Motor Industry Development Program (MIDP)</li> <li>- Access to first-world manufacturing and production facilities, coupled with high levels of locally produced minerals and metals</li> <li>- Numerous brands already have manufacturing bases set up in the country, such as General Motors Company, Nissan and Volkswagen</li> <li>- High levels of cheap labour allow for high degree of manufacturing flexibility</li> <li>- Economy is predominantly stable compared with other African markets</li> <li>- Strong geographic position for access to the rest of the region</li> <li>- The country's economy dominates sub-Saharan Africa</li> </ul>	<ul style="list-style-type: none"> <li>- Existing export market opportunities and access to state-of-the-art technology through international companies</li> <li>- Relatively cheap labour enables high degree of production flexibility for small model volumes</li> <li>- Geographic position offers access to the African continent (especially sub-Saharan)</li> </ul>

	Factor	Main implications for automotive suppliers
<b>Weaknesses</b>	<ul style="list-style-type: none"> <li>- Automotive sector is highly volatile to global markets and trends</li> <li>- South Africa is far removed from the large mass markets of Europe and North America</li> <li>- Auto industry has a tradition of union pressure on manufacturers</li> </ul>	<ul style="list-style-type: none"> <li>- Demand is dependent on international markets, as domestic market is too small</li> <li>- Geographical distance to major markets needs a strong back-up in infrastructure and logistics</li> <li>- Unionised labour workforce pressurises productivity</li> </ul>
<b>Opportunities</b>	<ul style="list-style-type: none"> <li>- Numerous opportunities created through continuing measures such as free trade agreements with trade zones such as the EU, and the South African Development Community (SADC)</li> <li>- Potential for exports of vehicles and components to the region</li> <li>- APDP, which replaces the existing MIDP in 2013, offers incentives to manufacturers investing in local production and may boost output</li> </ul>	<ul style="list-style-type: none"> <li>- FTAs with major export markets and access to sub-Saharan Africa offers potential</li> <li>- APDP aims for increased economies of scale and deepening of the local automotive supply chain</li> </ul>
<b>Threats</b>	<ul style="list-style-type: none"> <li>- Increasing levels of inflation directly affect sales and production, especially across the domestic market</li> <li>- Strength of the rand could negatively impact production and exports</li> <li>- Labour tension is a continuing and growing possibility</li> </ul>	<ul style="list-style-type: none"> <li>- Inflation, exchange rate and labour are likely to negatively influence the profitability and performance of the local industry</li> </ul>

Source: Researcher's own illustration based on Business Monitor International, March 2010: 6

### 2.3.3 THE HISTORY OF THE SOUTH AFRICAN AUTOMOTIVE INDUSTRY

#### 2.3.3.1 THE BEGINNINGS AND THE PERIOD BEFORE 1995

Ford and General Motors were the pioneers of the automotive industry in South Africa. They set up production plants near Port Elizabeth in the 1920s. The industry expanded rapidly and production figures were up to 120,000 vehicles in 1960. A large site of assembly plants had also been established by then. The promotion of the development of the automotive industry followed similar patterns to other developing countries – high tariffs were set on imported vehicles, which, combined with a growing market, attracted OEMs to launch in the area. Production was also aimed

solely at the domestic market, which kept the South African assembly plants isolated from their parents' global production networks. However, the operations of the foreign car makers were highly profitable (Black, 2001; Barnes, 2000a).

Despite the cost advantages for the OEMs, the level of local content was quite low at this stage, averaging about 20 per cent. This also led to negative balance of payments, as most of the components for vehicles were imported. From 1961 the first of a series of local content programmes was introduced. Domestic sourcing of 11 peripheral items was required (e.g. tyres, batteries, etc.) and higher local content levels were incentivised with import permits. Local content by weight rose to just above 50 per cent in the following decade. Due to local content being measured on a mass basis, a component industry for the heavier parts of vehicles, such as body pressings, developed. Under the next phases of the government regulations, which had similar requirements to the former ones, local content reached 66 per cent by 1977 and consolidation shaped the industry's development up to 1989 (Black, 2001; Black & Bhanisi, 2006).

The problems with the mass-based approach of local content became obvious as more highly sophisticated components were introduced into vehicle production. These components were all imported while still meeting the regulations in terms of local content by weight. In the end, the automotive industry was producing 20 different model variants for a market of 172,000 passenger cars in the mid-1980s (Black & Bhanisi, 2006: 6).

The result of the first series of local content programmes was a low-volume, high-cost production structure that locked domestic suppliers into the production of low technology in uneconomical volumes. Additionally, the 1980s were marked by a stagnating market caused by political instability and growing international isolation.

The phase VI programme brought significant changes to the government regulations in the automotive industry when introduced in 1989. It measured local content by value instead of weight. The local content was calculated on a net foreign exchange basis. This meant that exports by an assembler counted as local content and, therefore, increased the local content of domestically produced vehicles. A minimum prescription of 50 per cent local content was required while the targeted local content was 75 per cent. This means that a maximum of 25 per cent of 'local content' could be made up of exports. The system operated with an excise duty of 37.5 per cent on all locally assembled vehicles with an allowance of 50 per cent on the local content. As a result, if local-content requirements had been achieved, no duty would have been payable (Black & Bhanisi, 2006: 7). Additionally, some subsectors, like completely built-up vehicles, spare parts and accessories, received tariff protection and as a result imports were minimal. Also, exports were subsidised in the form of a rebate on excise duty of 50 per cent. All the exports were channelled

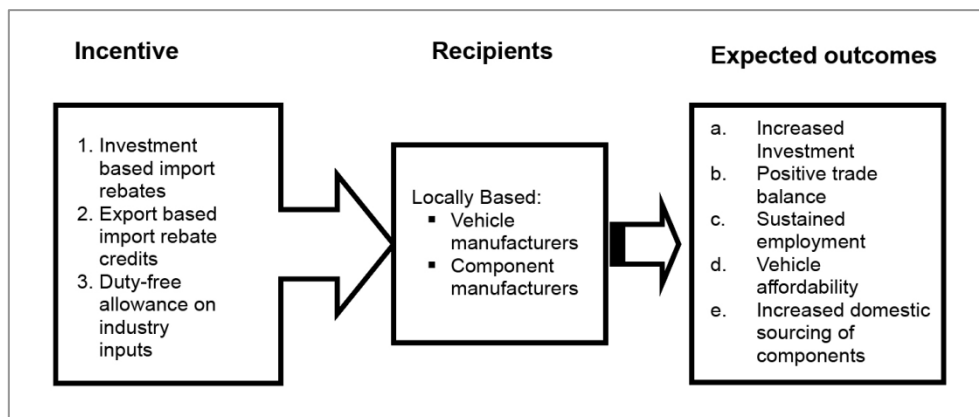
through vehicle assemblers, and component suppliers had to negotiate their receivables of the subsidy, which averaged at 30–40 per cent of the rebate (Black & Bhanisi, 2006: 7).

The impact of the phase VI of the government programmes is twofold. Firstly, exports rose substantially and faster than expected. The OEMs mediated the process of export growth through their international network by identifying local components where the local producers had a competitive advantage. Simultaneously the OEMs used the export opportunities to decrease local content in real terms, as they could compensate the lower local content value by rising exports. All imports were in the form of completely knocked down (CKD) packages so that if a domestic supplier were granted a part of the package the international supplier would remove the component from the pack and subtract a 'deletion allowance'. These allowances were held below international competitive prices and removed the former protection of domestic suppliers completely. This brought a threat to components that were part of sub-assemblies because importing was cheaper and restricted supply and quality issues. The impact on domestic component suppliers was seen in other dimensions as well. As local content was then measured by value instead of mass, specific components with high mass and low-value characteristics came under pressure because of the high cost with regard to tooling and uneconomical production runs (e.g. body pressings, plastic moulded components). This issue leads to the other impact of the phase VI programme. The proliferation of models and makes in the domestic assembly industry derives from the greater flexibility of sourcing options that allowed the OEMs to take advantage of cheaper foreign components. As a result, low-volume models forced the domestic component industry to operate in an uncompetitive environment as protection was being removed. An additional influence was brought in by the political and economic uncertainty at the time the programme was introduced, which led to a general lack of investor confidence (Black, 2001; Black & Bhanisi, 2006).

A common feature to other developing countries, like Brazil and India, was the combination of high tariffs and local content requirements, which were designed to encourage OEM-supplier linkages. But a distinctive feature was imposed by the sanctions in the late 1970s, which led to the disinvestment of assemblers (Ford and GM) in South Africa. A proposition of ownership developed with only two international firms wholly owning their operations in South Africa (VW and BMW). All other assemblers had local stockholders and produced under the 'franchise' of the international OEMs. This unique dimension was characterised by locally owned assembly firms producing international products (Barnes, 2000: 404).

### 2.3.3.2 THE MOTOR INDUSTRY DEVELOPMENT PROGRAMME

To overcome the shortfalls of the series of local content programmes the Motor Industry Development Programme (MIDP) was initiated in 1995. The programme was formed by a group consisting of members of the automotive industry organisations, trade unions and government. One of the major issues, the decrease of proliferation of models, was not accepted by the assembler organisation, the National Association of Automobile Manufacturers of South Africa. Therefore, the Motor Industry Development Program followed the direction of the phase VI programme with the difference that tariffs had to be downgraded by General Agreement on Tariffs and Trade (GATT) obligations, and local content requirements were fully abolished. The major difference from the local content programmes was an import-export complementation scheme that could be used to offset import duties by exporting vehicles and components. Import duties were phased down to 40 per cent for light vehicles and 30 per cent for components in 2003 and additionally light vehicle imports were entitled to a duty-free allowance of 27 per cent of the wholesale price (Black & Bhanisi, 2006: 10). In addition to the duty allowances mentioned above, vehicle manufacturers who invested in major export programmes were entitled to a Productive Asset Allowance (PAA) starting in 2003. The qualifying investment would be spread over five years and could be translated into duty credits worth 20 per cent of the respective investment (Black & Bhanisi, 2006: 12). Kaggwa *et al.* (2009: 3080) summarise the intentions of the Motor Industry Development Program in a static uni-directional model (see Figure 2.10).



**Figure 2.10: Static uni-directional MIDP incentive model**

Source: Kaggwa *et al.*, 2009: 3080

The specific aim of the Motor Industry Development Program with respect to international competitiveness of OEMs and suppliers was the increase of scale of production in the automotive industry. As a result of the series of local content programmes, the industry was fairly scattered with low production volume per model and, therefore, offered an uncompetitive environment for

local suppliers because economies of scale were not given. By releasing protection in terms of local content requirement and lowering tariff protection the industry became exposed to global markets immediately. OEMs were integrated into their parents' production networks and were used as production hubs for the domestic market, as well as for supplying specific export markets (Barnes & Morris, 2004: 795). This integration not only affected the production strategy itself, it also had implications on the ownership of the assemblers (see Table 2.4). All of the assemblers became majority-owned by their international parent companies (Barnes & Morris, 2008: 41). The consequences for the domestic supplier industry were dual. First, local suppliers were forced to compete with international suppliers, as protection by the Motor Industry Development Program was insignificant. Second, because of the restructuring in the OEM sector automotive component suppliers had to reposition themselves in the value chain with the aim of reinstating linkages to OEMs and facilitating exports.

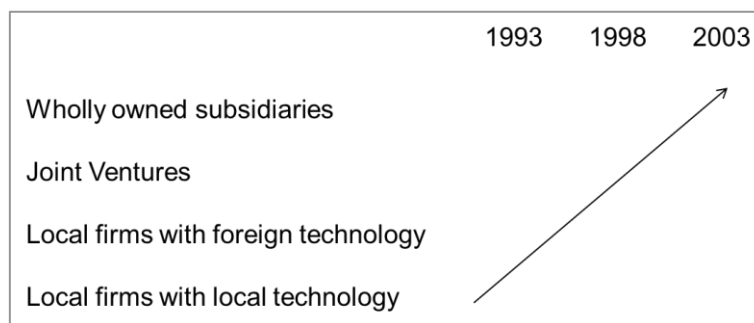
**Table 2.4: Changing ownership structure of South African-based vehicle manufacturers**

<b>South African Assembler</b>	<b>Ownership: 1990</b>	<b>Ownership: 1998</b>	<b>Ownership: 2007</b>	<b>Ownership: 1990 to 2007</b>
<b>Toyota</b>	100% local (listed on Johannesburg Stock Exchange)	Local: 72.2% (JSE listed) Toyota (Japan): 27.8%	Toyota: 75% Wesco (South Africa): 25%	SA to Transnational Company (TNC) - dominated Joint Venture
<b>Volkswagen</b>	Volkswagen AG: 100%	Volkswagen AG: 100%	Volkswagen AG: 100%	TNC – no change
<b>BMW</b>	BMW AG: 100%	BMW AG: 100%	BMW AG: 100%	TNC – no change
<b>Daimler Chrysler</b>	DaimlerChrysler (Mercedes Benz): 50%, Local 50%	DaimlerChrysler (Mercedes Benz): 100%	DaimlerChrysler: 100%	Joint Venture to TNC
<b>Ford</b>	100% local (Anglo American)	Anglo American: 45%, Ford: 45% Employee trust: 10	Ford: 100%	SA to TNC
<b>Nissan</b>	87% local, Nissan Diesel: 4.3%, Mitsui & Co. (Japan): 8.7%	Sankorp (local): 37%, Nissan: 50%, Nissan Diesel: 4.3%, Mitsui: 8.7%	Nissan: 87%, Nissan Diesel: 4.3%, Mitsui: 8.7%	Primarily SA to TNC
<b>General Motors</b>	100% local (management)	Local managers: 51%, General Motors: 49%	General Motors: 100%	SA to TNC

Source: Barnes & Morris, 2008: 41

However, the consequences in structural change were not only seen in the OEM sector. As OEMs were conducting an international strategic pattern, with model rationalisation on the one hand and model differentiation on the other (see platform strategy, Section 2.2.1), they also concentrated their resources on overall vehicle design and systems integration. Hence, it became important that global suppliers took over design responsibilities and the control of the supply chain for sub-assemblies. To ensure worldwide alignment and to reduce complexity in the supply chain OEMs chose to forge global relationships with their first-tier suppliers. These suppliers had to ensure the worldwide supply chain and in order to this they set up operations near to their customers. This concept of follow sourcing was either accomplished by building sites on a greenfield in proximity to their customers' plants or by purchasing enterprises in the respective areas (Barnes & Morris, 2008: 34).

South African OEMs also wanted their domestic suppliers to be integrated globally and, therefore, have equity relationships with international firms. In an era with local content requirements whereby suppliers had licensing agreements with multinationals, the trend was heading increasingly towards more integration of local suppliers in the global automotive value chain. This trend is pictured in the following illustrations. Figure 2.11 shows schematically the trend of sourcing strategies by OEMs in favour of wholly owned multinational subsidiaries. This trend is supported by evidence of a sample of the supplier structure of four OEMs (see Table 2.5) and also by an example of the changes in the supplier structure of an automotive OEM before and after the liberalisation (see Figure 2.12).



**Figure 2.11: Changing strategic perspectives on the ownership of component suppliers**

Source: Barnes & Kaplinsky, 2000: 804

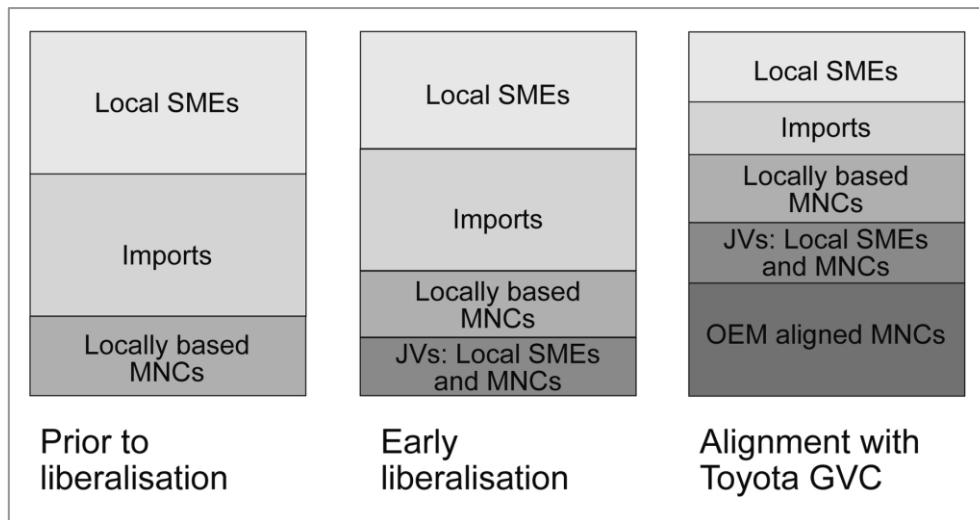


**Table 2.5: Ownership status and technology used by SA-based component manufacturers supplying SA-based assemblers (n = 4) (percentage of purchase value)**

Category	1997	2000	2003
Wholly owned subsidiaries of TNC automotive component manufacturers	26	31.7	37.5
Joint ventures between SA companies and TNC automotive component firms	18.5	26	32.5
SA companies with technology agreements with TNC automotive component firms	29.8	24.3	20
SA companies with South African technologies	25.8	18	10

Source: Barnes & Morris, 2004: 797

These two structural changes of ownership with respect to OEMs and suppliers in the South African automotive value chain were mainly influenced by the Motor Industry Development Program and the process of a transformation from a protected, inefficient industry to a highly outward-oriented export one (for figures, see NAAMSA, 2011a or NAACAM, 2011). The transformation was supported by substantial growth in exports (despite weak domestic demand) and an inflow of foreign direct investment and new technology (OEM- as well as supplier-directed) together with improvements in productivity and economies of scale (Black, 2009: 493). However, high-volume vehicle or component exports are not only a function of competitiveness, but also depend on integration in the global production networks of the OEMs. Local suppliers became dependent on the acquisition of a foreign partner to gain access to international markets. This process was facilitated by vehicle manufacturers to ensure a sustainable and more competitive domestic supply chain.



**Figure 2.12: Impact of liberalisation and alignment on suppliers of Toyota SA**

Source: Robbins, 2007

The changes in ownership had a strong influence on the connectedness of the South African automotive industry (Barnes, 2000: 405). Before the launch of the Motor Industry Development Program the local content requirements combined with the tariffs caused the industry to be cut off from the international environment and its global trends. The new openness of the industry under the Motor Industry Development Program was followed by a reorientation and repositioning in the global value chain of the South African OEMs. The influences on the suppliers were twofold. The first has been explained earlier, namely that OEMs wanted their suppliers to be economically tied to global suppliers. The second influence was more profound: local suppliers had to improve their operational competitiveness, as poor performance was no longer accepted by the OEMs. Failure to do so simply had the result that operations would be switched to an international supplier. By stating these underlying factors the overall aim of the Motor Industry Development Program becomes obvious again: a reorientation of the industry's structure in order to achieve global competitiveness.

However, this reorientation also entailed the development of slightly decreasing local content, as would be expected under conventional trade theory (Black & Bhanisi, 2006: 22). One of the successfully achieved objectives of the Motor Industry Development Program had been to increase model volumes to offer higher economies of scale to OEMs and suppliers. Taking into consideration the structural changes in ownership, it is important to look at the impact of the higher model volumes and the distribution of the value-adding activities between imported and locally produced goods. Changes in local content are normally observed when new models are introduced and/or suppliers are switched during a product cycle. Table 2.6 shows the development of local

content levels of a sample of new models introduced in the first three years of the Motor Industry Development Program.

**Table 2.6: Local content levels of new models introduced from September 1995 to 1998**

<b>New model</b>	<b>Local content (%)</b>
<b>A</b>	61
<b>B</b>	60
<b>C</b>	58
<b>D</b>	51
<b>E</b>	41
<b>F</b>	39
<b>G</b>	37
<b>Average (new models – unweighted)</b>	49.6
<b>Weighted average for the industry</b>	57.5
<i>Note: Local content measured by ex-works price less foreign content</i>	

Source: Black, 2001: 785

The tendency to introduce some models with low local content levels can be seen in the models with a local content of around 50 per cent or less. Four of the seven new models in Table 2.6 operate with a local content proportion of 51 per cent or lower. As the percentage of local content is measured by including assembly and profit margins, the level of components sourced locally is actually much lower. A proportion of 40 per cent of actual local components translates into less than 30 per cent of 'real' local content (Black & Bhanisi, 2006: 24).

The rapid transformation of the industry into an export-oriented one ran into a basic problem. The technology used by local component suppliers was outdated (but was still being used for domestic production, like the VW Citi Golf and Toyota Tazz) and could not be used for export business, as these models were built using more recent technologies. To solve this problem investment and foreign direct investment would have been required to upgrade the technology. However, model volumes were still not at sufficiently high levels to justify large investments in local production. At this time, the highest production volumes per model were about 40,000 to 50,000 units per year, which did not justify large-scale upgrades in the domestic component industry (Black & Bhanisi, 2006: 26). This argument should be taken into consideration when analysing the data in Table 2.6. Low local content levels normally appear in low-volume models because most of the components

are sourced from the international supply networks of the OEMs and multinational suppliers to limit direct investment and take advantage of economies of scale in a price-sensitive market. A comparison between local content in components of export- and non-export-focused suppliers supports the volume-based argument. The average proportion of local content in the period 2000–2005 for exporters was 90 per cent, whereas for non-exporters it was below 70 per cent (Black & Bhanisi, 2006: 27). Higher volumes enabled exporting suppliers to invest in technology in order to supply international markets, while non-exporters still had to handle uneconomical volumes and, therefore, relied on international supply chains for particular (sub)-components that needed high investment.

A second factor influencing local content levels derived from foreign direct investment and the different sourcing patterns of multinational suppliers. Because of the growing export business and the follow-source expectations of the automotive lead firms, foreign direct investment was quite substantial at the end of the 1990s and the beginning of the new millennium. Figure 2.11 shows the progression in the supply chain of South African OEMs from South African component companies with local technologies to wholly owned subsidiaries of multinational suppliers. Local content data for the period 2000–2005 confirms a significant difference of local content in components for multinational suppliers and South African-owned suppliers. Whereas South African-owned suppliers focus their supply chain activities on domestic sub-products (with a weighted local content of 90 per cent) the multinational suppliers operate on a basis of just two-thirds locally produced sub-components (Black & Bhanisi, 2006: 26). The use of foreign inputs mirrors the global trend of dispersed production networks in the automotive industry. But it is also caused by the fact that production volumes for particular domestically used products are not large enough to build up local production. In this case multinational suppliers prefer to take advantage of their global networks in order to set up their supply chains.

## 2.3.4 FUTURE CHALLENGES FOR SOUTH AFRICA'S AUTOMOTIVE INDUSTRY

### 2.3.4.1 SOUTH AFRICA'S AUTOMOTIVE INDUSTRY IN AN ADVANCED EMERGING MARKET

A ranking by the FTSE Group (a provider of stock market indices) classifies South Africa as an advanced emerging market on the basis of its national income and its market infrastructure (FTSE Group, 2009). Other countries in this market classification are Brazil, Hungary, Mexico, Poland and Taiwan. Markets are assessed with criteria regarding the market and regulatory environment, the custody and settlement, the dealing landscape and whether a developed derivative market exists (for further information, see FTSE Group, 2009). Advanced emerging markets are classified as such because they are upper middle gross national income (GNI) countries with advanced market

structures or high-income GNI countries with less developed markets. Other categories, as defined by the FTSE global equity index series, are developed countries, secondary emerging countries and frontier countries. Some other classifications also rank South Africa in the category of an emerging market. The Morgan Stanley Capital International Barra index (MSCI Barra) simply includes South Africa in the emerging markets section (MSCI Barra, 2009). South Africa is also a member of BRICS, which includes South Africa among the largest developing economies together with Brazil, Russia, India and China. And there are more terms and definitions that categorise South Africa in the same league as other newly industrialised countries (NICs).

The general classification of South Africa in terms of its market and economic environment raises the question of what stage does the South African automotive industry find itself in. Put another way, Barnes (2008: 39) asks: 'What then of those developing countries (such as South Africa) with automotive industries that are important contributors to economic wealth, but appear to be caught between the established, developed economy industries and the rapidly growing, highly competitive Asian economies?' This comment refers to the matter of the dispersed automotive industry. Lead firms (OEMs) in the developed countries (like the US, Japan and Western Europe) are controlling the development of the worldwide automotive industry. And the ways in which countries or regions are integrated into global value chains play a significant role. There is the positive outcome of integration on the one hand: export growth and expanded production, foreign direct investment, general industry upgrading – which is normally accompanied by a decline in local ownership and the downgrading of domestically owned firms (Black, 2009: 483–484). But on the other hand, the result could also be that an industry is downgraded to the periphery of automotive networks.

So what are the main trends with regard to the automotive industry in developing countries and their respective influences on South Africa's automotive industry? First, the share of emerging markets in the automotive industry with regard to both domestic sales and export production has grown considerably. Second, global automotive value chains are better described by 'regionalism' than by globalisation, which implies that an agglomeration in specific areas can be observed. And third, within developing country locations there is a growing concentration in markets with high growth rates and large market potential (Black, 2009: 485). From these main trends emerge different types of viable automotive spaces, which can be identified by specific criteria. The first is a national economy that offers a very large population, low vehicle ownership and dynamic economic growth rates. The protected markets of China and India are two classic cases of these kinds of economies. These countries offer the potential to build up large-scale integrated industries, which are even likely to include a substantial domestic ownership. The second type of a viable automotive space is developing countries that adjoin developed market areas. These areas have

the potential to become integrated into the neighbouring developed markets and profit from a combination of reasonable technological capabilities combined with low wages and short distances to the developed markets. Mexico, with its adjacent location to the US and the advantage of being a member of the North American Free Trade Agreement, is one example, as are the Eastern European countries (Poland, Czech Republic, Hungary and Slovakia) because of their recent inclusion in the expanded European Union and the resultant liberalisation of trade. The third type of viable automotive spaces is constituted by emerging regional markets which consist of countries allied by trade agreements. Two examples are the Mercado Comùn del Sur (MERCOSUR), integrating Brazil, Argentina, Paraguay, Uruguay and Venezuela in a regional free-trade area and the Association of Southeast Asian Nations (ASEAN), consisting of ten countries (members include Thailand, Malaysia, Indonesia, the Philippines, Singapore, etc.). These geopolitical and economic organisations align efforts for economic growth, social progress and stability in the region. With respect to the automotive industry, inefficiencies can develop in these pacts whenever more than one country has ambitions in vehicle production. All other environments which aim to establish the automotive industry and its integration in the global automotive value chain lack one major attribute compared to the three types of viable automotive market environments described above: a major (domestic) market potential in terms of current access to regional groupings and the potential to benefit from membership of one of the large trading blocs (Black, 2009: 486).

South Africa's automotive industry does not fully qualify as one of these viable automotive spaces. It neither profits from substantial growth potential nor is it integrated into a regional emerging economic group – apart from the Southern African Development Community and some other African trade areas, which are simply too small from an economic point of view. Its geographic location does not favour South Africa either, as the traditional automotive markets and emerging automotive markets are distant.

So the question remains – at what stage does South Africa's automotive industry find itself in if a classification according to general types of economic grading is not possible? A description of the industry's development, which is more inwardly oriented, defines three different stages (see Table 2.7) of automotive production (Black, 2009: 491). These three stages start with completely knocked down assembly, whereby completely knocked down packs are imported and assembled. The CKD (completely knocked down) stage is characterised by low volume and high cost, especially when a high level of localisation is stipulated by governmental regulations. The industry is focused on the domestic market and product design is adapted to the market. The next stage is the transition phase where normal series production and assembly takes place. This stage is characterised by expansion to export markets and involves the advancement to full production levels in terms of model line-up, quality and design. As local content is moderate due to cost reasons, total cost is

medium because of insufficient economies of scale. Total production cost for the case of South Africa is also influenced by high logistics costs. The full manufacturing stage includes full integration in the parent company. Model volumes increase and the model line-up consists of one to two platforms. As higher volumes attract foreign direct investment and enable local suppliers to supply components economically, this also means that to lower production costs local content levels have to be medium or high to avoid penalties incurred by import-related logistics costs.

Formerly protected developing countries like South Africa normally follow the steps of this conversion. South Africa finds itself in the transition phase, with some interesting prospects to advance to the full manufacturing stage when combined target markets (domestic and export) offer sustainable production volumes. The reasons that South Africa has not already advanced to the full manufacturing stage are varied. The historical context of a series of protection programmes that were in place until 1995 led to the fact that models produced in South Africa were outdated. Therefore, domestic assemblers and suppliers were not able to upgrade technological equipment as well as they were capable of. A change only occurred after the Motor Industry Development Program was introduced and export of vehicles and components was stipulated. The OEMs then pursued strategies to integrate themselves and their supply chains into the international networks of their parent companies. As a result, model volumes increased substantially and South Africa's automotive industry profited by the upgrading process that was necessary to compete in international markets (Black, 2009: 491).

**Table 2.7: Stages in the development of vehicle production in South Africa**

<b>Category</b>	<b>CKD Assembly</b>	<b>Transition</b>	<b>Full manufacturing</b>
<b>Target market</b>	Domestic	Domestic and export	Domestic and export
<b>Level of integration with parent company</b>	Low, import of CKD packs	Medium	High
<b>Model line up</b>	Many models	One or two	One or two
<b>Derivatives</b>	Limited to reduce costs	Full range to supply export market	Full range to supply export market
<b>Local content</b>	Generally low but may be quite high as a result of local content requirement	Moderate based primarily on cost factors	Medium to high
<b>Quality</b>	Below source plant	Equal to source plant	Equal to source plant
<b>Production cost</b>	High	Medium: penalties incurred by high logistics cost	Low
<b>Domestic design</b>	Local adaptations	None	None; may do worldwide R&D in niche areas

Source: Black, 2009: 491

#### 2.3.4.2 THE AUTOMOTIVE PRODUCTION DEVELOPMENT PLAN (APDP)

To ensure automotive production in South Africa, it was necessary that the Motor Industry Development Program, which runs until 2012, be reviewed and the impact of the programme assessed. Furthermore, it was crucial to provide the industry with a suitable outlook with respect to further government directions and policy beginning in 2013 (Kaggwa, Pouris & Steyn, 2007: 72–73). The implication for policy and government is to build a viable automotive space. This space must be defined in terms of regional or national boundaries and be protected by policy requirements. Policy must also ensure that the domestic industry is competitive and can attract foreign investment (Black, 2009: 485–486).

From the beginning of 2005 until the third quarter of 2008, this process was undertaken by a group involving the Department of Trade and Industry (DTI), the National Treasury and independent industry experts. Findings were that the automotive industry is the largest and leading manufacturing sector in the domestic economy. Under the regulation of the Motor Industry Development Program, the industry has rationalised and restructured, experienced significant



growth in production volumes, exports and investments while maintaining employment levels in a competitive environment. The global automotive environment is also characterised by substantial government support from the hosting countries, as emerging markets, like Eastern Europe and Asia, continue to attract investment. For South Africa, which sells less than 1 per cent of global automotive production and is isolated from larger markets and shipping routes, the remaining challenges are economies of scale and the depth of domestic component manufacturing. So the strategic direction focuses on further expanding production as well as deepening the industry. The goal of the Automotive Production Development Program is to double production by 2020 to 1.2 million vehicles and to improve local content levels (DTI, 2008).

To achieve the goals mentioned above four key elements will constitute the Automotive Production Development Program:

- Tariffs: Stable tariffs will remain at 25 per cent for light vehicles and 20 per cent for components; this provides sufficient protection to justify local vehicle assembly.
- Local Assembly Allowance (LAA): Vehicle manufacturers with a production volume of at least 50,000 units per annum will earn duty credits for 18–20 per cent of their domestically produced vehicles; this support aims to encourage high-volume vehicle production.
- Production incentive (replaces the import-export complementation scheme): Local value addition will be rewarded with duty credits; local value addition in the automotive value chain is expected to increase.
- Automotive Investment Allowance (AIA): Starting in 2009, this assistance will replace the current Productive Asset Allowance (PAA) and allow 20 per cent of the qualifying investments to be paid over to the participants over a period of three years (DTI, 2008).

Table 2.8 provides a comparison of the key elements of the Motor Industry Development Program and the Automotive Production Development Program. One major implication for the local supply base is the fact that investment assistance is available to the entire value chain. This implies that every investment which is 'auto'-related qualifies for the AIA and gives suppliers the opportunity to upgrade their technology and increase productivity in order to compete in the automotive value chain.

**Table 2.8: Summary comparison of MIDP and APDP**

	<b>MIDP (1995 – 2012)</b>	<b>APDP (2013 – 2020)</b>
<b>Tariffs</b>	The level of protection offered by tariffs reduced consistently from 65% and 49% for CBUs (completely built up) and CKDs (completely knocked down) respectively in 1995, to 25% and 20% in 2012	The level of protection offered by tariffs will remain constant at 25% and 20% for CBUs and CKDs respectively from 2013 to 2020
<b>Local OEMs vehicle allowance</b>	Duty Free Allowance (DFA): 27% of the local assembled vehicle's wholesale price is rebated against the duty payable on imported components that are used in the production of vehicles for the domestic market	Local Assembly Allowance (LAA): 20-18% of local assembled vehicle's wholesale price is rebated against the duty payable on imported components that are used in the production of vehicles, irrespective of where the production is sold, as long as annual units per plant exceed 50,000
<b>Industry incentives</b>	Export linked duty credits earned – benefits calculated on local material used	Market neutral Production Incentive in place – benefits calculated on local production value
<b>Investment assistance</b>	Productive Asset Allowance (PAA):  <ul style="list-style-type: none"> <li>- Only benefits OEM and 1st tier suppliers whose investment is linked to a local OEM</li> <li>- 20% benefit, payable over 5 years (4% per year)</li> </ul>	Automotive Investment Allowance (AIA):  <ul style="list-style-type: none"> <li>- Benefits OEM and auto component suppliers as long as investment is auto focused</li> <li>- 20% benefit, payable over 3 years (6.67% per year)</li> </ul>

Source: Ellis, 2008: 5

'The revised MIDP (Motor Industry Development Program) would seek to provide industry with a reasonable level of support in a market neutral manner,' Trade and Industry Minister Mandisi Mphahla said in September 2008 (Makapela, September 2008). The revised programme also needed to be comparable with major competitors and consistent with World Trade Organization (WTO) rules.

Vehicle manufacturers and their suppliers have to work together to reduce the cost gap against world-class benchmarks and collaborate closely to achieve sustained net cost reductions to enable the industry to become more competitive internationally, to grow the industry's export business and to provide more affordable products to local market. The detailed elements of the Automotive Production Development Program from 2013 to 2020 will enable vehicle manufacturers and their suppliers to plan strategically and to finalise investment decisions with confidence and certainty (DTI, 2008). It should also enable various manufacturers to tender for the production of new

models in South Africa (NAAMSA, 2007). Table 2.9 shows the specific goals of the subsector programme for the automotive industry.

**Table 2.9: Measurable objectives and medium-term output targets; subsector customised programmes**

Measurable objectives	Expected outcomes	Performance indicator/measure	2010/2011 target	2011/2012 target	2012/2013 target
Sustainability and growth of local automotive and components manufacturing capacity	Launched Automotive Investment Scheme (AIS)	Value of investments per annum	ZAR3 bn	ZAR4 bn	ZAR3 bn
	Finalisation of the Automotive Production and Development Programme (APDP) implementation guidelines	Publication of the APDP guidelines	Publish the APDP implementation guidelines		
	Competitiveness improvements in component manufacturing, with the intention of retaining jobs in the automotive sector	Number of firms participating in Supplier Development Programme	Increase participation of firms by 30 from the previous quarter	Further 29 firms to participate from quarter 4	Total of 75 firms assisted via the SDP

Source: DTI, 2010: 47

#### 2.3.4.3 STRUCTURAL ISSUES IN SOUTH AFRICA'S AUTOMOTIVE VALUE CHAIN

The developments and goals mentioned in this chapter lead to the subject of how the South African automotive value chain will develop in the next decade. Looking at a targeted increase of production of more than 100 per cent, the question is how will the industry strategically align the influences of international competition and domestic production? As the progress of car manufacturers seems to be designated by the parent companies because they are integrated into the operations of their parent organisations (this is not entirely correct, as the subsidiaries in South Africa have to tender for new projects), the development of the component suppliers – especially the local organisations without equity ties to foreign multinationals – needs to be defined. This issue does not examine the South African inbound market only. Furthermore it also looks at the worldwide competitiveness of South African component suppliers in the global automotive supply chain. Considering the relative importance of the automotive industry for South Africa in terms of its

contribution to the gross domestic product, employment figures and the ongoing support for the Automotive Production Development Program by the government, it is of relevance to investigate the structural issues in the value chain (Kaggwa *et al.*, 2007: 72–73).

Besides the needs being addressed by the Automotive Production Development Program, the South African automotive industry faces issues that are influenced by ongoing dynamics in the global automotive industry. The first issue derives from the ballooning trade deficit. The export orientation of the Motor Industry Development Program attracted foreign direct investment because of the import-export complementation scheme, but the components that are currently exported mainly consist of peripheral parts. These components are low value-added and have high raw-material content. The largest part of components for export is catalytic converters, stitched leather and tyres. Furthermore, the export business is driven by multinational suppliers who made relatively small investments and employ low levels of integration into the domestic industry (Black, 2009: 503). These factors lead to an uneven balance of technological capabilities available in the domestic market, as core components with high technological requirements are mostly imported. But on the other hand, there are also notable developments in the industry whereby high-value-added components are also manufactured domestically. These facts are supported historically as explained in the following. By 2005 engines and engine parts accounted for 7.7 per cent of component exports and this figure is likely to become higher (Black, 2009: 505). One of the contributors is Ford, with its engine plant in Port Elizabeth. Its RoCam 1.3 and 1.6 litre engines are manufactured for both the domestic and export markets. For the 1.3 litre version of the RoCam engine the South African-based plant is the sole supplier worldwide. Besides Ford's large investment, the creation of jobs in the area and some international suppliers, the effect on the local supply chain was also of marked significance. The engines had a level of local content of 82 per cent. Domestic supplies consisted of parts like blocks, cylinder heads, exhaust manifolds and valves, among others, and attracted local suppliers like Murray & Roberts Foundry Group and Atlantis Forge, which invested in new equipment (Cokayne, 2002). Despite this success story, the trade balance is also influenced by weak domestic sales and a limited local market. International firms do not normally want to expose themselves to large-scale exports of particular models or components when the domestic market is restricted.

This factor leads to the question of how securely foreign direct investment is embedded in South Africa, given the constraining domestic market and the low overall volumes, including exports. Foreign companies hesitate to undertake investments where a critical mass of at least 100,000 units per model/component is not exceeded. But even when this critical mass is met it can be seen that international first-tier suppliers often operate as assemblers. They source the subcomponents overseas and use advanced assembly jigs and testing equipment to put together the product. But

there are also particular examples of sustainable establishment. The catalytic converter industry began with low levels of investment, and initially involved the coating and canning of the imported substrates. Due to the pace of expansion – South Africa currently produces 14 per cent of global output – the component industry extended its value chain in South Africa to include the manufacturing and cutting of substrates. Additionally this involved creating associated industries, like matt manufacturing, flex connections and exhaust manifolds (Black, 2009: 505–506). A major factor influencing the establishment of this industry is the proximity to the raw materials in South Africa (e.g. platinum group metals) that are needed for production and lead to a high level of working capital in the industry.

The domestic supplier landscape is also exposed to the challenges of competition in the international automotive industry. Barnes and Kaplinsky (2000: 797) state that where local production of components by a multinational supplier is involved, there is decreasing space for locally owned component suppliers. Despite the increasing opportunities for domestic firms through backward linkages (see the example of the catalytic converter industry above) with multinational suppliers, it is to be questioned whether local suppliers will be able to attain the first-tier stage of the supply chain or if they will have to operate lower the value chain. The term ‘lower’ not only refers to the position the supplier finds itself in the supply chain; it also gives an indication of the value-added nature that these companies perform on the particular components (Black, 2009: 485).

To draw the big picture, it is necessary to take a close look at the South African automotive value chain and its predicted structure over the next decade under the influence of the Motor Industry Development Program and Automotive Production Development Program. The predicted structure of the South African automotive value chain is mainly influenced by three events. Firstly, OEMs are investing in the South African location, as witnessed by recent decisions by Daimler (production of the C-class successor) and BMW (production of the 3-series successor with an investment of R2.2 billion). The fact that global lead firms are making a commitment to their operations and the ongoing export/import-substitution under the Automotive Production Development Program makes OEMs claim that local content must improve substantially to reach global competitiveness. Secondly, the presence of car makers suggests that multinational suppliers will continue or even expand their strong presence in the South African automotive industry and there could be decreasing opportunities for local suppliers to gain access to the value chain as competition increases. The third fact which influences the automotive value chain is technological modularisation. As more competencies are being outsourced by the lead firms to capable suppliers, a power shift to module suppliers is predicted. This shift could have positive implications

for local suppliers, as the dominance of the lead firms moves up the value chain and they will, therefore, be more closely linked to firms operating high up the value chain.

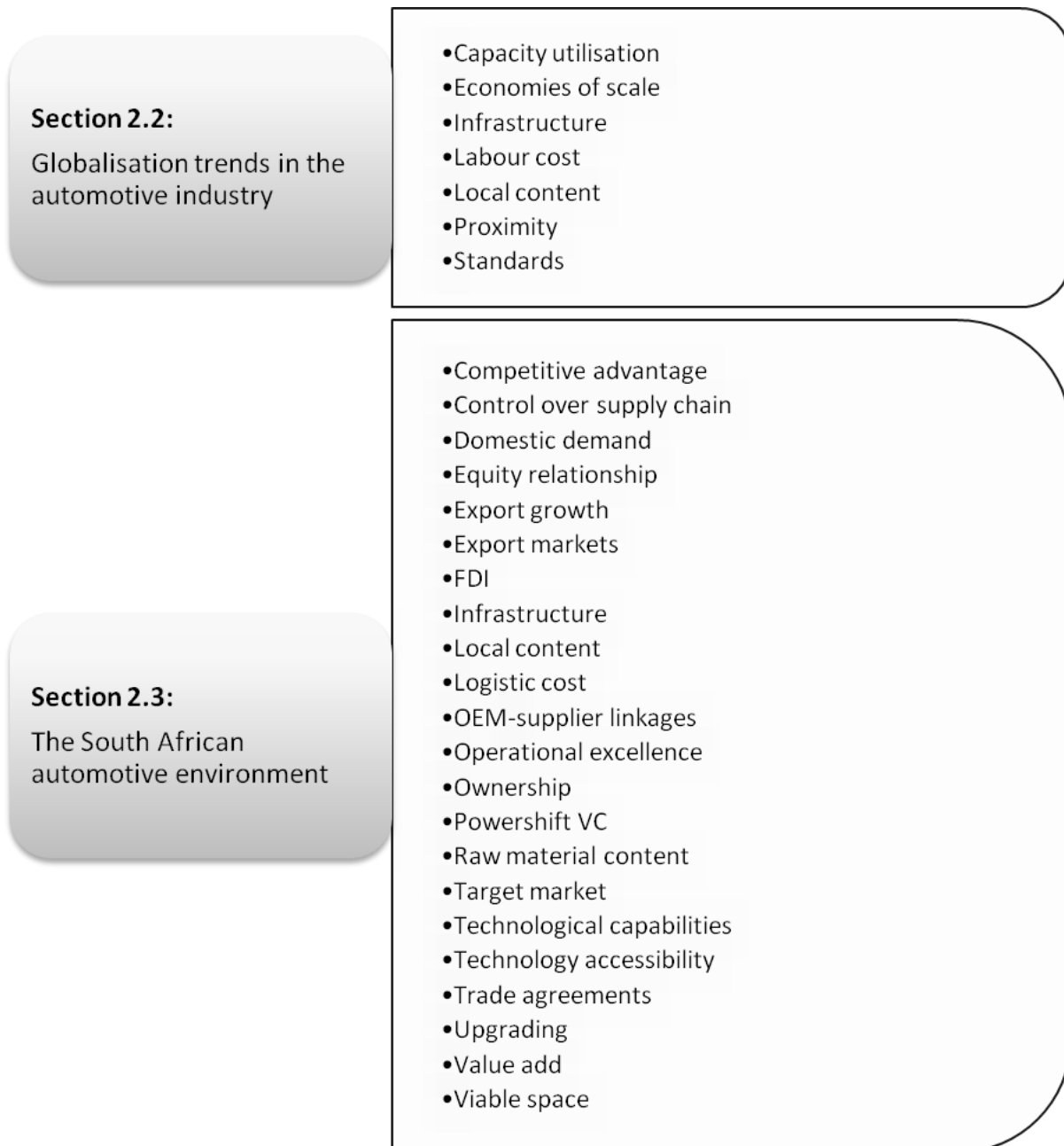
There are two strategic options facing vehicle assemblers. They can either pursue a low-volume strategy by maintaining a wide range of models or follow a rationalisation strategy that focuses on the production of one or two models with the aim of achieving economies of scale. Although the low-volume option with high production costs seems not to be viable because of decreasing import tariffs in the medium to long term, this option does offer some strategic benefits. South African operations are already used to access low-volume markets in Asia and Australia, with reduced shipping times compared with Europe. This strategy is mainly pursued by German car makers Daimler and BMW. South African-based assembly plants can also play a role as swing suppliers used for increased global demand, but are likely to be the first to cut production when global sales decline (Black, 2009: 500). The rationalisation option is in line with government directions and aims to reduce production costs. It also enables domestic supply to act under economical circumstances which would substantially reduce logistics costs. Logistic costs are one of South Africa's major disadvantages. The cost of inbound and outbound logistics is a function of long shipping distances and a high level of imported content (Black, 2009: 495).

Sustainability in an environment of falling protection and assistance is a function of cost competitiveness (including factors like labour, material and logistics) and more dynamic attributes, such as production volumes and productivity improvement over time (Black, 2009: 506). As seen in the previous arguments about the threats to the South African automotive industry, it should also been noted that the opportunities of a regional market are not yet fully discovered. At a NAAMSA (National Association of Automobile Manufacturers of South Africa) African export meeting in 2010 industry representatives suggested facilitating free-trade agreements for built-up vehicles and components with a number of African countries (Houghton, 2010). In particular, the trade agreements of SADC (Southern African Development Community) and COMESA (Common Market for Eastern and Southern Africa) would enable the industry to grow the export business further and simultaneously reduce the limiting factors like logistics cost because of the geographic location of these markets.

## 2.4 SYNTHESIS

This chapter highlighted globalisation trends in the automotive industry as well as the characteristics of the South African automotive environment. Several factors and concepts described in this chapter impact on the sustainability of local suppliers in emerging markets. Figure 2.13 lists these factors alphabetically within each subsection. These factors will be taken into consideration in the development of a comprehensive model of sustainability of local suppliers in

emerging markets in Chapter 5, together with next two chapters, which conclude the literature review.



**Figure 2.13: Independent variables identified in the literature review**

## **CHAPTER 3**

# **LITERATURE REVIEW: AUTOMOTIVE VALUE CHAINS AND GLOBAL VALUE CHAIN GOVERNANCE**

### **3.1 INTRODUCTION**

As described in the first chapters, the automotive industry is spreading its operations in more countries to gain access to emerging markets and to operate at lower costs. To further investigate this trend, it is important to discuss the value chain in general and to deepen the theoretical insights into global value chains (GVCs).

This chapter discusses value and supply chains with respect to the automotive industry. As the automotive industry is distinctive from most other industries, important concepts like fragmentation, modularisation and supplier classification are examined in this context. In addition, general theory about value and supply chains is reviewed. The concept of global value chain governance forms the third part of this chapter. The chapter ends with a discussion of the global value chain governance approach in the context of the research problem.

The theory of supply chain management is used to explain concepts which are applied in the automotive industry. These concepts are normally defined from the customer's point of view (e.g. the automotive OEM). Because this research is focused on the supplier's point of view which is also the unit of analysis, the term supply chain is used as a synonym for the downstream value chain of the automotive component suppliers as well as for the upstream value chain of the automotive customers (e.g. first tier suppliers, OEMs). Therefore, in this case, supply chain theory is embedded in value chain theory and will be discussed on the operational supply chain management level.

### **3.2 AUTOMOTIVE VALUE CHAIN AND SUPPLY CHAIN**

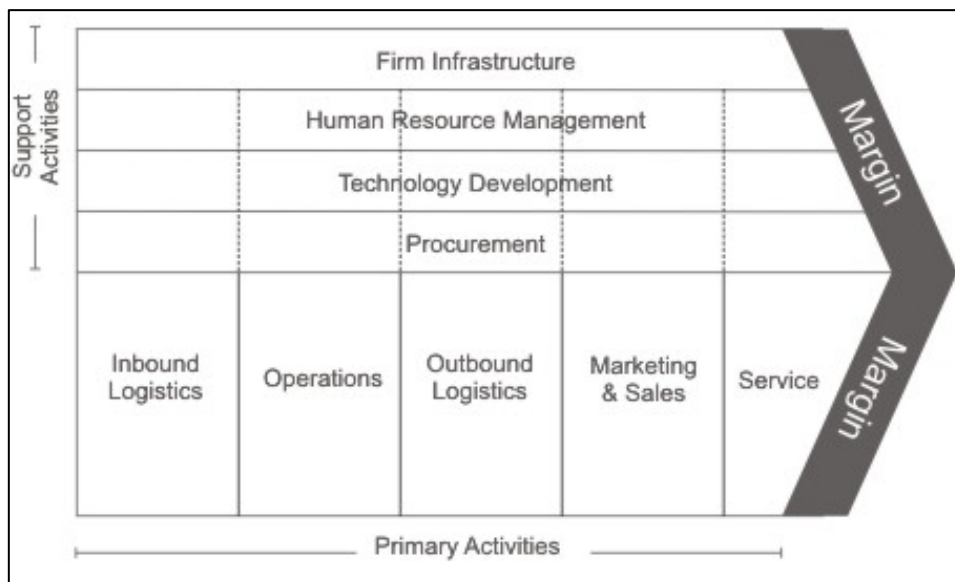
#### **3.2.1 VALUE CHAINS AND NETWORKS**

Value chains provide a snapshot of economic activity that cuts through larger structures, while at the same time clearly identifying smaller-scale entities and actors, such as workers, clusters, firms, and narrowly defined industries (Sturgeon, 2001; Sturgeon *et al.*, 2008: 304). This 'meso-level' view of the global economy provides a sufficient base to analyse the research problem and allows for a clear picture that is not blurred by the excessive variation and differences of other concepts like clusters and networks. Another argument for examining the value chain concept derives from the fact that the complexity of the research is not forced into a narrow spatial or sectoral frame.



The variety of network forms derives from the globalisation of production and trade. This means that the vertical disintegration of transnational companies is triggering several types of chains and networks that are used to coordinate and control the complex transactions among companies and geographic areas. There have been several sustained efforts to systemise observed patterns in global industries, most notably the global production-networks approach (Henderson *et al.*, 2002) and global value-chain approach (Sturgeon *et al.*, 2008). As argued above, the global value chain approach will be used for the further research because it is capable of analysing the subsets of networks, clusters or grids without becoming lost in complexity. What is the difference between a value chain and a production network? Sturgeon (2001: 10) defines the difference of these types of activity agglomerations in terms of the value chain being 'a sequence of productive activities leading to and supporting end use', whereas a production network is 'a set of inter-firm relationships that bind a group of firms into a larger economic unit'. Coe, Dicken and Hess (2008: 274) add the aspect of international fragmentation to the definition, as they define global production networks as 'one whose interconnected nodes and links extend spatially across national boundaries and, in so doing, integrates parts of disparate national and sub-national territories'.

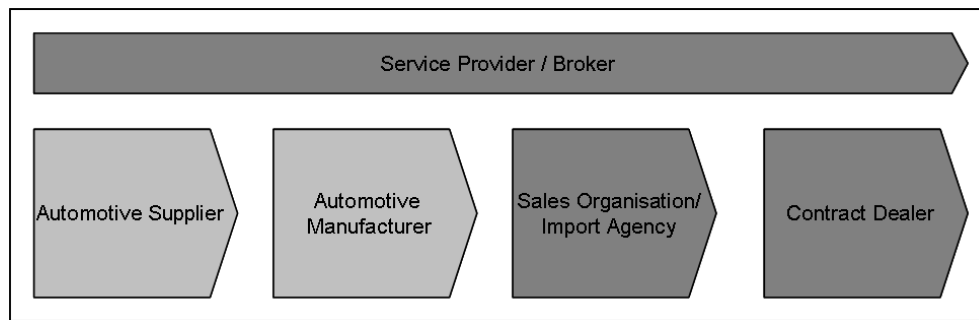
From the perspective of a firm (see Figure 3.1), a value chain describes the primary activities and related costs, like purchasing and inbound logistics, operations, distribution and outbound logistics, sales and marketing, and service. These primary actions are supported by activities like research and development, human resources and general administration (Porter, 1985: 34).



**Figure 3.1: Porter's value chain**

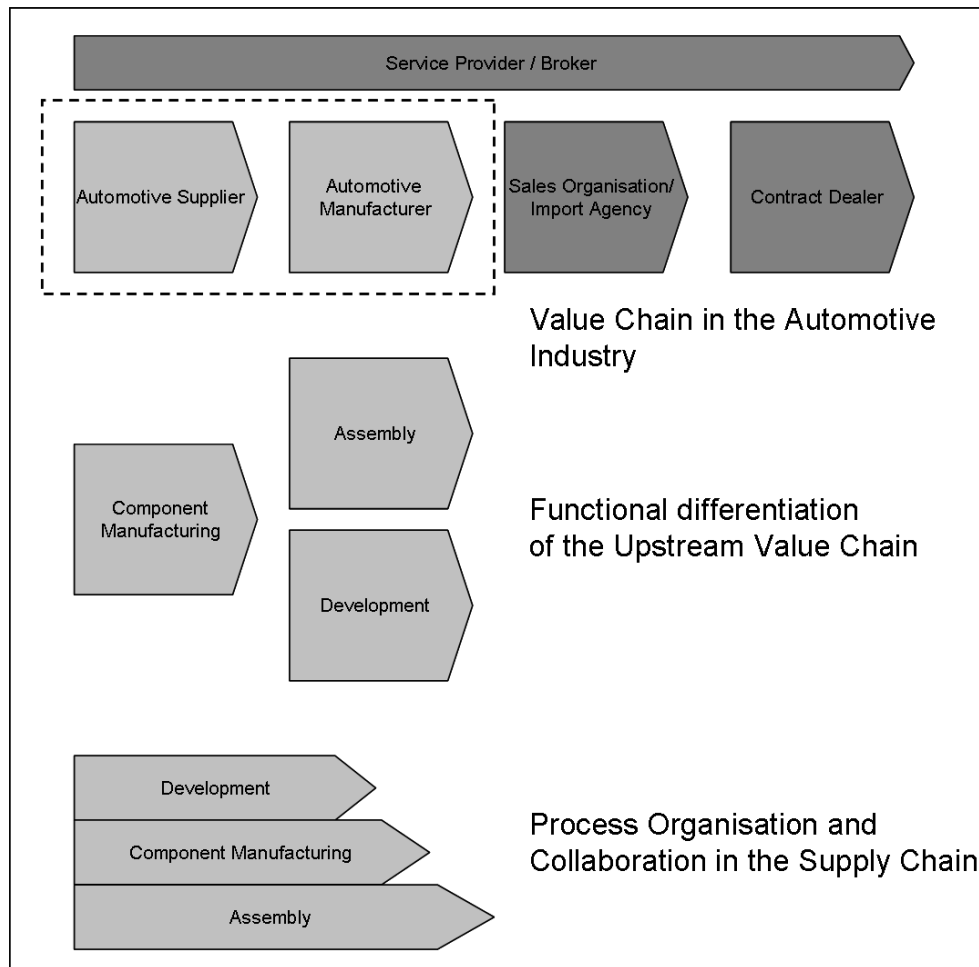
Source: Porter, 1985: 34

Hence, vertical disintegration applies not only to the single company's view, but instead describes the distribution of value chain activities of an entire industry (Gereffi, Humphrey & Sturgeon, 2005; Sturgeon, 2001; Sturgeon, 2008). Therefore, the concept of value chains has been adapted to value systems, which describe the combination of activities from the supplier-related value chains, company value chain, distribution-related value chains to the customer-related value chains. It can be said that a company's value chain is embedded in a larger system of activities. Suppliers' value chains, also called upstream value chains, are important because of the cost and quality of the inputs they deliver to a company's value chain. This implies that by generating more effective inputs by the supply base the competitive position of a company is enhanced substantially. The forward channel value chains, also called downstream value chains, are of relevance because of the cost and margins that come about from getting the product to the customer and because of the activities that influence the customer's satisfaction. Figure 3.2 illustrates the traditional value chain in the automotive industry.



**Figure 3.2: The traditional automotive value chain**

An interesting phenomenon is the role of the actors in value chains. The literature suggests five distinctive types, beginning with the integrated firm, which literally combines all value chain activities under one roof (e.g. Phillips). The second type is the retailer, which markets, distributes and/or resells products or services (e.g. Amazon). The next three types of actors give the picture of a supply chain, whereby the lead firm is the OEM or anchor firm (e.g. Dell, Nike, Daimler) and the suppliers in the tier chain vary from turn-key suppliers, which deliver complex parts and processes (e.g. Bosch, Fedex), and component suppliers whose scope of activities is discrete elements like components, parts and services (Sturgeon, 2001: 16). Figure 3.3 shows the differences between the traditional automotive value chain and functional and process-oriented value chains.

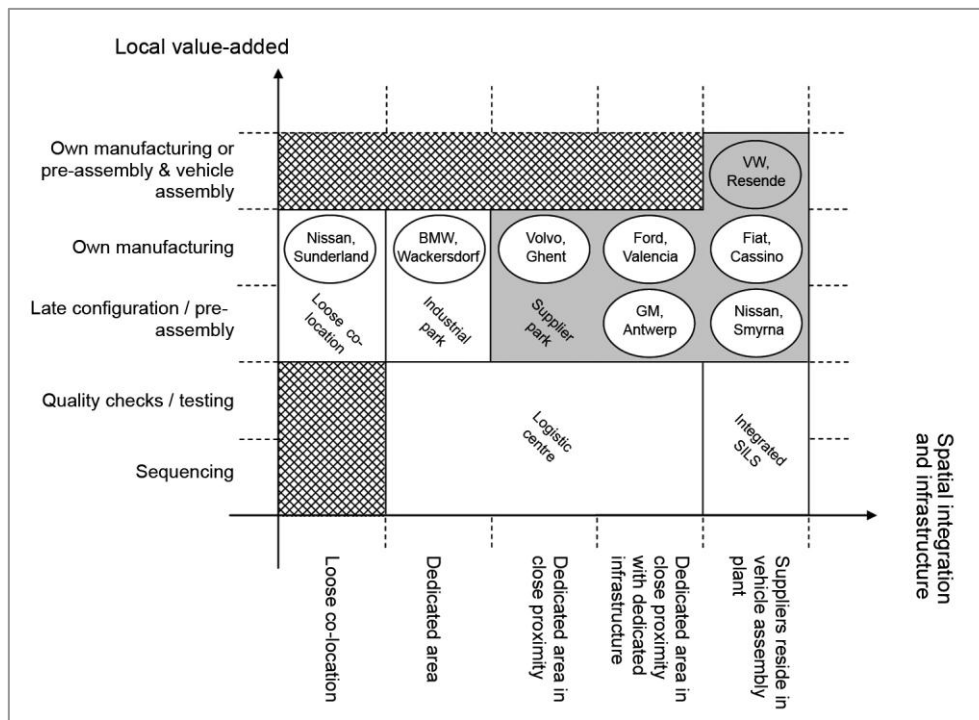


**Figure 3.3: Functional vs. process organisation in the automotive value chain**

### 3.2.2 FRAGMENTATION AND ECONOMIC GEOGRAPHY

Economic geography shows a fragmentation, as the automotive industry is located in nested structures that show strong regional influences (Bryson, 1999; Rugman & Collinson, 2004; Sturgeon *et al.*, 2008; Sturgeon *et al.*, 2009; Uallachain & Wasserman, 1999). This factor not only results in local clusters, but also diffuses globalisation, as decisions in the automotive value chain do not only depend on rationales with regard to microeconomic decision analysis. They also depend on the geographic proximity of new ventures to important clusters, like existing design and production centres. This phenomenon is supported by a study on co-located supplier parks in the automotive industry by Reichhart and Holweg (2008), who find that transaction cost economics is less suited to analyse co-location. Further findings concern a highly concentrated firm structure, which creates high barriers to entry and limits the upgrading prospects for supplier firms due to customer specification (see Figure 3.4). Co-location of suppliers seems to be required to ensure the coordination of physical and informational flows between the business partners on the one

hand, whereas on the other hand the dependency on particular partners rises by constraining the possibility of terminating the contract or restricting the opportunities for economies of scale (Morris, Donnelly & Donnelly, 2004: 131). This trade-off leads to different spatial configurations (Frigant & Lung, 2002: 752). It can be concluded that in the automotive industry production has tended to follow markets (Cattaneo, Gereffi & Staritz, 2010: 16).



**Figure 3.4: The co-location grid**

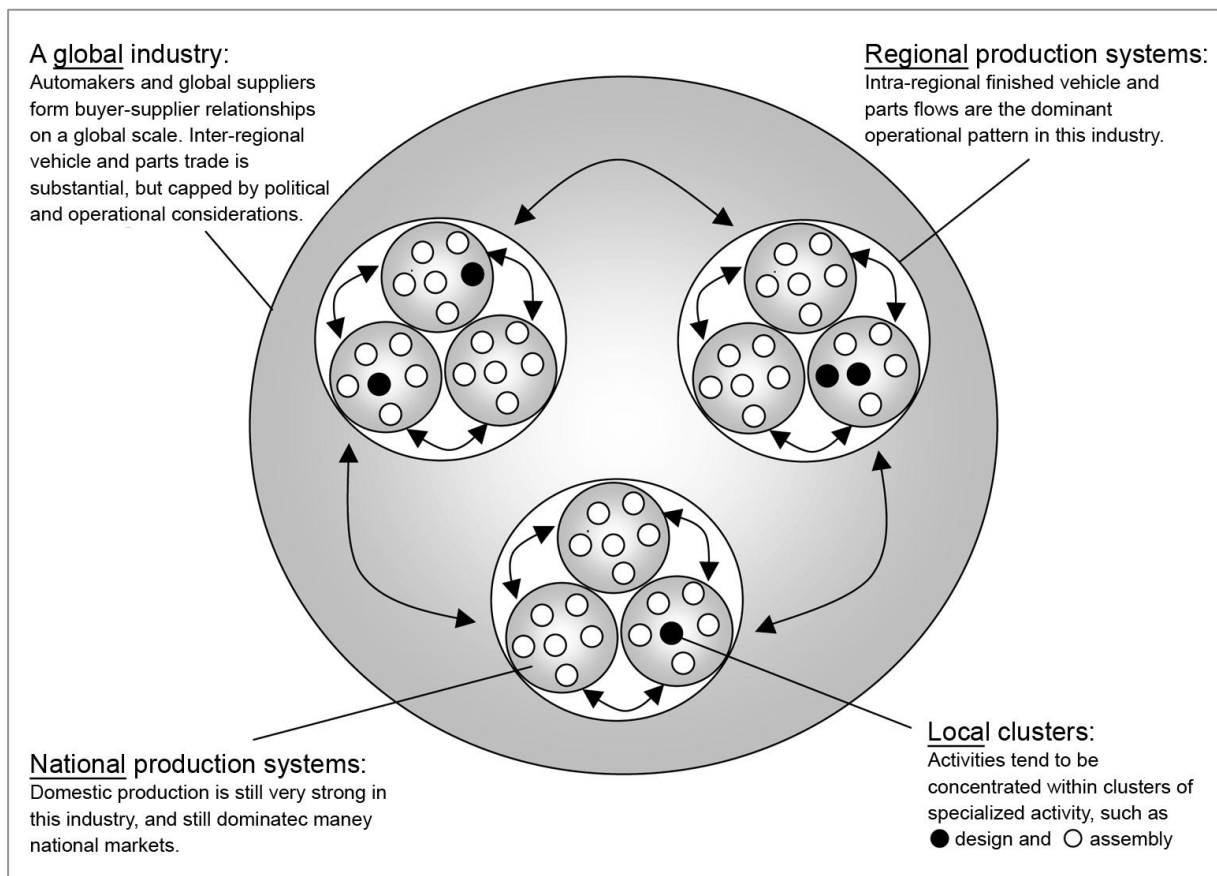
Source: Reichhart & Holweg, 2008: 67

Another important factor in regional structuring is the influence of policy and large groups of stakeholders. These groups show strong interests in the automotive industry because of the impact on national economies and societies. On the one hand, the automotive industry accounts for a large part of the economies' gross domestic product, which automatically leads to the fact that employment in this industry is substantial. On the other hand, there is high visibility of the products among the general public. This puts pressure on political institutions, as the public considers the visibility of national products in daily life as highly valuable (Coe *et al.*, 2008).

The spatial scale of value chains ranges from local clusters to global commodity chains. The local cluster can be seen as an industrial district or a specialised industrial cluster, whereas the global commodity chain includes activities across at least two continents or trading blocs. Between these two extremes of spatial scale there are three other types of value chain or production networks. After the local cluster the next spatial upgrade is the national or domestic production system. An

example for this type of single country network is a local supply base. International and regional value chains define themselves by operating in more than one country; the only distinguishing factor is that the regional system performs within a trade bloc (Sturgeon, 2001: 14).

Sturgeon *et al.* (2008: 306–307) reach the conclusion that local, national and regional value chains are nested within the global automotive value system. These structures are interlinked within the global organisational structures and business relationships of the largest firms. Figure 3.5 illustrates the global automotive value system.



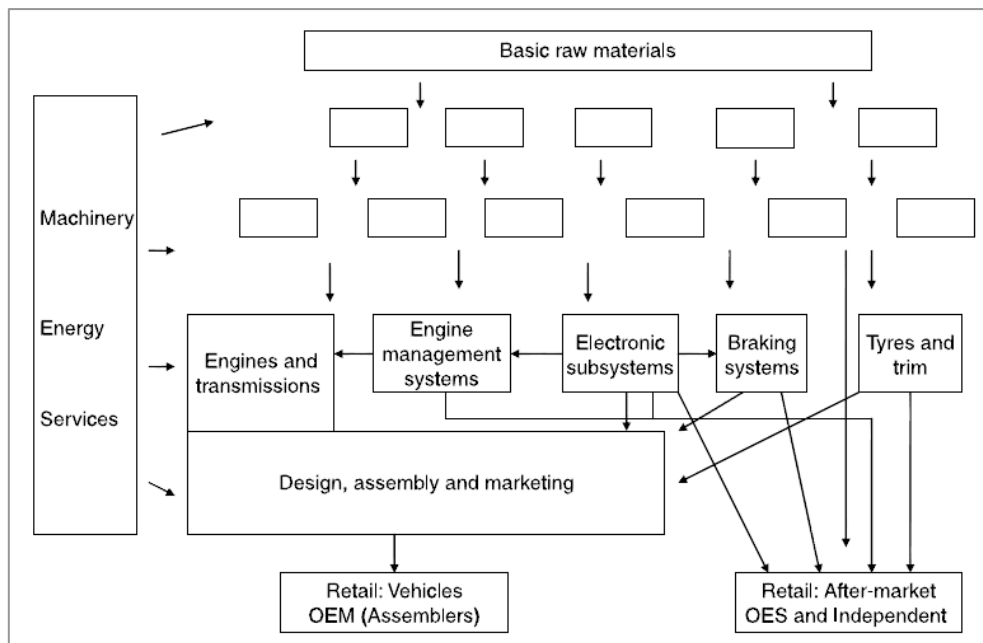
**Figure 3.5: The nested geographic and organisational structure of the automotive industry**

Source: Sturgeon *et al.*, 2008: 307

### 3.2.3 THE AUTOMOTIVE UPSTREAM VALUE CHAIN

The general concepts of value chains with special attention to the automotive industry have been explained. This section now focuses on the upstream automotive value chain and explains relevant concepts with respect to the research problem. These concepts are found in the principal component bodies of strategic management and best practices of supply chain management. The following discussion focuses on the component industry in the upstream value chain, as the

organisations working in this environment are the unit of analysis. An example of a component value chain in the automotive industry is given in Figure 3.6. The following is not to be confused with general supply chain management theory as well as supply chain reference models. The focus of the research deals with the issue of market access and the role of component suppliers in the automotive value chain. As the automotive supply chain is part of this question the following shows important concepts of supply chain theory with respect to the automotive industry, but it is not aimed to discuss supply chain management of the component industry on an operational level.

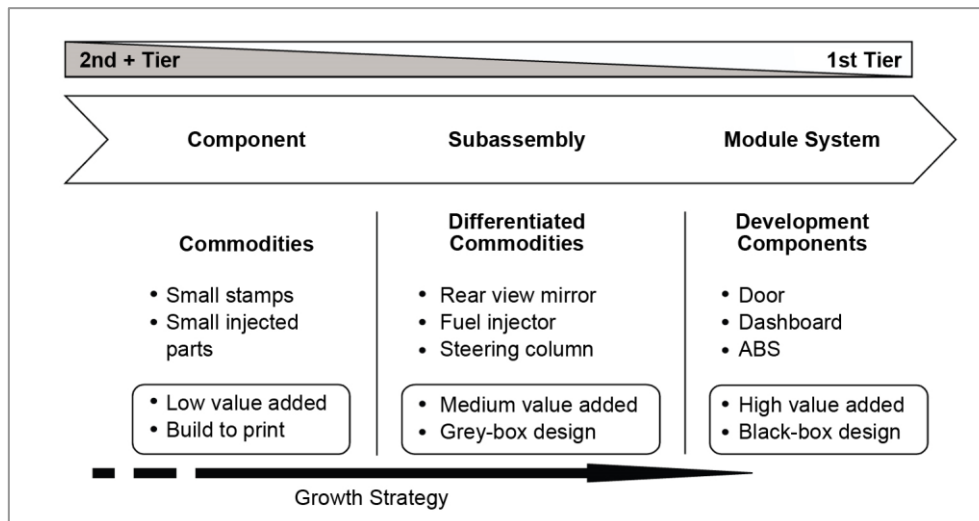


**Figure 3.6: The vehicle and components value chain**

Source: Barnes & Morris, 2008: 35

The role of suppliers in the automotive industry derives from their responsibilities in the supply chain of the OEMs. The upstream automotive value chain can be classified by different dimensions. Firstly, a general classification can be done according to the tier level of a particular supplier. These levels start at the first tier level and extend to second and third levels – and as far as the supply chain is organised. The first-tier supplier supplies the car manufacturers (OEMs) directly, whereas the other members of the supply chain (e.g. second- or third-tier suppliers) supply the next tier in their respective supply chains. This classification normally develops according to the products that are manufactured by the suppliers. It can be seen that the supply chain is divided into suppliers of components, modules (or sub-assemblies) or systems. Component suppliers are responsible for commodities in the sense of build to print parts. The value add is low and the component suppliers are to be found on the second/+ tier-level. Sub-assembly suppliers deliver modified or customised commodities into the automotive value chain. These products are a grey-

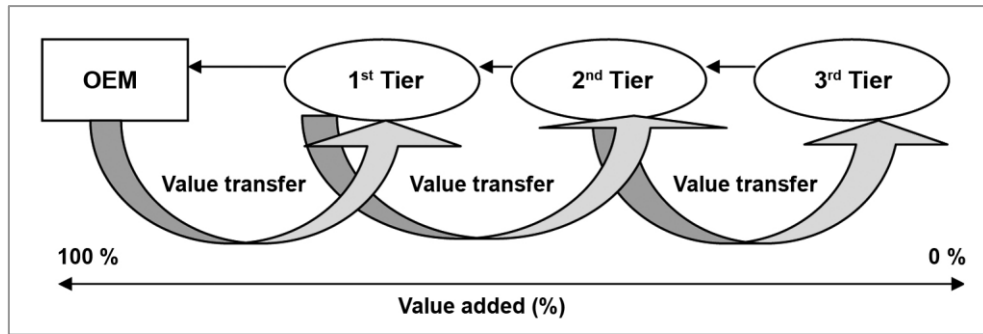
box design whereby the customer gives indications and specifications, but the final design and production is fully in the hands of the supplier. Value add is medium, and a supplier can be located anywhere in the tier chain, but is usually to be found on the first or second tier level. The module or system supplier produces fully integrated systems to the OEMs, which are normally delivered just in time (JIT) or just in sequence (JIS) to the car maker's assembly lines. As these suppliers work on a black-box design, value add is high because a lot of development and design work is involved. These companies are normally located on the first tier level of the automotive supply chain (Hsuan, 1999; Uallachain & Wasserman, 1999; Veloso *et al.*, 2000). Additionally, suppliers can be characterised by their market presence, which goes along with the tier level. Second and lower tier levels normally operate in a regional or local environment, whereas first-tier suppliers are globally engaged (Veloso & Kumar, 2002: 13). The positioning of companies in the supply chain is illustrated in Figure 3.7.



**Figure 3.7: Company positioning in the supply chain**

Source: Veloso *et al.*, 2000

The automotive industry is seen as a producer-driven industry (Sturgeon *et al.*, 2009). As explained in the first chapters, a small number of OEMs control and coordinate the production network. It can be seen that these companies shift their design activities and the supply of complete functions to their suppliers (see Figure 3.8). The transformation is been initiated by OEMs in order to cut development costs and shorten design lead times.



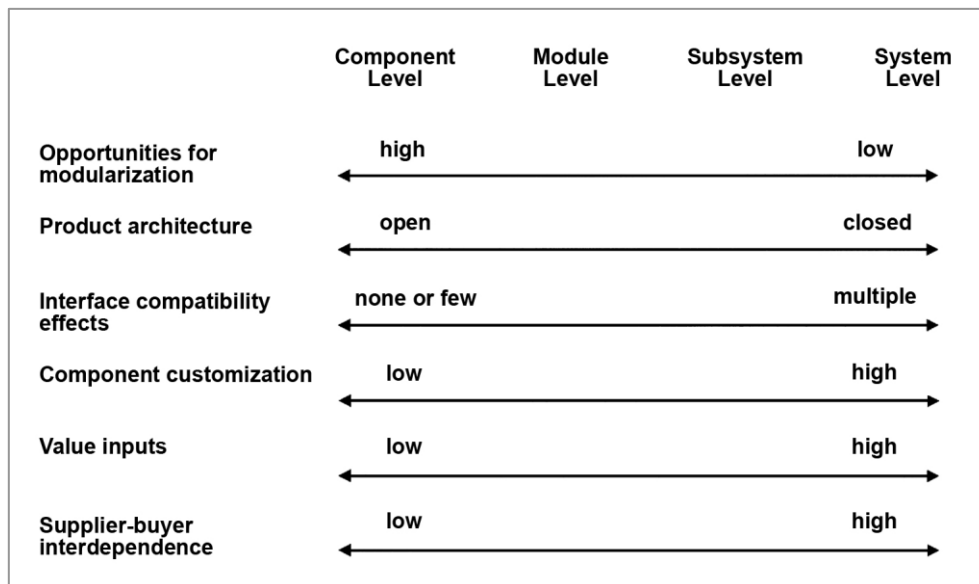
**Figure 3.8: Value transfer activity (modular supply chain)**

Source: Doran, 2004: 103

With this trend an issue in the automotive industry arises, namely the need for economies of scale among component manufacturers. As there is a paucity of standards in the industry the rise of modularity in the automotive industry is limited (Kaplinsky, 2010: 14; Nadvi, 2008; Ponte & Gibbon, 2005: 4). This is due technical factors and structural dimensions. Technical factors include the complex, integral system of a vehicle, which circumvents the codification of a vehicle or the design process of a new model. The structural dimension derives from the concentration of lead firms in the industry. Due to their power over the value chain, the lead firms are able to apply their own standards in the industry (Sturgeon *et al.*, 2008: 312). Another dimension is brought in by the transaction cost theory. According to this theory, standard products that are describable and valuable can be handled through arm's length market relations. This is because the required degree of coordination and the impact of asset specificity are low. There is also a variety of suppliers and a variety of customers. Unlike standard products, customised products involve a high degree of coordination as well as transaction-specific investments, which makes them, according to transaction cost theory, likely to being produced in-house. The variable of frequency adds to this approach and leads to the fact infrequently used inputs are acquired externally (Gereffi *et al.*, 2005: 80). In addition to the transaction cost approach, the theory of firm capabilities and learning would suggest that the capturing of value activities also depends on the generation and retention of competencies (Gereffi *et al.*, 2005: 81). This argument relates to the concept of core competencies, whereby sustainable development of distinctive competencies leads to a firm's comparative advantage. The development of those distinctive qualities is also dependent on the capabilities within the firm. To conclude on the influences of the different schools of thought on the fragmentation of value chains, the network approach posits that trust, reputation and mutual dependence affect inter-firm relationships, and contrary to transaction cost theory enables the players to engage in complex connections and interdependencies. This fact derives from the effects of repeat transactions, reputation and social norms in particular geographic areas (Gereffi *et al.*, 2005: 81).



Despite the issues mentioned above, Veloso and Kumar (2002: 7) find that there is a move towards modules in the automotive industry due to declining profits per vehicle and shorter product life cycles. Doran, Hill, Hwang & Jacob (2007: 2–3) state that modular production offers increased flexibility, speed to market and reduced cost. Figure 3.9 offers an overview of the characteristics of different levels of modularisation.



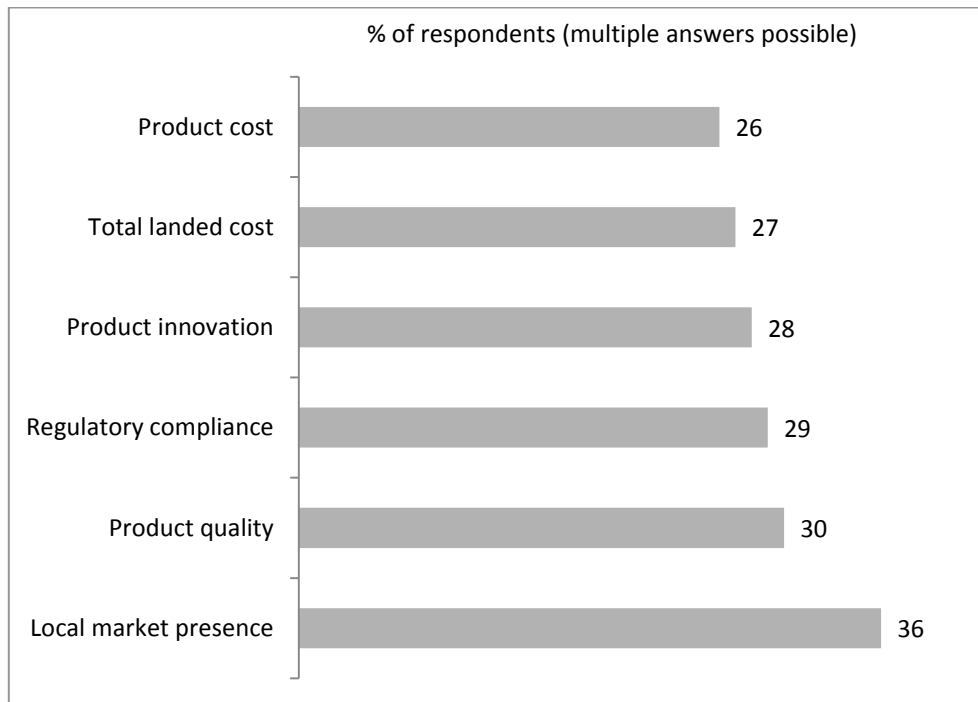
**Figure 3.9: Characteristics of different levels of modularisation**

Source: Hsuan, 1999: 201

The transformation of value and power shift along the value chain comes with the involvement of OEMs in suppliers' production and quality systems (Bailey *et al.*, 2010: 313; Humphrey, 2000: 249). This is because the risk of contracting and supplier risk management increases with this transformation (Altenburg, 2006: 501). Therefore, OEMs are reducing their direct relationships with suppliers in order to make the outsourcing feasible in terms of monitoring and controlling. From the supplier point of view, a power gain can be observed. Global turn-key suppliers rise in importance to almost the same level as OEMs (Veloso *et al.*, 2000: 42).

Having pointed out the most important trends in the automotive upstream supply chain, the next section will focus on best practices with regard to supply chain strategy in the automotive industry. Cohen, Geissbauer, Bhandari & D'heur (2008) find in their report about global supply chain trends that local market access is the leading driver of supply chain strategy for automotive and industrial manufacturers. They find that the local market presence is by far the most important factor. This outstanding driver is accompanied by factors like product quality, regulatory compliance, product innovation and product cost, as well as landed cost (see Figure 3.10). These findings are in line with the leading automotive companies' search for new, emerging markets for new sales

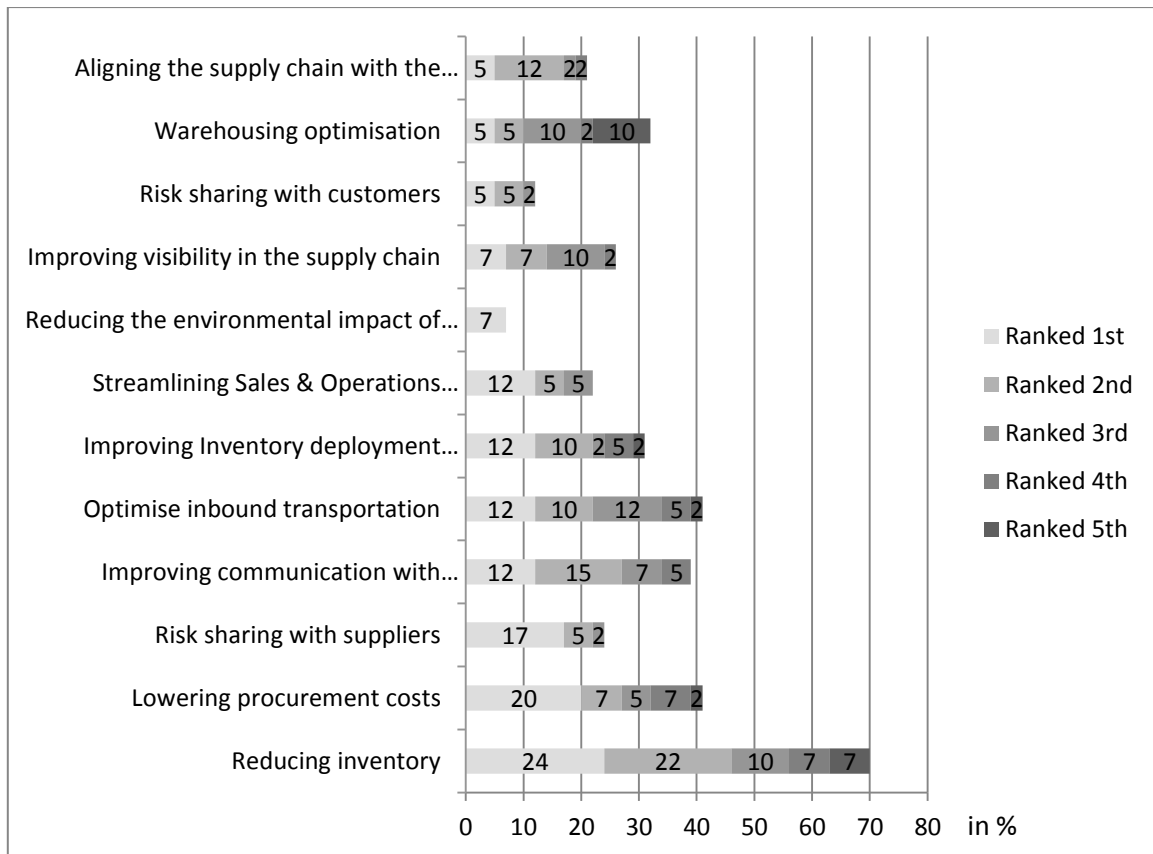
opportunities and cost advantages. As outsourcing is set to remain an important factor in the automotive industry, the report shows that automotive and industrial manufacturers, by taking advantage of the global footprint, could save about 25 per cent in labour costs and 15 per cent in material costs. Additionally, the growth path is supported by shifting operations through outsourcing. Shifting operations to new markets aligns with the goal to develop customised local products and secure sustainable market access (Cohen *et al.*, 2008: 15).



**Figure 3.10: Primary drivers of supply chain strategy for automotive and industrial manufacturers**

Source: Cohen *et al.*, 2008: 14

Focusing on the South African automotive industry, a report by Barloworld Logistics (2010) shows that the top five short-term objectives concern cost reduction. These include reducing inventory, lowering procurement cost, risk sharing with suppliers and optimising inbound transportation. The drive for cost reduction stems directly from post-recessional caution. Next to these objectives only the improvement of communication with the customer is listed in the top five objectives.



**Figure 3.11: Automotive supply chain objectives**

Source: Barloworld Logistics, 2010: 5

### 3.3 GLOBAL VALUE CHAIN GOVERNANCE

The situation of value chains and outsourcing combined with the feature of globalisation raises the question of the coordination of the fragmented activities. As Arndt & Kierzkowski (2001: 4) point out, the 'separability of ownership is an important determinant of the organizational structure of cross-border production sharing. Where separation of ownership is not feasible, multinational corporations and foreign direct investment are likely to play a dominant role. Where it is feasible, arm's length relationships are possible and foreign direct investment is less important. Global value chain governance (GVCG) analysis focuses on three features irrespective of the industry (Sturgeon *et al.*, 2008: 298):

- The geographic location and the linkages of value-added activities
- The power distribution among firms and other actors in the value chain
- The role of institutions on business relationships and industrial location

Why is it important to understand the governance of global value chains – especially with respect to the research objectives and the automotive industry? Humphrey & Schmitz (2001: 20–21) argue that governance in value chains involves the following:

- Market access – How lead firms undertake the functional integration of internationally dispersed activities
- Fast track to acquisition of production capabilities – Upgrading effects are particularly significant for local producers new to the global market
- Distribution of gains – Developed-country producers are ‘governors’ and own the high value-adding activities (R&D, design, etc.), whereas developing-country firms are the ‘producers’ and perform the lower value-add activities
- Leverage point for policy initiatives – Government initiatives can be adjusted according to the influence of lead firms on suppliers from developing countries
- Funnel for technical assistance – Partnership of transnational and small to medium sized companies is fostered by providing entry points to the local supply base through the help of agencies (e.g. the UN)

Furthermore, an understanding of value chain governance defines the critical coordination processes within a chain. There are four key parameters that define what is to be done (Humphrey & Schmitz, 2001: 22):

- What is to be produced? – Product design
- How is it to be produced? – Specification of processes
- How much is to be produced? – Demand issue
- When and where it is to be delivered? – Logistics issues

Gereffi *et al.* (2005) describe in their research the theoretical framework of global value chains and explicitly focus on the governance of global value chains: ‘Global value chain research and policy work examine the different ways in which global production and distribution systems are integrated, and the possibilities for firms in developing countries to enhance their position in global markets’ (Gereffi *et al.*, 2005: 79). In theory, one can differentiate between buyer-driven global commodity chains and producer-driven networks (Gereffi *et al.*, 2005: 82). The distinction lies in the explicit coordination that is executed by the powerful lead firms on the competent supply base. If there is less capability in the supply base the production network tends to move to vertically integrated firms. The lead firms also use this tight coordination to create a supply base that is capable of operating without direct ownership. The supply relationships can be divided into three distinctive types, which are dependent on the complexity of the product:

- Commodity supplier, who supplies standard products and the relationship is based on arm's length markets.
- Captive supplier, who supplies non-standard products which are solely customised to the buyer's needs.
- Turn-key supplier, who supplies customised products, but uses a modular production network to serve different customers. (Sturgeon, 2002)

Combining these types of supplier relationships with the pure market relationship and the vertically integrated firm, Gereffi (2005: 83) identifies five basic types of governance:

- Markets that exist over time with possible repeat transactions and low switching cost for both parties.
- Modular value chains, with products being specified by the customer, and suppliers that take full responsibility of production processes; asset specificity is limited because of the use of generic machinery.
- Relational value chains with complex interactions between the players, which create mutual dependence and high levels of asset specificity.
- Captive value chains which are controlled and monitored by the lead firms and involve smaller suppliers that are dependent on the larger buyers.
- Hierarchy is characterised by vertical integration and governed by managerial control.


By adding three key variables of value chain governance patterns to the outlined types, an analytical view of how global value chains are governed can be given:

- Complexity of transactions: The transfer of information and knowledge with respect to product and process specifications.
- Ability to codify information: The extent to which efficient information can be transmitted.
- Capabilities in the supply base: The degree to which suppliers can meet the requirements. (Gereffi *et al.*, 2005: 85)

These variables take the approach of transaction cost theory into account, while acknowledging the problem of asset specificity. Additionally, it is accepted that coordination incurs cost increases along the chain.

By assigning the variables only two values – high and low – eight possible combinations exist, of which five can be observed. The degree of explicit coordination and power asymmetry runs from the lower end of the spectrum, which can be observed in market relationships, up to the other end of the range, where hierarchical interaction is the dominant form. Table 3.1 presents an overview of the key determinants of global value chain governance.

**Table 3.1: Key determinants of global value chain governance**

<b>Governance type</b>	<b>Complexity of transactions</b>	<b>Ability to codify transactions</b>	<b>Capabilities in the supply base</b>	<b>Degree of explicit coordination and power asymmetry</b>
Market	Low	High	High	Low
Modular	High	High	High	
Relational	High	Low	High	
Captive	High	High	Low	
Hierarchy	High	Low	Low	

Source: Gereffi *et al.*, 2005: 87

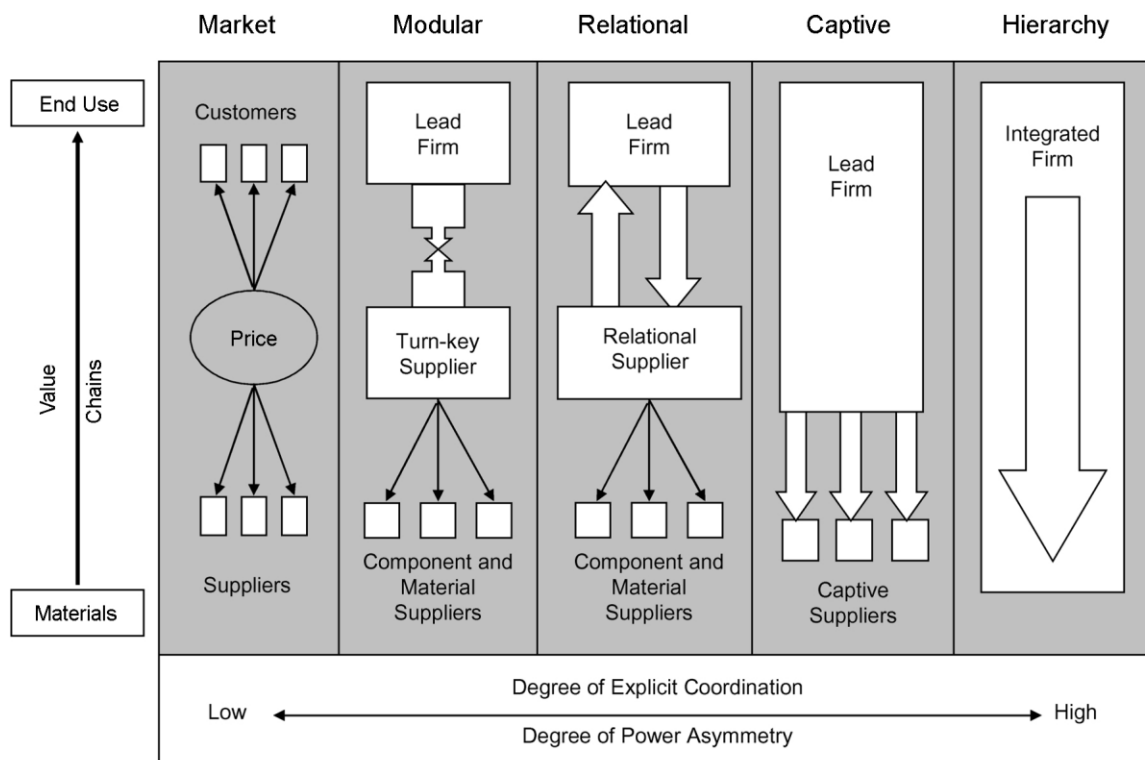
Before describing the existing governance types, it is interesting to discuss the combinations that are unlikely to occur respectively, but which do not exist per se. The combination of low informational complexity combined with low ability to codify cannot exist, regardless of the competence in the supply base. However, the combination of low complexity with high ability of codification, and the case that suppliers still do not have the capabilities to meet the requirements, might occur whenever requirements increase and/or the supply base in developing countries is not keeping up with industrial upgrading. This fact will be assessed in Chapter 5 again because it literally means the exclusion from the value chain at a specific point of time if such a constellation occurs.

Applying the key determinants to the different governance types of global value chains, the following characterisation of each type can be made (Gereffi *et al.*, 2005: 85):

- Markets: Low complexity of transactions but high ability to codify information and high capabilities in the supply base lead to a situation where buyers and sellers are not dependent on each other, as asset specificity is not a factor and the coordination through the chain is low. Markets are mainly governed by price and, therefore, the degree of power asymmetry is low.
- Modular value chains: This combination of the key determinants allows for a relatively low level of coordination, as the rising complexity of transactions is offset by technical standardisation and modular product architecture. The reduced component variation enables the supplier to pool investments for different customers, which reduces asset specificity. As complex information can be exchanged with little coordination because of high codification abilities, the cost of switching to new partners still remains relatively low.

- Relational value chains: When supplier capabilities and product complexity are high, but product specifications cannot be codified, a close relationship, including the need to exchange tacit information, can be expected. The motivation for lead firms to allow high levels of coordination and a mutual dependence comes from the advantage of access to competitive competencies, which is offered by the highly competent supply base. As these relationships can be regulated by reputation and social or spatial proximity, the high costs of switching to new partners feed the regulation between the players.
- Captive value chains: When the capabilities in the supply base are low, but the complexity of transactions and the capacity for codification is high, lead firms tend to capture the supplier by investing in control and coordination and narrowing down the transactions to particular tasks. Out of this transactional dependence, the supplier faces high switching costs, making an exit an unattractive option, although the dominance of the lead firm controls the linkage between the partners.
- Hierarchy: When the ability to codify transactions and the capabilities in the supply base are low, but the product complexity is high, lead firms are required to develop and manufacture in-house. As the exchange of tacit information between different value chain activities is on a high level, it is crucial that intellectual property is controlled effectively.

Figure 3.12 depicts the findings of these five different forms of global value chain governance.



**Figure 3.12: Five types of global value chain governance**

Source: Gereffi *et al.*, 2005: 89

Value chain governance patterns are not static, but change when industries upgrade. Additionally, the value chain pattern is not applicable to the whole industry (Gereffi *et al.*, 2005: 90). Increasing complexity can be observed as lead firms place new demands on the value chain (e.g. just in time supply and product differentiation) and reduce supplier competences in relation to new demands. Whenever there is shrinking ability in terms of codification, innovation has taken place in the value chain. Also, supplier competence changes over time as suppliers learn and adapt to technology requirements, and decreases when new technology is introduced into the value chain.

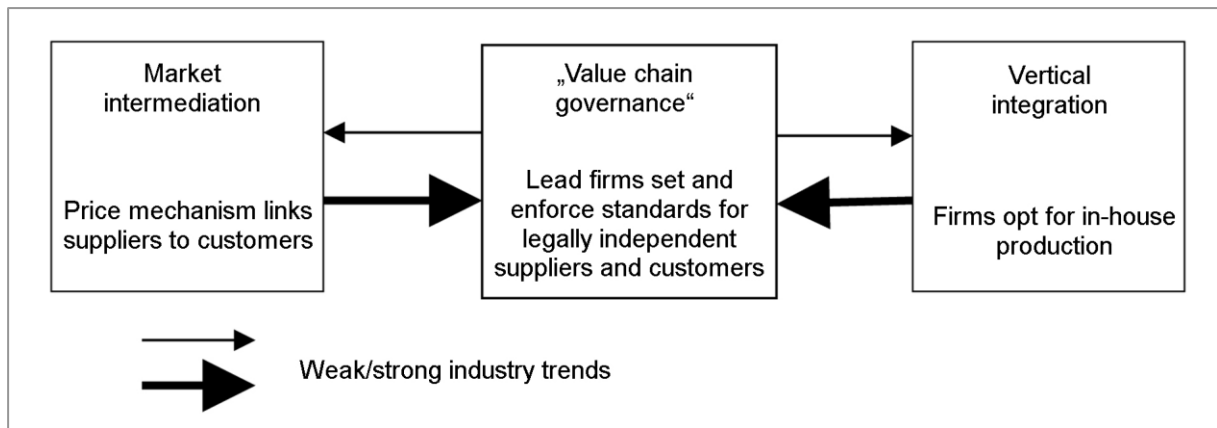


By looking at some trends in global value chain governance, it becomes obvious that factors influencing chain governance are located internally and externally (Humphrey & Schmitz, 2001: 28):

- Risk of supplier failure is a key driver of chain governance – Increasing competence in the supply base will soften ties to the global buyers, but performance will be monitored by external agents.
- Continuous scouting for new suppliers – The search for lower labour costs to counter the cost effects of the branding tendency, among others.
- Shift to parameter setting and enforcement by agents outside the chain.
- Concentration in retailing – An increasing number of producers in developing countries engage in contract manufacturing for a decreasing number of global buyers.
- Branding and chain governance tend to go together – Brands play an increasingly important role in enterprise strategy.
- Business to Business (B2B) electronic commerce – Monitoring and accreditation agencies will be of increasing importance to ensure compliance.

Altenburg (2006: 503–506) discusses further issues with respect to governance in global value chains; he expects that value chain governance will assume increasing relevance (see Figure 3.13). In addition to the factors covered by Gereffi's global value chain approach (core competencies, supplier capabilities, relationship-specific investments, complexity of transactions, extent to which transactions can be codified), Altenburg adds the following influences to the discussion:

- Market transparency and search costs – Substantial costs are involved when entering new markets and screening for a reliable local supply base.
- Uncertainty about market development – Strong fluctuations in input and output needs mean that lead firms tend to avoid fixed assets and pass the uncertainty on to the suppliers.
- Market structure – Concentration affects power relations and the distribution of gains and risks.
- Institutional framework conditions – Regulatory and compliance requirements by formal and informal institutions influence business transactions.
- Capital intensity and the cost of capital – High cost of capital supports the outsourcing of processes and activities in order to offer opportunities to avoiding capital-intensive activities.
- Consumer demand – Lead firms are committed to different standards owing to their corporate philosophy, and apply pressure on their supply chain to enforce these standards.

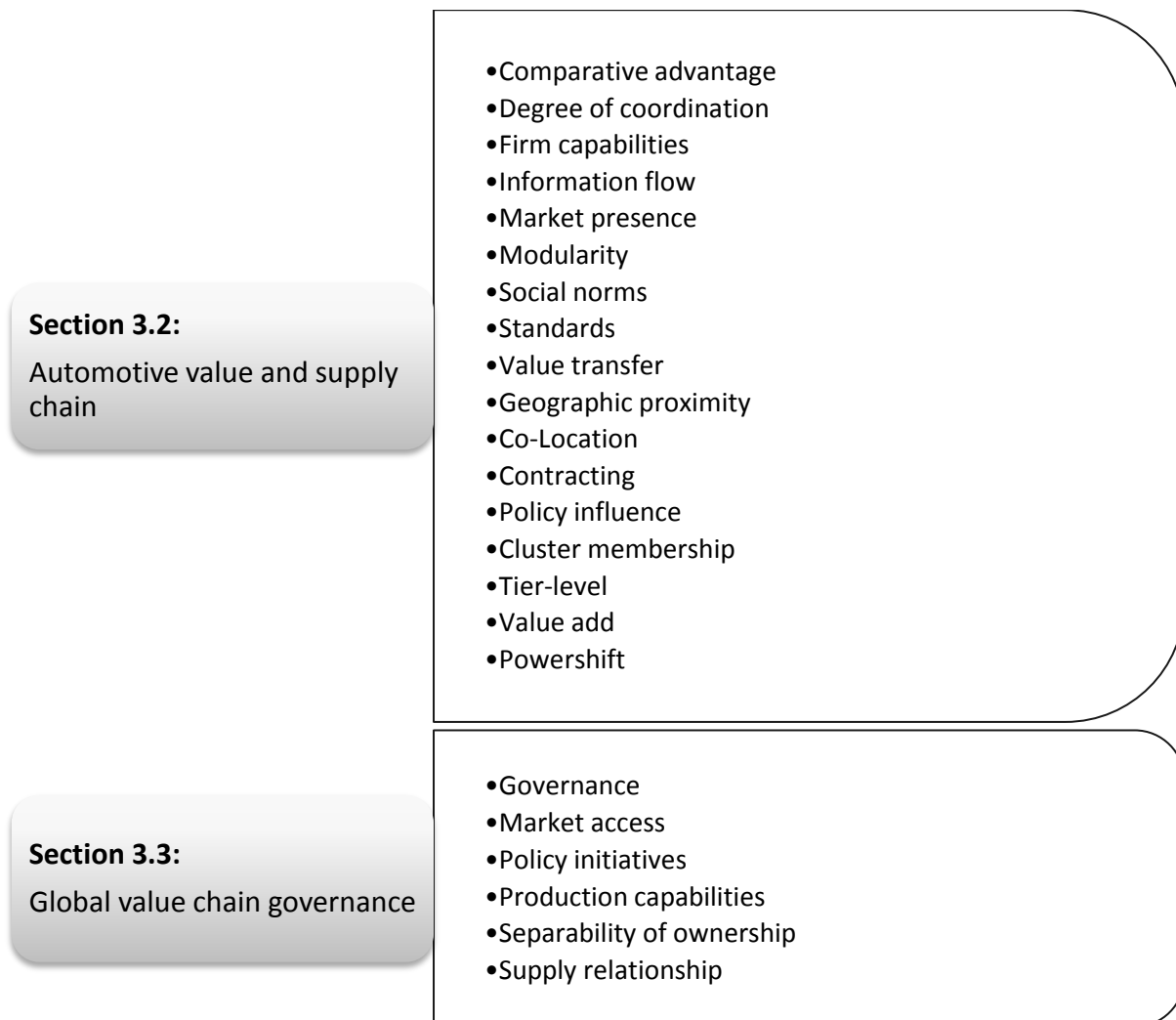


**Figure 3.13: Increasing relevance of value chain governance**

Source: Altenburg, 2006: 502

### 3.4 SYNTHESIS

This chapter pointed out insights about automotive value and supply chains, and discussed the concept of global value chain governance. Several factors and concepts described in this chapter impact on the sustainability of local suppliers in emerging markets. Figure 3.14 lists these factors alphabetically within each subsection. These factors will be considered for the development of a comprehensive model of sustainability of local suppliers in emerging markets, provided in Chapter 5, and in the conclusion of the literature review.



**Figure 3.14: Independent variables identified in the literature review**

## **CHAPTER 4**

### **LITERATURE REVIEW: MARKET ACCESS IN EMERGING MARKETS**

#### **4.1 INTRODUCTION**

This section discusses local supplier sustainability from two different angles. The first point of view examines emerging-market specifics with respect to entry barriers and upgrading opportunities of a local supplier industry to a global value chain, like the automotive industry. The second discussion is the issue of market access, which is seen as a crucial factor for long-term sustainability. The prerequisites for participation in global production networks are examined and how these capabilities and requirements can be accomplished from a strategic point of view.

#### **4.2 PERSPECTIVES OF LOCAL AUTOMOTIVE SUPPLIERS IN EMERGING MARKETS**

Altenburg (2006: 499) states: 'The fact that trade is shifting from anonymous market-based exchange of products to more durable patterns of industrial organization, with an increasingly prominent role of lead firms, has multiple implications for developing countries:

- Minimum requirements for participation in value chains tend to rise as lead firms demand increasing scales of production as well as compliance with more sophisticated product and process standards.
- The competitiveness of the respective chain may rise or decline, hence also the viability of developing country firms in these chains may be affected.
- Gains and risks will usually be renegotiated and redistributed among customers, retailers, traders, processors and suppliers.
- The increasing or decreasing efficiency of value chains will affect the quality, availability and price level of goods and services.'

What does this mean for a local supply base in an emerging market? It can be argued that lead firms pursue the same interests as their upstream and downstream partners as far as the efficiency of the supply chain is concerned (Sturgeon & Van Biesebroeck, 2010: 27). But on the other hand, they are looking for advantages when it comes to the distribution of risks and rents. Therefore, the interests in relation to quality standards, purchasing prices and contractual obligations differ substantially between the lead firms and their suppliers. Lead firms also pay attention to foster competition in order to enhance their purchasing and bargaining power in the value chain, but only to the extent that the size of their supply chain partners remains manageable (Altenburg, 2006:

517–518). Summing up, it can be argued that lead firms in the value chain try to optimise their gains from the relationship with supply chain partners as long as the extent is only complementary to their own activities.

Another factor comes into the equation when the variable of proximity is introduced. Lead firms tend to have a reliable, low-cost, high-quality local supply base nearby. This is especially the case for bulky, transaction-cost-intensive supplies (Altenburg, 2006: 518). However, this case is only valid when transport costs are high and standardisation is not in place. In all other cases, lead firms tend to make use of their global production and sourcing network. Local firms and their stakeholders (especially government institutions), on the other hand, are interested in developing a local supply base.

All this is due to changing governance structures, which transform the automotive industries in developing countries. As described earlier, this fact can be manifested in two ways:

- The integration of developing countries into global auto production systems, which leads to the exposure of local companies to the global value chains of their customers
- The emergence of global component suppliers that are increasingly responsible for designing and delivering component systems at multiple locations around the world (Humphrey, 2003: 122)

Humphrey (2000) says that the governance structures in the automotive value chain principally allow for different strategic approaches to develop perspectives for local suppliers in emerging markets. These include:

- 'Going it alone' as a first-tier supplier – which effectively means becoming global and competing with much larger global component manufacturers.
- Developing an alliance with an international leading supplier – which offers substantial access to technology and markets.
- Being a national first-tier supplier through licensing designs and technology – which seems difficult, as transnational companies tend to set up their own operations in the follow-sourcing concept of the OEMs.
- Finding a profitable niche in the second tier – although the tendency of the second-tier supplier stage is to be cost-competitive, this space is not likely to be allocated by international companies, as their financial and managerial capabilities are not sufficient to expand their business overseas.

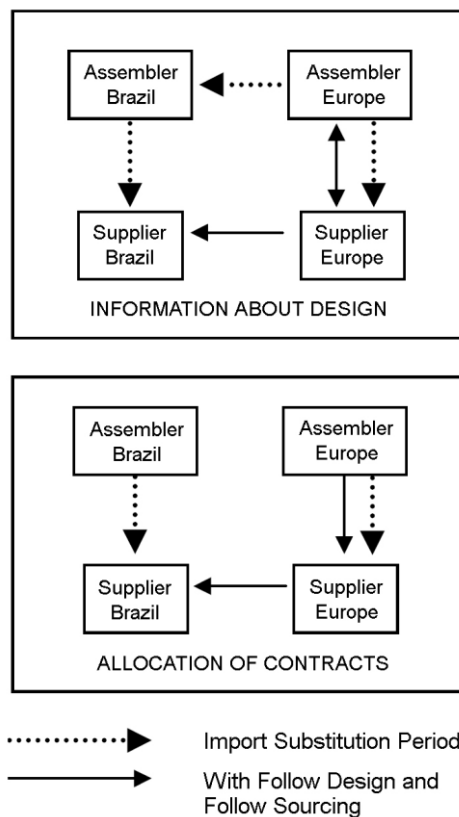
- Finding a specialist position as a global supplier – which depends on the availability, and capability to make use, of comparative advantages of the home market; often this perspective is tied to raw materials, labour cost or specialisation in products (Humphrey, 2000: 266).
- Being a supplier to both domestic and international aftermarkets. The ability of locally owned firms to compete in each of these markets can be influenced by support provided by local and national institutions (Humphrey & Memedovic, 2003: 43).

These findings are supported by the Trade and Development department of the United Nations, UNCTAD/DITE (2007), which show in their research on linking local businesses into global value chains that collective efficiency through horizontal clusters (Altenburg & Meyer-Stamer, 1999: 1697) or vertical TNC-linkages give the best opportunities to pursue the abovementioned perspectives. Humphrey and Schmitz (1996: 1873) describe this as a 'triple-C approach' for the industrial policy of a developing country – an approach that combines ideas about customer-oriented, collective and cumulative.

So what are the implications for local suppliers in emerging markets? As Barnes and Morris (2008: 34) state in their work about the South African automotive industry, there are three key challenges for developing economies. Firstly, there are the characteristics and governance of producer-driven value chains with centralised power in the form of the OEMs as lead firms. Secondly, there is agglomeration of power in terms of access to information flows in global multinational firms. And thirdly, there are competitive pressures in the global markets, which lead to the deterioration of financial results.

The restructuring of automotive supply chains has implications for local suppliers (Sturgeon & Van Biesebroeck, 2010: 4). As power is centralised in the hands of lead firms – either OEMs or large suppliers – the domestic industry in developing countries seems to be confined to the second tier of the value chain (Sturgeon & Florida, 2000: 64). This is mainly because of the follow-sourcing characteristics in the industry. New production sites in emerging markets by OEMs are likely to be supplied by international first-tier suppliers that are tied to the OEMs. This is because the OEMs want the same quality in products and processes throughout their operations in order to deliver the final customer a comparable product and/or service in every market (Fujita & Child Hill, 1999: 221). Although first-tier suppliers tend to develop their own supply networks in developing countries, it can be said that the financial and managerial possibilities of the second-tier supplier landscape do not allow for the concept of follow sourcing (Humphrey & Memedovic, 2003: 32). This offers opportunities for locally owned suppliers to enter the value chain and occupy the second tier of component manufacturing. As the first-tier suppliers have to concentrate their efforts on the production and delivery of modules and systems, even the chance to upgrade from low-skill

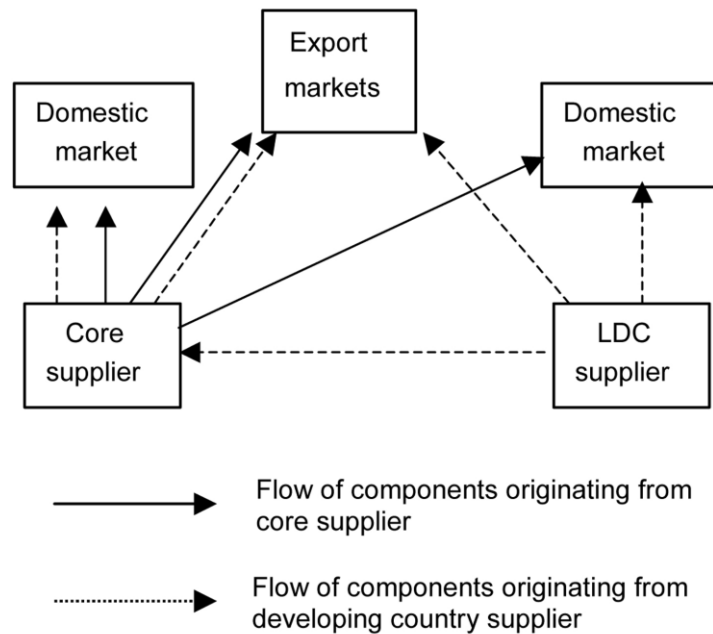
operations (and, therefore, normally low value-added products) to producing more sophisticated components for the domestic supplier landscape is given. To take advantage of these niche markets it is important that the supplier has information about the outsourcing strategies of the first-tier supplier in order to focus the resources on the right products. If the products cannot be offered by the local supplier industry, first-tier suppliers have to either contract multinational firms or import the products. The implication for local South African suppliers is that they must also take into account the changed environment with respect to governmental regulations and policy. As the automotive component industry does not receive any substantial protection any more it is faced with issues of competitiveness on two fronts. On the one hand, it needs to improve the general performance of its operations in order to compete with the threat of imported products, and on the other hand it needs to connect with lead firms for the sake of relationships with OEMs and the facilitation of export opportunities (Barnes, 2000a: 408). An interesting fact that is sometimes neglected is the buyer's organisational structure. The automotive industry normally works in centralised organisational units (e.g. centralised purchasing units in the lead firms' headquarters) to take advantage of economies of scale and efficient business processes. Therefore, it might be important that suppliers that wish to participate in the buyer's value chain have a presence and visibility in traditional and booming markets (Sturgeon & Van Biesebroeck, 2010: 27).



**Figure 4.1: Changing assembler-supplier relations**

Source: Humphrey, 2003: 131

Figure 4.1 and 4.2 describe the change in flow of components under the concept of follow sourcing and show that it is most likely that suppliers in developing countries will connect to the international first-tier suppliers of the OEMs in order to get access to markets and information.



**Figure 4.2: Global sourcing from developing-country partners**

Source: Humphrey & Memedovic, 2003: 41

#### 4.3 SOUTH AFRICA AS AN EMERGING MARKET IN THE GLOBAL AUTOMOTIVE VALUE CHAIN

The picture of emerging markets in the global automotive value chain turns out to be quite diverse. It ranges from the situation in China, with its exploding domestic growth rates and a rapidly developing automotive industry (both domestically and internationally owned), to South Africa, with expected moderate growth rates and a domestic industry that finds itself in a competitive international environment while still looking for the upgrade to full manufacturing stages. Looking at the different concepts that have been discussed earlier, it becomes obvious that there are certain features that distinguish the South African automobile industry from other emerging markets.

The first distinctive feature is the limited domestic market, although government initiatives aim for it to grow to 1.2 million vehicles by 2020 – including exports. However, the domestic market and the southern African regional markets are too small to be recognised as a viable automotive environment. Therefore, the capacities of domestic production must also be used for export purposes to accomplish sufficient economies of scale. This leads to the question of which markets



should be targeted and whether the infrastructure of the country is sufficient to support expansion into global markets. The second issue raised by limited inbound market options is whether it is possible to link local suppliers in the global value chain. This issue certainly does not concern the multinational companies or their joint ventures because their subsidiaries or affiliates will profit from being bound into the global production network of their parent companies. Therefore, the question is how locally owned suppliers can be brought into the global value chain and what the preconditions for this linkage are.

The second distinctive feature is the economic stage of the South African automotive industry. From a historical point of view the industry is quite mature with regard to OEM-structure and a dispersed local supplier industry. All of the vehicle assemblers have been operating their plants for decades and use their South African hub to supply domestic markets in the southern African region, as well as to serve specific markets that either fit into production strategy (like export markets for right-hand-drive vehicles) or offer trade agreements (like the North American Free Trade Agreement because of the African Growth and Opportunity Act). Additionally, the import-export scheme of the Motor Industry Development Program brings a high rate of inner-company trade for OEMs and large suppliers, as they use the South African location for labour and products that are raw-material-intensive. Because of the long history of the industry the multinational supplier landscape has also formed itself according to how it has been shaped by the OEMs. The multinational supplier industry uses the South African market as a hub for exports. For instance, the industry for catalytic converters uses the proximity to raw-material markets for precious metals in southern Africa to optimise working capital. The question then arises whether the exporting companies are local suppliers or multinational enterprises. If the latter it should be asked how much value-add is contributed by local suppliers and how they are integrated into the value chain.

The third unique characteristic, it can be argued, is the concept of economic geography. The South African automotive industry seems to be highly fragmented from the lead firms' headquarters, as operations by the vehicle manufacturers and their suppliers are concentrated in the traditional triad markets and expanding into the big emerging markets, like China and India. There are other exceptions for cost reasons, as European vehicle manufacturers locate operations in Eastern Europe – and also force their suppliers to follow – and the same applies to North America, as OEMs and suppliers tend to shift operations either to Mexico or to the southern areas of the US. Therefore one needs to question why vehicle manufacturers still maintain their operations in South Africa, given that the country very distant from any emerging or traditional markets. One answer may be related to the history of the South African automotive industry, as mentioned above. As the industry has been operating in South Africa for decades, an environment has developed in which world-quality standards can be achieved and export support through the Motor Industry

Development Program results in a fairly competitive cost situation. A second answer lies in the comparative advantage of South African operations. With its wealth of raw-material resources, South Africa offers OEMs and suppliers opportunities to directly engage with the raw-material suppliers.

The fourth attribute of South Africa's automotive industry is its long-lasting protection and support through governmental regulations. Although this characteristic does not substantially differentiate South Africa from other emerging markets, like Brazil, the switch from protectionist local content programmes to a supportive regulatory policy in 1995 gives the industry a unique feature. The market exposure to global competitive pressures led to a restructuring of the industry in terms of ownership structures in the OEM and supplier businesses. It also meant a transformation from low-volume, uneconomical vehicle production to high-volume unit output with the aim of achieving economies of scale. The export-import complementation scheme brought the opportunity to offset import duties by exporting products.

#### 4.4 UPGRADING AND POSITIONING OF LOCAL AUTOMOTIVE SUPPLIERS IN THE VALUE CHAIN

The perspectives of automotive suppliers, as described in the previous section, lead to the question: How can local automotive supplier enterprises develop and position themselves in order to take advantage of the globalised automotive value chain? Two influences have a major impact on this question. Firstly, the capabilities of suppliers to upgrade themselves either horizontally or vertically; and secondly, the ability of these companies to position themselves at the right place in the value chain.

Research on linking among local suppliers in global value chains suggests different overarching approaches to the question of market access. These approaches will be examined in the following discussion, but it is important to mention that the base layers of a firm's competitiveness and operational excellence have to be sufficient to link into global value chains before looking at the more general concepts of integration. Once local suppliers are capable of production to internationally required standards and show their performance in the domestic supply chain they can advance by upgrading horizontally or vertically in the value chain (Giuliani, Pietrobelli & Rabellotti, 2005: 552).

The issue of market access is located on the level of industry or macroeconomic mechanisms in the global automotive value chain: at what stage of the value chain is it likely to get market access? In general, this question views the value chain in a three-dimensional way.

The first dimension relates to whether the point of access is located in the upstream or downstream part of the value chain. The upstream value chain feeds components to the assemblers, whereas the downstream value chain offers services concerning the distribution of products to the final customer. The question to be asked with regard to this issue is whether local automotive suppliers should target the vehicle manufacturers directly or should rather focus on further opportunities in the value chain. Opportunities for access to the value chain could lie in the upstream value chain as a second or third supplier, as well as in the very downstream value chain when after-sales come into play. This fact is also supported by findings from the Organisation for Economic Co-operation and Development, the OECD (2008) which provide insights gleaned from case studies in Mexico, India and South Africa. Local suppliers in developing countries were not able to become global sourcing partners and, therefore, started to link in as second-tier suppliers (Lee & Cason, 1994: 240). The next differentiation of upgrading opportunities is tied to the question of whether the business process of the supplier is a high- or low-value-adding activity. The degrees of value-add have implications for the competitive pressures that the participating companies have to deal with. Low-value-adding activities are generally found in price-sensitive environments, whereas high-value-adding activities normally appear in technologically advanced product areas that do not follow regular price mechanisms in general. These products offer advantages of a technological or other nature that cannot be offset by market regulations. The third layer of the three dimensions of the value chain relates to the issue of whether primary or supportive functions are performed by the companies that are seeking market access. Primary functions involve everything used for the actual processing of the product, like material conversion or the assembly of sub-modules or systems; supportive functions are found in the service areas around the value chain.

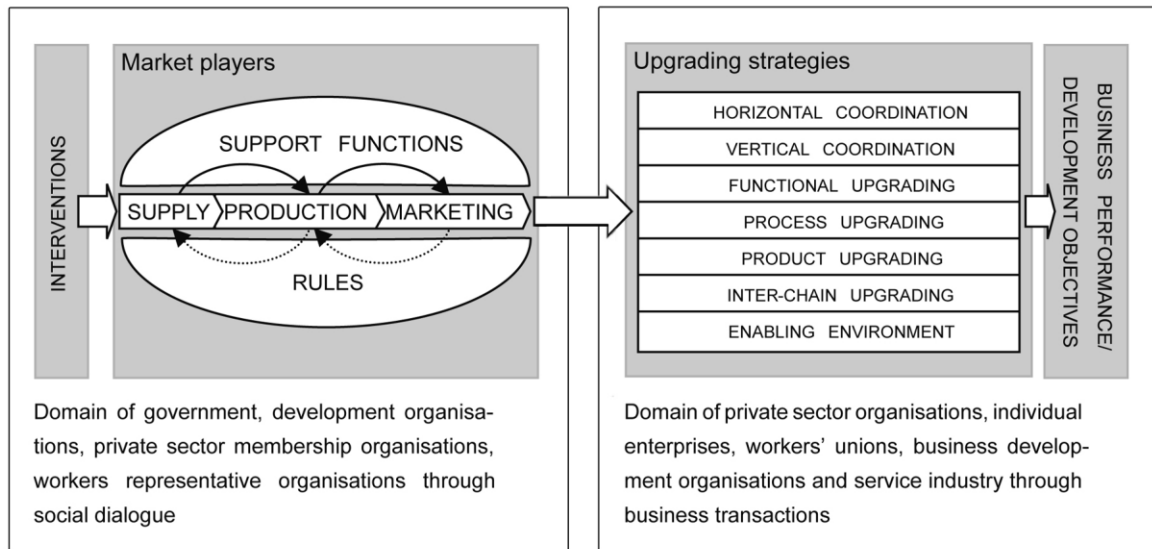
The next issue of access to a value chain relates to the channel that is used to acquire contracts with other members of the value chain. Access can be either granted horizontally through efficient local clusters or vertically by linkages between transnational and small to medium-sized local companies. Efficient local clusters refer to the issue of whether a competitive advantage can be offered to the receiving value chain by these conglomerates of industrial production. An efficient local cluster in this context describes the effects of a combination of some firms that use a cluster approach to continuously improve their performance (e.g. by benchmarking activities, etc.). Vertical linkages between transnational companies and local suppliers explain the relationship between foreign companies and the domestic supplier landscape, which is used to profit from the low-cost input factors. The chance to upgrade opportunities and backward linkages by means of technology and knowledge introduced by foreign direct investment are numerous (Humphrey & Schmitz, 2004: 354). Table 4.1 lists the differences involved in governance and upgrading in clusters versus value chains.

**Table 4.1: Governance and upgrading: Clusters vs. value chains**

	<b>Clusters</b>	<b>Value Chains</b>
<b>Governance within the locality</b>	Strong local governance characterised by close inter-firm co-operation and active private and public institutions.	Not discussed. Local inter-firm co-operation and government policy largely ignored.
<b>Relations with the external world</b>	External relations not theorised, or assumed (by default) to be based on arm's length market transactions.	Strong governance within the chain. International trade increasingly managed through inter-firm networks.
<b>Upgrading</b>	Emphasis on incremental upgrading (learning by doing) and the spread of innovations through interactions within the cluster. For major upgrading initiatives, local innovation centres play an important role.	Incremental upgrading made possible through learning by doing and the allocation of new tasks by the chain's lead firm. Discontinuous upgrading made possible by 'organisational succession' allowing entry into more complex value chains.
<b>Key competitive challenge</b>	Promoting collective efficiency through interactions within the cluster.	Gaining access to chains and developing linkages with major customers.

Source: Humphrey & Schmitz, 2002: 22

The upgrading opportunities illustrate the third layer with respect to market access in the value chain. These upgrading opportunities differ according to the type of value chain involved. In general upgrading can be differentiated by product/process, functional and intersectoral upgrading. Product and process upgrading describes the enhancement of capabilities with respect to the value-adding activity the organisation currently performs. This can be either technological in the form of more advanced production techniques or organisational in terms of process development. Functional upgrading refers to the development of capabilities that qualify the organisation to perform activities at a higher value-adding level within the value chain. For instance, if a business is engaged in producing singular components it could then operate in the assembly of a variety of these subcomponents to a module. The third aspect is intersectoral upgrading. This means the shift or expansion of a company's activities to another value chain that involves the diversification of products and processes that the organisation operates in. A typology of upgrading strategies is given in Figure 4.3.



**Figure 4.3: A typology of upgrading strategies**

Source: Herr, 2006: 2

Giuliani *et al.* (2005: 565) state that interactions between lead firms and local suppliers do not play a significant role with regard to product and process upgrading. Market liberalisation has caused the lead firms to displace most of the local ones in favour of their existing supply network – in this case, multinational suppliers. Giuliani *et al.* furthermore come to the conclusion that participating in a value chain does not necessarily lead to opportunities for upgrading in the specific industry. They state that the interest is intrinsic to the firms that want to operate as suppliers, and upgrading is facilitated by market mechanisms.

Figure 4.4 summarises the options pointed out above and describes who supports or promotes the development opportunities structured according to the governance structure that the supplier feeds into.

	Actor	Supported/promoted by					Governance structure / Form of cooperation		
		SME		Lead firm	External				
		Intentional			Unintentional				
		SME's own effort	Specific investment	Support of partner	Spill over effects	External effects	Captive	Modular	Relational
Development opportunities for SMEs	Increase in competence level: – <i>process upgrading</i> – <i>product upgrading</i>	+	+	+	+	?	Set by lead firm, profits from spill-overs	Dependent on SME's own initiative	Matter of negotiation within margins set by lead firm
	Promotion within a value chain: From primary to supporting activities ( <i>functional upgrading</i> )	+		+	+	?	Set by lead firm	Dependent on SME's own initiative	Matter of negotiation within margins set by lead firm
	Change into a higher-quality value chain ( <i>chain or inter-sectoral upgrading</i> )	+	+	-	+	?	Very unlikely	Possible, in related sector	Rather unlikely
Implementation of development opportunities through innovation processes	Process innovation	Increase in efficiency/ reduction of costs							
	Product innovation/ product differentiation	<i>Quality increasing</i>							
		<i>Variety expanding</i>							

**Figure 4.4: Summary of innovation processes and the interrelation of concepts, actors and their interactions**

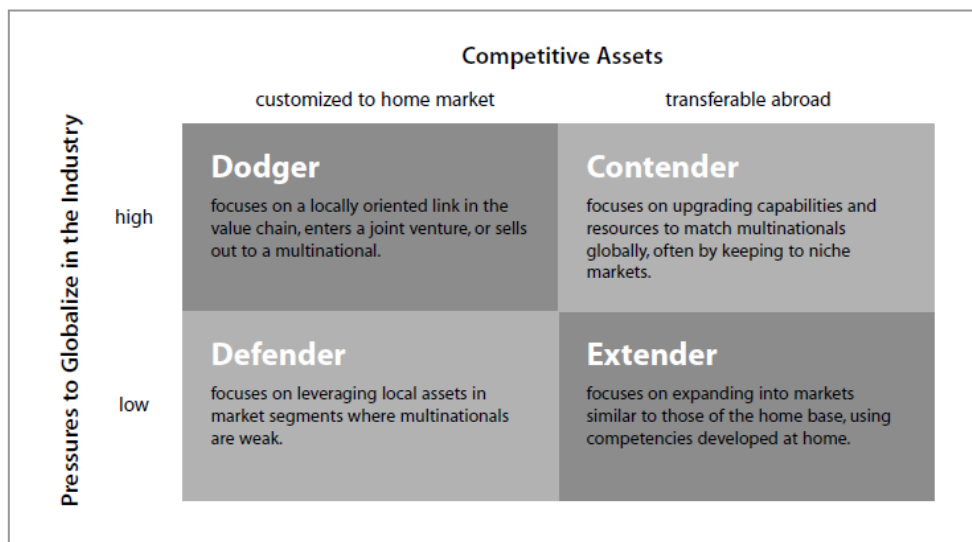
Source: Brach & Kappel, October 2009: 18

Having described the opportunities of access to value chains, it is worthwhile looking at some of the benefits and risks of exclusion. Because global networks and, therefore, global value chains are widely dispersed and fragmented it is an imperative to link into global networks of knowledge (Barnes & Morris, 2008). These 'key channels of knowledge' enable participants to acquire important information about the governance of the value chains. Necessary information in this matter could be who the lead firms in the value chain are and how the relationships between lead firms and suppliers are configured (Fu, Pietrobelli & Soete, 2010: 13).

It should also be noted that producer-driven value chains contain the risk of supplier failure (Schmitz, 1999). These supplier issues can range from delivery problems to quality issues, which put the lead firms in the value chain into a position where they depend on the reliability of their suppliers. To minimise the risk lead firms tend to operate with suppliers that already have an established relationship and operate globally. By doing this, lead firms rely on single sourcing in

particular circumstances, but can benefit from the global operation networks of the multinational suppliers, as issues on delivery or quality can be resolved in the supplier's organisation itself. A trend that is reinforcing this issue is the ongoing consolidation in the supplier industry. With the rise of the so-called mega-suppliers, the power in buyer-seller relationships in the automotive industry is likely to shift in favour of large suppliers that offer high competencies in innovative technologies (Sturgeon & Florida, 2000: 69). This power shift could cause inefficiencies in the supply chain, as the chain is controlled by different participants with diverse aims. Stakeholders in the value chain, the OEMs and the large suppliers all target profit maximisation in their field of business, which could lead to uneconomical allocation of capital and resources.

What do the perspectives and the upgrading opportunities mean in terms of positioning in the automotive value chain for emerging-market suppliers? Dawar & Frost (1999: 122) suggest the following typology (see Figure 4.5) in their work about survival strategies for local companies in emerging markets. Their classification is dependent on the competitive assets of the local firm and the pressures to globalise in the industry. With respect to the automotive industry, it can be said that the pressures to globalise are rather high for emerging-market companies. This is because a critical mass in terms of economies of scale must be reached to compete in the automotive value chain. According to the framework the 'dodger' and the 'contender' approaches should be targeted in this constellation.

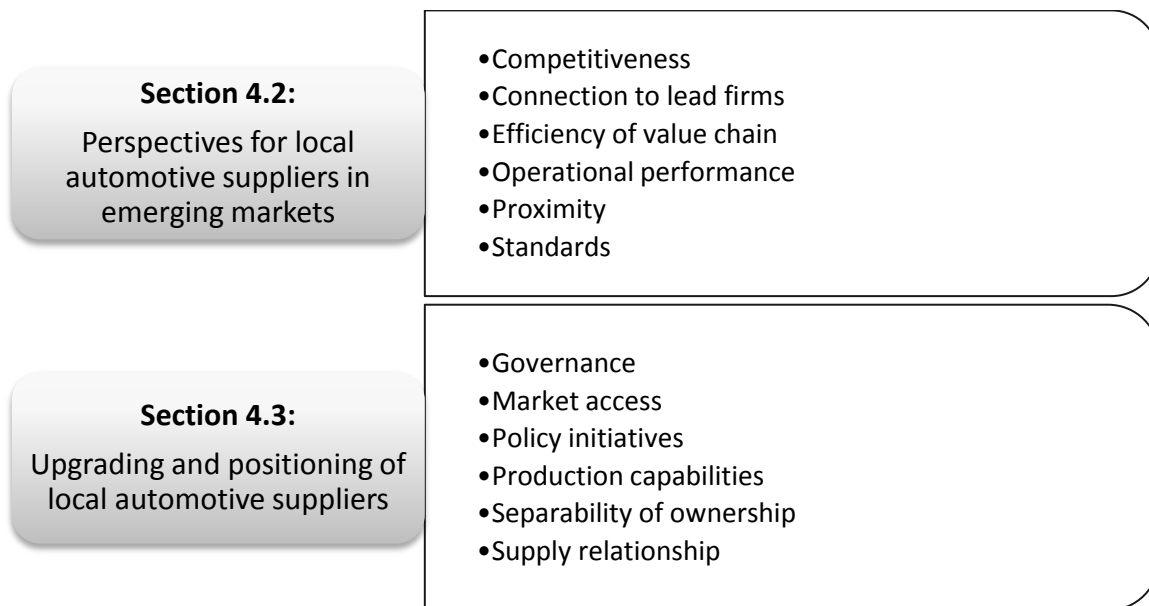


**Figure 4.5: Positioning of emerging-market companies**

Source: Dawar & Frost, 1999: 122

## 4.5 SYNTHESIS

This chapter provided insights about perspectives for local automotive suppliers in emerging markets, as well as a discussion about the upgrading and positioning of these firms. Several factors and concepts, described in this chapter, impact on the sustainability of local suppliers in emerging markets. Figure 4.6 lists these factors alphabetically within each subsection. These factors will be considered for the development of a comprehensive model of sustainability of local suppliers in emerging markets in Chapter 5 together with the conclusion of the two previous chapters.



**Figure 4.6: Independent variables identified in the literature review**



## **CHAPTER 5**

### **DEVELOPMENT OF THE CONCEPTUAL MODEL**

#### **5.1 INTRODUCTION**

This chapter summarises the theoretical approaches with respect to the formulation of the conceptual model. Therefore, the theoretical concepts from the literature review are generalised and analysed for their capability to offer a solution for the research problem. In the further course of this chapter the factors for the sustainability of local suppliers in the automotive value chain in South Africa are aggregated from the conclusions of each literature review chapter. This aggregation is then used to formulate a holistic conceptual model.

#### **5.2 CONCLUSIONS OF THE LITERATURE RESEARCH**

The most relevant theories that have been discussed during the literature review are the following:

- Globalisation (see Section 2.2), as it focuses on the integration of trade, foreign direct investment across countries and the spread of technology.

In terms of globalisation, vehicle manufacturers tend to set up manufacturing plants in emerging markets to overcome regulations, profit from the low-cost input factors and produce vehicles in proximity to their final markets. The growth perspectives and the comparative advantage of emerging markets lead to a vertical fragmentation of the automotive value chain, as suppliers follow their customers because they are forced to do so by the lead firms. With this issue the possibility of inefficiencies in the value chain arises. These inefficiencies can range from strategic disadvantages as suppliers follow a different production strategy to high opportunity cost when the venture does not turn out successfully. Conversely, the opportunity of foreign direct investment brings technology and knowledge to the emerging markets. This will likely increase the competence of the supply base and enable local suppliers to gain access not only to the domestic market, but also to international markets. Globalisation connects with the concepts of global value chains, economic geography and political economy. One of the main criticisms in terms of the application to the research issue is the fact that globalisation is commonly connected to market areas with high growth rates – the ‘shining’ emerging economies like China. The concept does not neglect other emerging economies, but it offers fewer insights for these areas. Nevertheless, the theory of globalisation offers implications about the effectiveness of foreign direct investment and the spread of technology.

- Political economy (see Section 2.3) because it refers to the interdisciplinary studies drawing from economics, law and political science and it explains how the political environment and economics influence each other.

The theory of political economy interferes with the theoretical concepts of global value chains and economic geography. The main reason for this interference is that political economy discusses the influences of trade agreements and government regulations in particular areas of economic activity (mostly in the area of countries or trade regions). As all of the concepts deal with dispersed operations in different areas, the influences of trade agreements and/or government are an additional dimension discussed by political economists. Even though the concept of political economy gives references to the research questions it does not give an answer to the sustainability issue of local suppliers in emerging markets without government protection. However, the theoretical ideas of political economy are of great relevance to the research issue, as automotive products are among the 25 highest-ranked products that are traded globally. This makes the automotive industry a well-respected sector in those countries where it accounts for a significant proportion of the gross domestic product.

- Economic geography (see Section 3.2), which concerns itself with the location, distribution and spatial organisation of economic activities worldwide; it also includes thoughts on globalisation and cluster theory.

Economic geography offers some explanations for the changes in the automotive industry that have occurred as a result of the impact of fragmentation in the production processes in the last decades (see Section 2.2 for a more detailed discussion). Although the concept of economic geography considers many of the research problems, the specific issue of sustainability of local suppliers in developing markets is not explored in depth. However, particular issues, like the dispersion of production networks into geographical areas, are examined. Compared to the concept of global value chains, economic geography places more emphasis on the spatial organisation of economic activities. Therefore, it adds an important aspect to the global value chain notions.

- Fragmentation and cluster theory (see Section 3.2), which focuses on the concentration of specialised industries in particular locations.

Market access not only refers to competitive advantages that are provided by suppliers to lead firms in terms of cost rewards and access to technology, it also depends on geographic proximity and social ties within the industry. Cluster theory can help to explain some of the issues that are quite distinctive to the automotive industry. Clusters can be defined as geographically proximate groups of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities. These agglomerations of firms are based on trust, reputation and mutual dependence. The improvement of processes through combined efforts of the members of a cluster is the most visible advantage. As cluster theory focuses on informal relationships in a particular value chain, one major question is what are the prerequisites for membership? Membership is important because it is believed that efficient clusters offer horizontal access to the automotive value chain. Clusters are also likely to develop in emerging markets because the combination of the capabilities of locally owned firms helps to comply with the requirements in global value chains.

- Value chain analysis (see Section 3.2) categorises the generic value-adding activities of an organisation (or beyond by analysing supply chains) and identifies the cost and value drivers of each activity.

Value chain analysis directly assesses the issue of how to link into a production network. By analysing the value chain the different stages of value-added of a product, the players in the chain and the underlying business models of the participants in the value chain are identified. It can also be concluded which lead firms in the value chain strategically opt for in-house production. Therefore, important information on the components that are outsourced and the core competencies of the lead firms can be assessed. The discussion of a value chain also leads to an awareness of where the competitive advantages of specific stages in the value chain are located and which companies can perform these activities. With regard to the research question, value chain analysis gives answers to the specific question of how value-added is distributed in a particular production process and where the opportunities for likely market access are given. The consideration of competitive advantages explores the opportunities for local suppliers in emerging markets on the one hand, but is not sufficient with regard to the question of what the requirements for successful entry into the value chain are. In particular, value chain analysis adds to the

concept of global value chains because it investigates the technical foundations of a specific value chain.

- Supply chain strategy (see Section 3.2) is used in the field of supply chain management (SCM) to outline the planning and management of all activities in sourcing, procurement and logistics.

Supply chain strategy or management describes the planning and management of all activities related to sourcing and procurement and all logistics management activities. From a lead firm perspective it sets the footprint of the supplier network and also configures the supplier landscape. The most important concepts with respect to the configuration of the supplier network in the context of the research issues are single sourcing and follow sourcing. Single sourcing describes the decision of a lead firm (which acts as a buyer in this case) to supply a particular product from one specific supplier only. On the one hand, this procedure puts the buyer in a dependent position where the risk of supplier failure is extremely high; but on the other, the bargaining position improves through increased economies of scale. The concept of follow sourcing is much more important in the context of the research. Follow sourcing describes the movement of suppliers that 'follow' their customers to new production areas. Lead firms, in this case the customers, want their important first-tier suppliers to set up supply in proximity to new production sites to ensure equal supply in terms of cost and quality in their global production network. The lead firms' knowledge of supply chain strategy (and management) in the automotive industry is one important factor in answering the research problems. It gives answers about the location of the lead firms, but does not consider the question how local suppliers can compete or link with transnational companies, which are preferred by the lead firms. Supply chain strategy interferes with all of the other microeconomic concepts, as these concepts have direct influence on the decisions on the supply chain strategy of a particular company.

- Global value chain governance (see Section 3.3) focuses on the spatial distribution of activities and the exploration of how to engage in a value chain.

The global value chain concept gives insights into the dispersion and governance of the automotive value chain. As the global value chain is a hybrid concept that recognises macroeconomic as well as microeconomic factors, it can explain some of the specific issues which are shaping the automotive industry. It recognises the pure impact of

transactions while looking at the complexity of transactions and it also examines the issues of the ability to codify information and the capabilities in the supply base. Therefore, the approach of global value chains considers not only global industry-level issues, but also acknowledges issues that are specific to particular regions. In terms of the research questions, the conclusion is that by applying measures of the concept of global value chains the specifics of the automotive industry in developing markets can be adequately understood. Nevertheless, in its generalised form it does not recognise the level of the value chain that is being examined (e.g. the relationship between OEM and first-tier supplier or the relationship between other members of the value chain). And it does not take into account where the value chain is located (e.g. in developed or emerging markets).

- Firm-level learning and capabilities (see Sections 4.2 and 4.4) explore the question of what measures and upgrading options companies have and pursue.

Firm-level learning and capabilities describe competencies in the supply base. They allow possibilities for horizontal or vertical upgrading in a specific supply chain of a particular company. The theory of firm-level learning and capabilities is fundamental to the research problem. As companies in emerging markets are required to comply with global standards, the element of firm-level learning and capabilities will be regarded as a prerequisite to the research. Therefore, this aspect will not be discussed in depth during the further research. The approach is partly considered in the concept of global value chains, as capabilities in the supply base define a variable in the discussion of governance of value chains. Firm-level learning and capabilities also refer to modularisation and supply chain strategy because suppliers who want to get access to the value chain have to be able to cope with current technological developments, like modularisation, and also have to show their qualification in the supply chain in order to be considered by lead firms with regard to their decisions about the supply chain landscape.

All these theories can be used to describe the global automotive value chain in the context of the research problem. However, the question still remains as to how local suppliers in the automotive industry can link into the global automotive value chain and whether there is a theoretical model that describes the issue of the sustainability of local automotive suppliers in emerging markets.

From a literature-review point of view, it can be stated that a holistic approach with regard to the research question based on existing theories does not exist because of the complex system that is

the global automotive value chain. Each of the abovementioned theories contributes to the research, but is not able to display a solution for the research problem on its own. Therefore, the approach is to develop a conceptual model out of the various factors that have been discussed and summarised in the conclusions of the literature review.

### 5.3 THE CONCEPTUAL MODEL

#### 5.3.1 SYSTEM AND GOVERNANCE LEVELS

Combining the findings of the literature research it can also be concluded that the global automotive value chain, with particular respect to the upstream supply chain, cannot only be described at the firm and industry levels. It is also influenced at the market and government levels. Therefore macro-, meso- and microeconomic schools of thought can be deployed to investigate the global automotive value chain. As a result, the research follows an approach of different paradigms, as depicted in Table 5.1. In addition to the different methodologies mentioned by Morrison, Pietrobelli and Rabelotti (2008: 44) the meso-approach is also introduced and will be used to depict factors in between the macro- and micro-approaches.

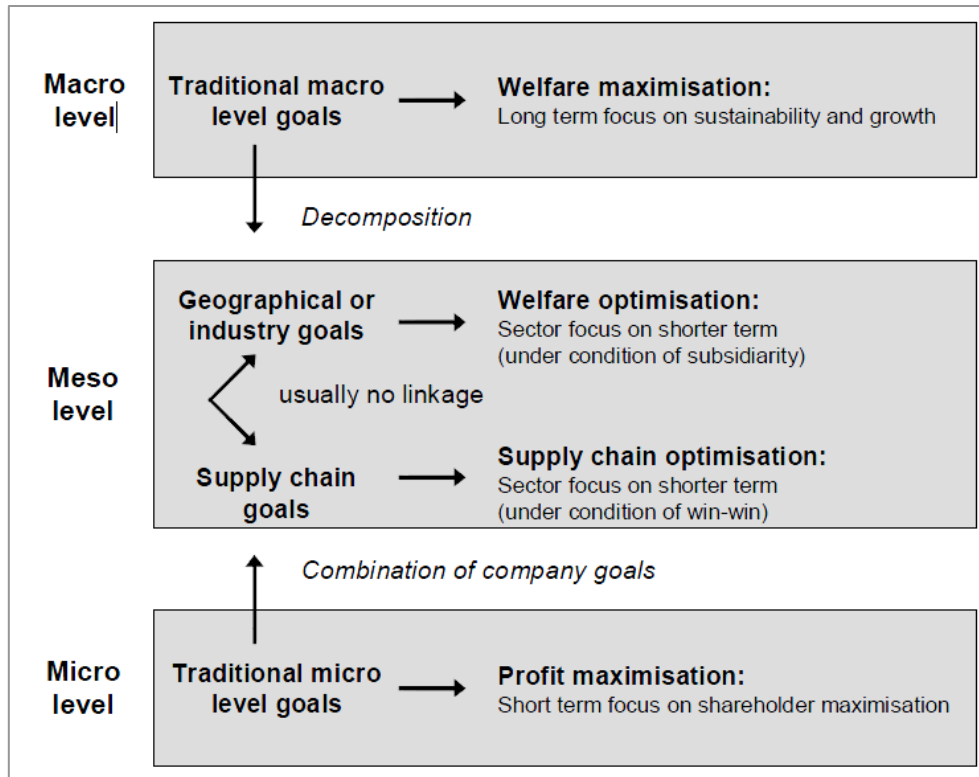
**Table 5.1: Different GVC (Global Value Chain) schools of thought**

	<b>Internationalists</b>	<b>Industrialists</b>
<b>Main focus</b>	GVCs' governance and upgrading mainly in LDCs	GVCs' governance and upgrading mainly in LDCs
<b>Methodology</b>	Macro approach Industry-level data/trade data	Micro approach Case studies, qualitative data
<b>Policy focus</b>	International division of labour, role of bilateral/multilateral trade agreements, FDI	Competitiveness of clusters, local and cluster development policies
<b>Theoretical background</b>	International economics, political economy, TNC theories	Industry studies, local development, cluster studies

Source: Morrison *et al.*, 2008: 44

The suggested approach becomes more viable when one looks at the distinction of the macro-, meso- and micro-levels developed by Demkes and Tavasszy (May 2000) with respect to the connectivity of macro- and micro-levels in logistics (see Figure 5.1). They state that micro-goals are capable of measuring internal and external goals at a company level, but inadequate for inter-related value or supply chain issues. A similar statement can be made about the macro-level goals, which traditionally focus on welfare optimisation. These measurements are useful when it comes to

comparative analysis among different nations but must be reconfigured in order to be adequate for an industry analysis.

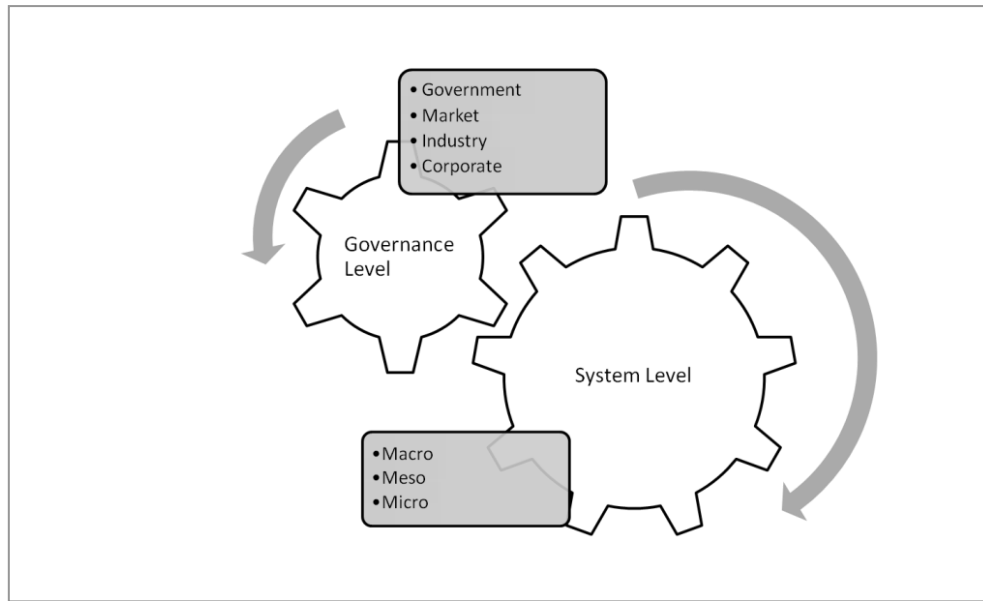


**Figure 5.1: Migration towards supply chain focus**

Source: Demkes & Tavasszy, 2000: 16

In the conclusion on governance methodology, which was discussed in the literature review about the governance of global value chains, the conceptual model also proposes to include levels of governance as a further factor in the model. Governance levels are open to a typology suggested by Coe and Hess (December 2006) in their work about global production networks. They differentiate between political, institutional, industrial (or inter-firm) and intra-firm governance. This concept adds to the inter-firm governance of the global value chain approach (GVC) and informs about the intra-firm, institutional and political forms of governance.

In conclusion, the conceptual model is suggested to be composed of two layers, namely the system levels and the governance levels. The system levels contain macro-, meso- and micro-views and the governance levels are subdivided into government, market, industry and corporate influences. The layers of the conceptual model are shown in Figure 5.2.



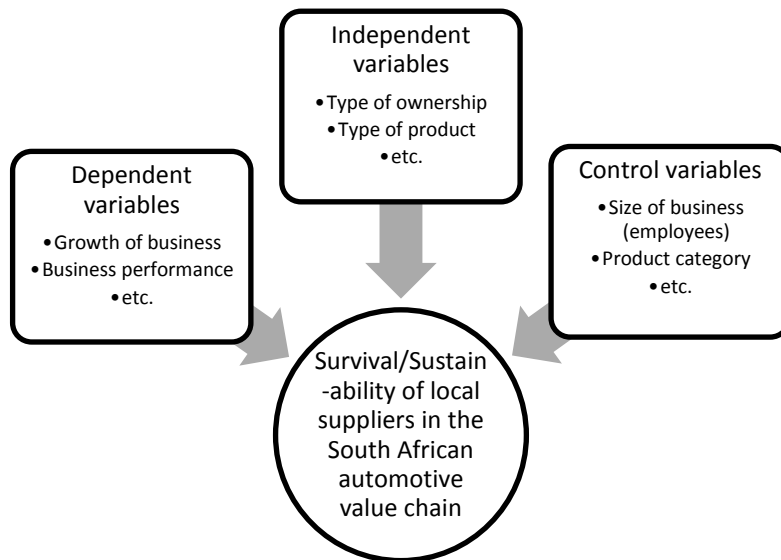
**Figure 5.2: Conceptual model layers**

### 5.3.2 VARIABLES

Figure 5.3 gives an overview of the structure of the variables. Note that this illustration only gives an overview and does not contain every single variable. Figure 5.3 shows how the variables are subdivided into three subcategories:

- Independent variables, which will be the underlying factors to be tested in the model
- Dependent variables, which will be the identified measures for economic sustainability
- Control variables, which will describe the units of analysis – in this case an automotive component supplier in South Africa





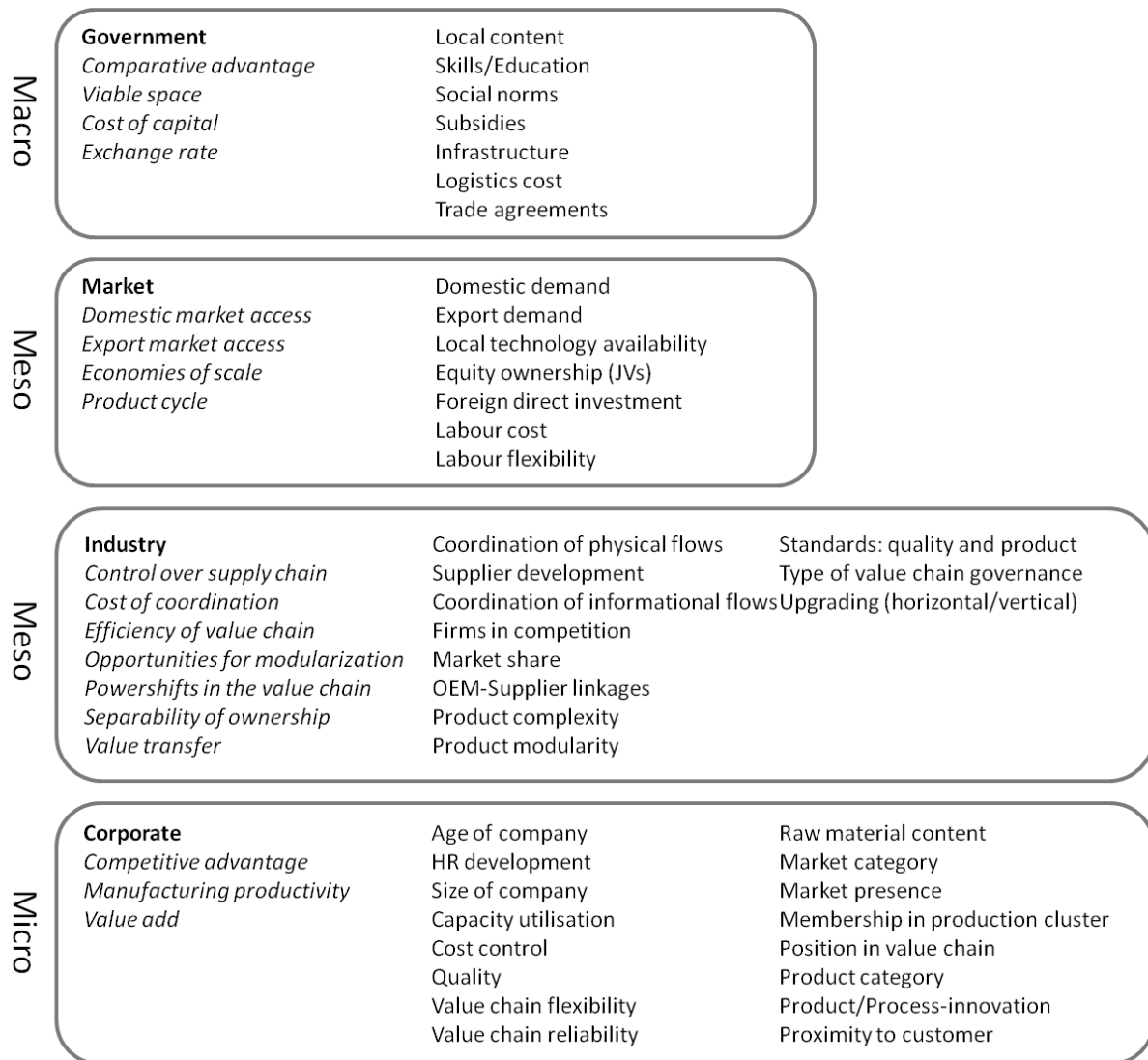
**Figure 5.3: General overview of the structure of the variables used in the conceptual model**

The factors that were identified in the literature review and cross-referenced to this chapter are used in the following discussion to identify the variables. Additionally, these variables will be structured according to the abovementioned system and governance levels. Factors that cannot be translated into variables directly are explained and transformed into such. These factors are the following:

- Degree of coordination: Translated into cost of coordination, as this variable can measure the degree by evaluating the cost involved.
- Technology accessibility: Can be measured by the foreign direct investment inflow and the equity ownership because international ties enable local companies access to new technologies.
- Export markets: Measured by the proportion of revenues made in foreign markets and the relation of revenues in free trade agreement areas.
- Supply relationship: Recognised by the type of value chain governance that the supplier operates in.
- Policy influence and initiatives: Summarised under the topic of industrial policy and contain variables like subsidies, education, etc.
- TNC-SME-linkages (Transnational companies with small to medium sized local companies): Measured under the synonym of the information flow between the supply chain partners.
- Competitive advantage, competitiveness, firm capabilities, operational excellence and operational performance: Translated into operational performance measures.

- Tier-level: Measured by the position in the value chain.
- Local cluster: Rated by the membership in a production cluster.
- Co-location: Translated into the geographical proximity concept.
- Production capabilities: Can be measured by the R&D expenses of a firm.
- Connection to lead firms: Rated through the OEM-supplier linkages.

Figure 5.4 shows the structure of the conceptual model including the translated and directly used factors from the literature review. The variables are also assigned to the respective layers of the conceptual model.



**Figure 5.4: Conceptual model with independent variables and layers**

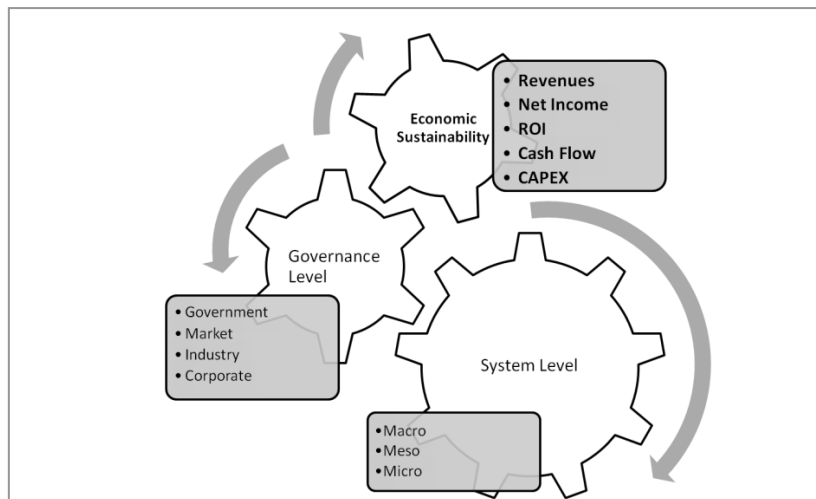
The variables in the first column of each layer (displayed in italics) can be structured into two types. The first type is constant variables, which are determined by structural influences on a national or

global level. These variables include the cost of capital, the exchange rate and overarching topics, like comparative advantage. The second type is latent variables, which cannot be measured directly and are, therefore, decomposed into measurable constructs. In such a way the cost of coordination is measured by the coordination of physical and informational flows.

After having discussed the independent variables the dependent variables will be deduced from the factors that were identified in the literature review. The starting point is the sustainability of the local suppliers in the South African automotive value chain, which is acknowledged as the research objective. The sustainability issue is raised by Barnes & Morris (2008: 31), where they raise the question of the sustainability of the South African automotive industry and its exposure to the global automotive value chain. Although sustainability is generally understood to be the triple bottom line approach as a combination of environmental, social and economic performance (Doane & MacGillivray, March 2001: 3), this research focuses on the economic dimension. Therefore, sustainability is seen in an economic way in the research, which focuses on financial performance measures. In conclusion, it can be stated that the term 'sustainability' is modified to 'economic sustainability' in the context of this research.

Economic sustainability can be defined as 'the ability to extract revenues – in a certain period of time – that outweigh the cost of operating the firm and thereby securing the future of the firm' (Found *et al.*, December 2006: 3). At the simplest level, this means that economic sustainability is about how companies stay in business. Stated another way, economic sustainability can be described by the business economic performance of a firm. By considering business economic performance as the measurement for economic sustainability, the view on sustainability changes from a mixture of internal and external implications to just an internal view (Doane & MacGillivray, March 2001). This view has to be taken in the research context, as the question is about how organisations stay in business, which is ultimately about survival.

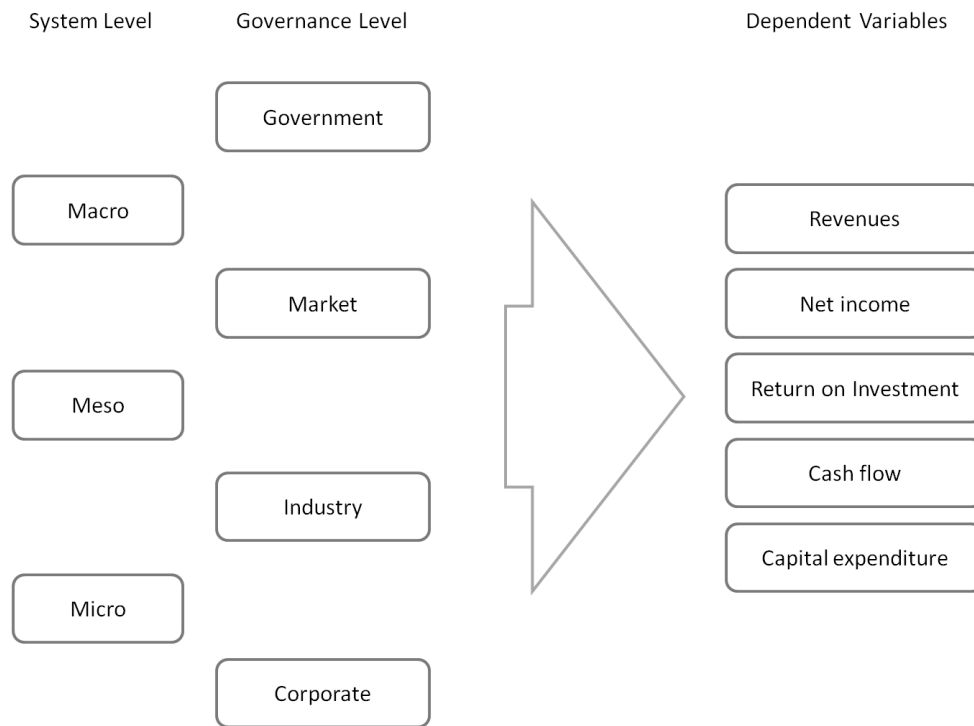
Venkatraman & Ramanujam (1987: 4) state in their work about the measurement of business economic performance that sales growth, net income growth and return on investment are three dimensions of evaluating a firm's economic performance. Besides these measures, it seems important to incorporate the dimensions of operational performance and investment in future activities. Therefore, the operating cash flow and the capital expenditures of a firm are integrated into the measures of business economic performance in the research context. The dependent variables are shown in combination with the conceptual model layers in Figure 5.5.



**Figure 5.5: The measures for economic sustainability**

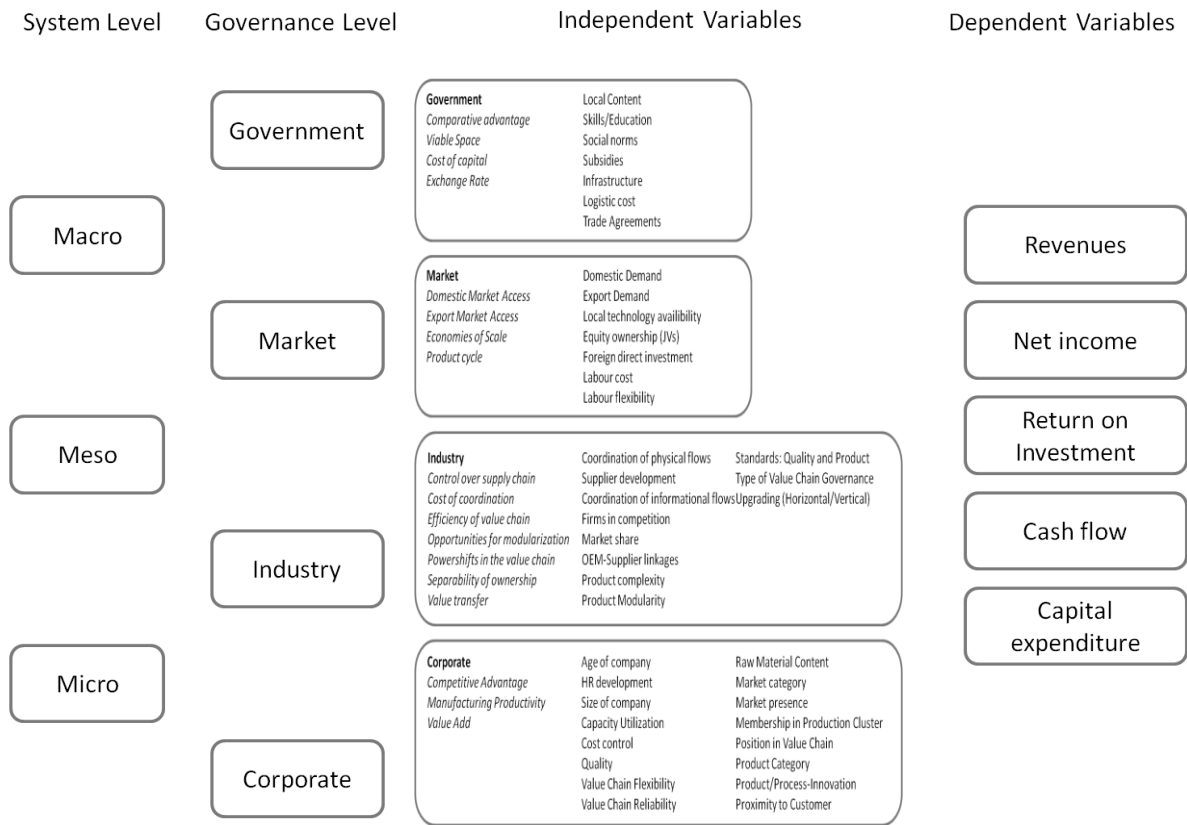
### 5.3.3 MODEL

By assembling the layers of the conceptual model in relation to the dependent variables it becomes visible that the research suggests that economic sustainability for an automotive component supplier in the South African automotive value chain is influenced by variables at the different system and governance levels. It can be stated that the flow of influences starts on the system level, is then followed by the governance level and leads to the dependent variables. It can also be noted that there are dependencies between the system and governance levels. The macro-factors are governed on the government and market levels; the meso-factors are governed on the market and industry levels and the micro-factors are governed on the industry and corporate levels. The conceptual model without the independent variables presents as shown in Figure 5.6.



**Figure 5.6: Conceptual model without independent variables**

By incorporating the independent variables it becomes obvious that the conceptual model shows a complexity towards the independent and dependent variables (Figure 5.7). To overcome this complexity while building up the conceptual model the independent variables are structured according to their governance levels. While being able to accommodate the independent variables with their respective system and governance levels it cannot be stated how and what independent variables influence the dependent variables. This is the primary research question and the research design and methodology will follow up on the question of how to approach this issue.



**Figure 5.7: Conceptual model including independent variables**

### 5.3.4 RESEARCH QUESTIONS

After having developed the conceptual model, the research questions must be linked to the model. The primary research question is how local automotive suppliers in emerging markets can build up or secure competitiveness, which is equal to the question of which factors influence the local supplier sustainability in the research environment. The secondary research questions relate to factors that should change or enhance the sustainability of local suppliers. With regard to the sustainability issue, the following assumptions can be made:

- Economic sustainability is assumed to be influenced by the independent variables.
- The independent variables show significant correlations (positive or negative) to the dependent variables.
- Economic sustainability is not only based on the micro-level factors, but also derives from meso- and macro-factors, which occur at the industry, market and government levels.

With regard to the secondary research objective, the factors and variables of the conceptual model will be investigated according to their relevance and importance. This matter is twofold: the first

aim is to identify patterns with regard to the levels of the model where a change or improvement should take place; the second intention proves or disproves the theoretical findings of the literature review, with regard to the local supplier industry in the South African automotive value chain. To be more precise, the latter means that concepts like follow sourcing or the isolation of local suppliers to their home markets will be analysed.

#### 5.4 SYNTHESIS

This chapter has summarised the bodies of theory that contribute to a solution for the research problem. As stated earlier, it can be concluded that the existing theory does not offer a holistic approach. Therefore, a conceptual model is designed that includes the different factors that influence the economic sustainability of local automotive component suppliers. The conceptual model is structured in system and governance levels in order to acknowledge the characteristics of the factors. By adding the independent and dependent variables to the model a holistic approach to the research problem is presented.

The next chapter will show how the conceptual model will be tested and validated and how the factors of the conceptual model will be analysed according to their influences on the research problem.

## CHAPTER 6

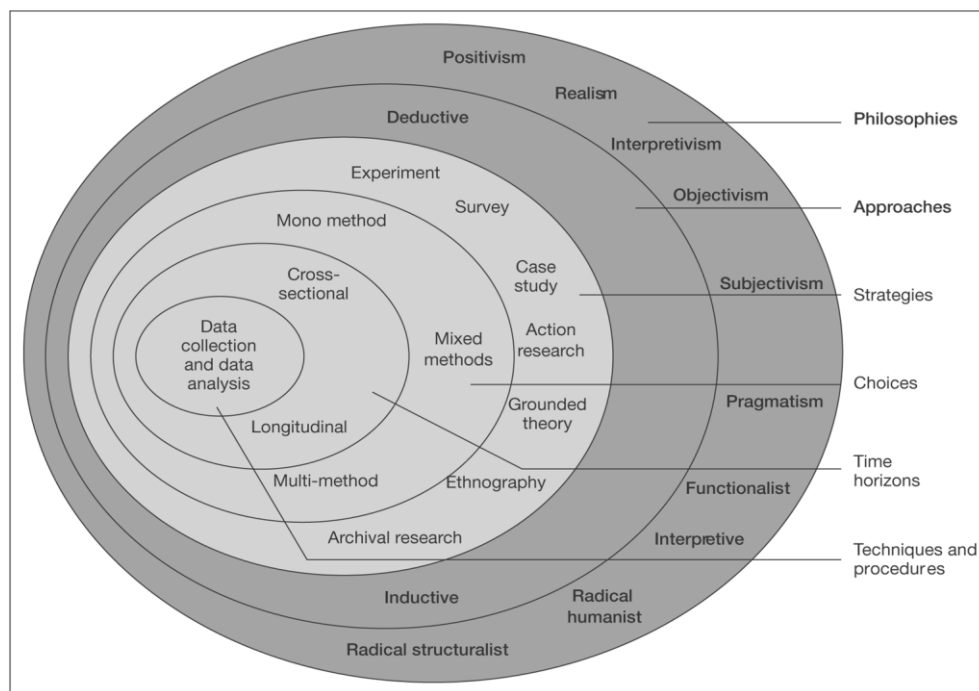
### RESEARCH DESIGN AND METHODOLOGY

#### 6.1 INTRODUCTION

This chapter explains the research design and methodology. The first part of the chapter aims to give an overview of the research design, which follows on from the development of the conceptual model. The second part discusses the research methodology, and explains and outlines the qualitative and quantitative research approaches.

#### 6.2 RESEARCH DESIGN

Figure 6.1 will be used for the design and methodology discussion. The research 'onion' will be used to explain the research philosophy and strategy.



**Figure 6.1: The research 'onion'**

Source: Saunders, Lewis & Thornhill, 2009: 108

Starting with the outer layer, it can be concluded that the philosophical approach is tied to pragmatism. This is because external and multiple views are chosen to best enable a solution or answer regarding the research questions. This is important to ensure the application of the research problem in theory and practice. Furthermore, as the research objective is embedded in an



environment that is highly dynamic and a trendsetter, it has to be considered that observable phenomena are as important as subjective meanings of the industry's stakeholders. To overcome the dichotomy of the research, the focus is practical applied research and integrating different perspectives to help interpret the data (Saunders *et al.*, 2009: 119).

The foundation of the research is formed by a deductive approach. However, in order to take the research stakeholder's view into account (in this case the automotive component supplier industry), the design follows an inductive approach in the second phase (after the literature review). This is needed to ensure that the views from this dynamic industry are considered in the further course of the research. In the third phase the approach moves back to deduction, as it aims to test the conceptual model and to identify, reduce and generalise the factors that influence the research problem. However, there is also an inductive influence in this phase, as not all of the variables could be tested and evaluated regarding their influence on the research objective.

The specific outline of the research design and the other layers of the 'research onion' will be discussed in the next paragraphs. Subsequently, Section 6.3 (Research methodology) discusses the choice and set-up of the methods used to investigate the problem.

The literature review and the conceptual model show that test data is needed to revise and decompile the complexity of the research objective in order to make it applicable in theory and practice. The complexity of the research problem also necessitates triangulating the design. Given that theory discloses that the research question cannot be answered by a single application of a particular body of knowledge, the need to approach the research problem from different angles arises (Blumberg, Cooper & Schindler, 2008: 201). This leads to a need to combine an exploratory and explanatory study – a two-stage design – to identify the factors that influence supplier sustainability in the field of research. The exploratory part is used to clarify the understanding of the research problem (Saunders *et al.*, 2009: 139), whereas the explanatory part is used to explain the relationships between the variables of the conceptual model (Saunders *et al.*, 2009: 140).

This leads to a multiple-method choice for data collection (Saunders *et al.*, 2009: 150). This approach is advocated particularly for business and management research (Curran & Blackburn, 2001: 119). As discussed earlier, the mix of qualitative and quantitative approaches is executed in a sequence to, firstly, revise the key issues and the conceptual model, and, secondly, to explain the relationships of the research variables (Karami, Rowley & Analoui, 2006: 48). This also relates to the pragmatic research approach, as it builds the opportunity to combine micro- and macro-levels of the research, which is important for the research objective (Onwuegbuzie & Leech, 2005: 383).

## 6.3 RESEARCH METHODOLOGY

### 6.3.1 LITERATURE REVIEW

An extensive literature review is undertaken to investigate the scope and set a demarcation of the field of research. Therefore, the research objectives are broken up in sub elements to allow for an academic approach. The first sub element discusses current aspects of the worldwide automotive value chain with special respect to the phenomenon of globalisation. Subsequently, the status of South Africa's automotive industry is explained and linked to the global automotive value chain. Additionally the literature review discusses the concept of value chains with special attention to the upstream component value chain and also reviews the concept of global value chain governance. Finally, the aspect of how local automotive suppliers in emerging markets can upgrade and position themselves in the automotive value chain is discussed.

### 6.3.2 QUALITATIVE RESEARCH

#### 6.3.2.1 VALIDATION DISCUSSIONS

As described in the research design, the research objective is embedded in an environment where theory and practice are strongly related because of the high dynamics in the automotive industry, not only in South Africa, but worldwide. This is emphasised by the fact that the South African automotive OEMs and most of the component suppliers are either bound to a worldwide production network or export cars and components to overseas markets.

Therefore, it is necessary to align the theoretical research objectives with industry needs, as well as to ensure practical applications of the research findings. In order to facilitate the process of alignment, two major automotive bodies are approached:

- The Automotive Industry Development Centre (AIDC)
- The National Association of Automotive Component and Allied Manufacturers (NAACAM).

These bodies (see AIDC, 2011 and NAACAM, 2011 for further information) are used to capture and discuss the industry needs.

The validation discussions are set up with members of the Automotive Industry Development Centre and National Association of Automotive Component and Allied Manufacturers and follow a semi-structured approach. In the early phase of the research the discussion was aimed at considering the South African automotive environment and the inherent differences to the developed countries. The follow-up discussion was aimed at validating the findings from the

literature review and the conceptual model in order to prepare the further qualitative and quantitative research.

As the abovementioned discussions are aimed at further qualifying the research strategy, design and methodology, the findings are already incorporated in the overall concept. Therefore, the findings of the discussion are not mentioned in particular in this section.

### 6.3.2.2 FOCUS GROUP AND INTERVIEWS

#### 6.3.2.2.1 INTRODUCTION

The literature review concluded with a complex model with regard to the research objective. As the complexity of the model derives from the number of independent variables on the different system and governance levels, it was decided to align theory and practice. This alignment is implemented by the use of a focus group and semi-structured interviews to discuss the complexity of the conceptual model and validate the findings from the literature review. This alignment is the first goal of the qualitative research methods. As a result, the conceptual model is adapted according to the findings of the focus group and interviews.

The second target of the focus group and interviews is to capture the current state of the South African automotive industry. This is done to identify main features and topics of the automotive value chain in South Africa with particular emphasis on how they differ from those of developed countries.

The findings of the focus group and interviews will be used to point out factors and issues with regard to the research objectives.

#### 6.3.2.2.2 SET-UP

The focus group was organised as follows:

- The location was Cape Town, the venue the Solution Workshop (see The Solution Workshop, 2011 for further information)
- The aim was to gather four to eight participants
- The target audience was Chief Executive Officers (CEOs), Managing Directors (MDs), senior managers from automotive firms (either OEMs or suppliers) and other value-/supply-chain related professionals
- The focus group itself was a two-hour session
- An external moderator was used (Venetia Amato from Solution Workshop)
- The session was audio recorded and a transcript is available for analysis

The interviews were run with the following set-up:

- Location is the particular venue/office of the interview partner
- It is aimed to conduct 2-3 interviews
- The target audience are CEOs, MDs, Senior Managers from automotive firms (either OEMs or suppliers) and other value-/supply-chain related professionals
- The semi-structured interviews itself will be a 1 hour session
- The interviews are moderated by the author of the research report
- The sessions were audio recorded and transcripts are available for analysis

#### 6.3.2.2.3 AGENDA

The general agenda for the focus group and the interviews was as follows:

- Introduction
- General industry probe
- Trends in the industry
- Discussion about conceptual model
  - Levels/attributes
  - Factors (independent variables)
  - Measures for sustainability (dependent variables)
- Group/interview closure

The guideline for the focus group discussion and interviews is provided in Appendix A. The discussion guide was primarily developed for the focus group discussion and was then used in the interviews (with deviations according to the method of semi-structured interviews).

#### 6.3.2.2.4 DATA COLLECTION

The focus group was held on 12 October 2010, 18h00, at The Solution Workshop, Cape Town. There were four participants (after eight positive replies to the invitations had been received in advance). The group consisted of two managing directors from automotive suppliers in the Cape

Town area; one managing director of a packaging business (and, therefore, in the supply- and value-chain-related area) and an executive procurement and supply chain director of an automotive OEM. The following statements to the data collection process of the focus group are feedback from the moderator of the focus group:

- It can be stated that the respondents were well recruited and fitted the profile well.
- Their various backgrounds helped to contribute to diverse perceptions, and the level which they operate on contributed well to the flow of the discussion.
- The group itself flowed really well. The discussion started on a general level and then filtered down to more specifics. The majority of the discussion was around the proposed conceptual model.
- Due to the technical nature of the topic, no metaphorical or projective techniques were used.
- The format was that of open-ended questioning and in-depth probing.

The focus group was conducted in the suggested time frame of two hours. The results of the focus group are captured in audio format and a transcript is available for the analysis.

The first semi-structured interview was conducted on 19 October 2010, 10h00, with a general manager of an automotive supplier in the Cape Town area. The interview took place in the office of the interview partner and the duration was one hour. The result of the interview is captured in audio format and a transcript is available for analysis.

The second semi-structured interview was conducted on 20 October 2010 10h00 with a former executive of Nissan SA, currently working as an independent consultant. The interview took place in the office of the interview partner and the duration was one and a half hours. The result of the interview is captured in audio format and a transcript is available for the analysis.

#### 6.3.2.2.5 DATA ANALYSIS

The transcripts and notes of the qualitative research methods were used to analyse the data. The analysis followed two different directions. The first direction aimed at the revision and validation of the conceptual model. Therefore, the available data was screened for comments and recommendations with regard to the proposed conceptual model.

The second direction of the analysis of the qualitative research methods aimed at the identification of patterns with regard to issues in the South African automotive industry with special respect to the component supplier industry. Therefore, overarching themes will be identified and aggregated to patterns with regard to the research objective.

### 6.3.3 QUANTITATIVE RESEARCH

#### 6.3.3.1 INTRODUCTION

Having explained the qualitative part of the research, this section discusses the quantitative methods of the research. An empirical study is needed because of the partial availability of secondary data due to the type of the unit of analysis. The unit of analysis are suppliers of components for the automotive industry; they range from listed companies to private companies. Additionally, there is a lack of primary data about the South African automotive value chain. These facts necessitate collecting primary data across the research variables in order to ensure a valid analysis.

#### 6.3.3.2 SURVEY

The aim is to employ a firm-level survey to explore the impact of the factors in the proposed conceptual model on local firms' competitiveness and upgrading (Morrison *et al.*, 2008: 52). In particular, the combination of variables at the macro- and meso-levels and the fact that the unit of analysis is the company level make it indispensable to gather data in the field.

As there is also a lack of data about the automotive value chain in South Africa and theoretical concepts do not explore the core question of improved sustainability of local suppliers in depth, the aim was to formulate a field study among the component suppliers in the South African automotive industry. The research need derives from three major points. The first one is that past and current data about the South African automotive component supplier industry is only available for operational measures. The second point is that secondary data is not available throughout the industry, as the companies – which are the units of analysis – are not always listed. The third and most significant point derives from the findings of the literature review and the conceptual model. The complexity and layers of the conceptual model create a need to gather data which can be used in order to create modelling data with regard to the research objectives. This data will give insights about the structure of the value chain and reveal implications for the local supplier industry in terms of competitive issues and economic sustainability.

### 6.3.3.3 SET-UP

The survey was carried out using the following design:

- Web-based questionnaire
- Duration approximately 20–30 minutes.
- Foundation is the conceptual model
- Influence of variables on the research objective will be tested
- Variables on the meso- and macro-levels have to be translated into the firm-level perspective in order to gather the relevant data
- Unit of analysis is the single company

### 6.3.3.4 SAMPLING

The identification of the sample was done by a non-probability sampling technique, as the population of the South African automotive suppliers can only be estimated due to the lack of a comprehensive national list. Nevertheless, the National Association of Automotive Component and Allied Manufacturers and the Automotive Industry Development Centre, which were approached in order to align the research to practical issues, provided address databases.

In order to estimate the population size of the South African automotive supply industry the Automotive Industry Development Centre database was used, as this list is based on latest market data (see also <http://www.autoindustry.co.za/SupplierSearch/SupplierSearch.aspx> for further information). This list has been data cleaned and shows a total number of 469 automotive suppliers with a local presence in South Africa. This number includes component suppliers down to the fourth tier level, as well as service providers to the automotive industry.

Due to the focus on the component supplier industry it was decided to make use of the database of the supplier organisation NAACAM (National Association of Automotive Component and Allied Manufacturers) in order to define a sample. Their members' database provides a sample with respect to the component industry of the automotive supplier population in South Africa. After data cleaning the list on a company level (so that regional production sites were excluded) and after identifying the component suppliers, 114 automotive suppliers were identified to be included in the sample. This results in a 24 per cent sample of the estimated total population of automotive suppliers from the Automotive Industry Development Centre database (see above, 469 suppliers).

The fact that the sample is derived from an organisation from inside the South African automotive supplier industry together with the focus on approaching the component industry makes it a purposive homogeneous sample. The homogeneity is caused by the fact that it is specifically

designed to study the component industry of the South African automotive value chain as an overarching research matter. Additionally it can be argued that this sample was chosen because accessibility to the members of the National Association of Automotive Component and Allied Manufacturers is high due to the ability to inform and contact them directly and indirectly through their official body.

#### 6.3.3.5 RESPONSE RATE

Due to the direct and indirect accessibility of the sample the expected response rate was 30 per cent or higher. The endorsement of the National Association of Automotive Component and Allied Manufacturers by its CEO and the direct mailing of the survey invitations to the sample entities suggest that the targeted response rate was achievable. In addition to the accessibility it can be stated that the awareness of a survey in the sample could be increased through impact presentations at an annual conference of the National Association of Automotive Component and Allied Manufacturers organisation and the participation of the author in regional meetings of the National Association of Automotive Component and Allied Manufacturers.

The response rate for the survey can be calculated as shown in Table 6.1.

**Table 6.1: Survey response rate**

Number of component suppliers in NAACAM database (sample)	114
Responses usable (not ended, but more than 50 per cent of questions answered)	53
Responses ended (finished entire questionnaire)	38
Response rate for 'responses usable'	46%
Response rate for 'responses ended'	33%

Additionally, the following calculations can be made. By taking the component suppliers of the National Association of Automotive Component and Allied Manufacturers' database and putting them in relation to the estimated population size of South African automotive suppliers, it can be assessed that 24 per cent of the population is included in the sample. It can also be estimated that three out of four suppliers are component suppliers (this is the proportion of the National Association of Automotive Component and Allied Manufacturers' database) and, therefore, 347



suppliers out of the estimated population are component manufacturers. The response rate decreases to 15 per cent when comparing the usable responses to the estimated population size.

### 6.3.3.6 QUESTIONNAIRE

#### 6.3.3.6.1 INTRODUCTION

This section discusses the questionnaire that relates to the field study. The design of the questionnaire is shown and the variables from the conceptual model are related to the questions in the questionnaire.

#### 6.3.3.6.2 DESIGN

The questionnaire follows a self-administered and internet-mediated design. This is done with the aid of a survey-software called Checkbox.

The questionnaire starts with a cover letter in which the intentions, requirements and contact information are given. The questionnaire includes 46 questions. The types of questions range from rating, quantity and qualitative.

The data points used in the questionnaire relate to 2009 – if not otherwise stated. This is because the primary research was undertaken in the course of 2010 and early 2011 so that the latest official data available were 2009 data. Although 2009 fell within the worldwide financial crisis it is nevertheless believed that the mechanisms between the factors and measures of sustainability remain the same.

A testing of the survey was done in preparation for carrying out the questionnaire to the potential respondents. This pilot showed satisfactory results, although the time required to complete it, was a concern of the pilot respondents. Therefore, answer bands for the numerical questions were brought into the questionnaire for ease of use and to make the responses with respect to the financial data more anonymous.

The full questionnaire is provided in Appendix B.

## 6.3.3.6.3 VARIABLES

The variables of the conceptual model that were translated into questions and measured in the survey are shown in Table 6.2 (in alphabetical order).

**Table 6.2: Variables and related questions and measures in the questionnaire**

<b>Variable</b>	<b>No.</b>	<b>Question in questionnaire</b>	<b>Data point</b>	<b>Unit</b>	<b>measured in</b>
<b>Age of company</b>	2	Please indicate the age of your company today.	Today	years	Bands
<b>Capacity Utilization</b>	43	Please state your Capacity Utilization in 2009.	2009	per cent	Bands
<b>Capital Expenditure (CAPEX)</b>	41	Please state your Capital Expenditure (CAPEX) in 2009.	2009	mil ZAR	Bands
<b>Coordination of informational flows</b>	32	Please state the investment in Supply Chain Capabilities and Collaboration in 2009.	2009	mil ZAR	Bands
<b>Coordination of physical flows</b>	32	Please state the investment in Supply Chain Capabilities and Collaboration in 2009.	2009	mil ZAR	Bands
<b>Cost control</b>	25a	Total inventory levels (Raw material, WIP, Finished Goods)	2009	mil ZAR	
<b>Domestic Demand</b>	35	Please state your Domestic Revenues as of Total Revenues in 2009.	2009	per cent of Revenues	Bands

Variable	No.	Question in questionnaire	Data point	Unit	measured in
<b>Equity ownership</b>	3	Please indicate the type of ownership of your company.	Today	categories	Internationally owned/ Joint Venture/ Locally owned/ Locally owned using international license
<b>Firms in competition</b>	20	Please state the number of competitors in your market.	Today	number	Bands
<b>Foreign direct investment (FDI)</b>	4	If internationally tied please indicate the FDI (Foreign Direct Investment) in the last 5 years.	2007-2011	mil ZAR	Bands
<b>HR development</b>	38	Please state your HR-Training expenditures as of Total Revenues in 2009.	2009	per cent of Revenues	Bands
<b>Infrastructure</b>	7,8,9,10,11	How would you rate the South African Road-Infrastructure compared to the developed markets (e.g. Europe, US)?	Today	Lickert 7	inferior/ comparable/ superior
<b>Labour cost</b>	12	How would you rate the South African labour cost including all influences compared to the developed markets (e.g. Europe, USA)?	Today	Lickert 7	inferior/ comparable/ superior
<b>Labour flexibility</b>	6a,b	Please state the percentages of the following categories of your employees in 2009 - Temporarily/Broker workers	2009	per cent of Total Employees	
<b>Local Content</b>	23	Local content of TOP-product	Today	per cent of Product cost	

Variable	No.	Question in questionnaire	Data point	Unit	measured in
<b>Local technology availability and requirements</b>	26	How many of the production stages for your main product(s) is/are available locally?	Today	per cent	Bands
<b>Logistic cost</b>	33	Please state the Logistic Cost of your business in 2009.	2009	per cent of Revenues	Bands
<b>Market category</b>	19	Please state the category of your main customers or the type of market you operate in.	Today	categories	OEM/ Tier1/ Tier2/ Tier3/ Aftermarket/ Non-Automotive
<b>Market presence</b>	15	Please rate your market presence.	Today	categories	Website/ Sales Reps/ Sales Office
<b>Market share</b>	21	Please state your market share for 2009.	2009	per cent	Bands
<b>Membership in Production Cluster</b>	16	Please rate your membership in a production cluster.	Today	categories	No cluster/ Regional cluster/ Supplier park
<b>Net income growth</b>	39	Please state your Net Income in 2009.	2009	mil ZAR	Bands
<b>OEM-Supplier linkages</b>	18	How would you rate the Supplier-Customer linkages in terms of information flows in your business?	Today	Lickert 7	not sufficient/ sufficient/ value adding
<b>Operating Cash flow</b>	42	Please state your Operating Cash Flow in 2009.	2009	mil ZAR	Bands

Variable	No.	Question in questionnaire	Data point	Unit	measured in
<b>Position in Value Chain</b>	19	Please state the category of your main customers or the type of market you operate in.	Today	categories	OEM/ Tier1/ Tier2/ Tier3/ Aftermarket/ Non-Automotive
<b>Product Category</b>	22	Please categorize your TOP-product.	Today	categories	Powertrain/ Electrics & Electronics/ Interior/ Exterior/ Chassis/ Raw material
<b>Product complexity</b>	23e	Standardization category of TOP-Product	Today	Lickert 7	Standard/ Customized/ Special
<b>Product Modularity</b>	23d	Classification of TOP-Product	Today	categories	Component/ Module/ System
<b>Product/ Process-Innovation</b>	37	Please state your R&D expenditures as of Total Revenues in 2009.	2009	per cent of Revenues	Bands
<b>Proximity to Customer</b>	17	Please rate the impact of your geographical distance to current & potential customers on your business success.	Today	Lickert 3	no impact/ medium/ high
<b>Quality</b>	25b	Customer return rates (0 km)	2009	ppm	
<b>Raw Material Content</b>	23b	Raw-material content of TOP-Product	Today	per cent of Product cost	

<b>Variable</b>	<b>No.</b>	<b>Question in questionnaire</b>	<b>Data point</b>	<b>Unit</b>	<b>measured in</b>
<b>Return on Investment (ROI)</b>	40	Please state your Return on Investment (ROI) in 2009.	2009	per cent	Bands
<b>Revenue growth</b>	34	Please state your Revenues in 2009.	2009	mil ZAR	Bands
<b>Size of company</b>	5	Please indicate the overall number of employees in your company today.	Today	number	Bands
<b>Skills/ Education</b>	6c	Please state the percentages of the following categories of your employees in 2009 - Graduates	2009	per cent of Total Employees	
<b>Social norms</b>	14	Please state the cost for "Social Commitment" in 2009.	2009	mil ZAR	Bands
<b>Standards: Quality and Product</b>	24	Please state the cost involved with Standardization in Quality and Product for 2009.	2009	mil ZAR	Bands
<b>Subsidies</b>	13	Please state the ONCE-OFF monetary support you had received by the government (and/or any governmental related organizations) in 2009.	2009	mil ZAR	Bands
<b>Supplier development</b>	27	Please state the amount of Supplier development activities you have received and/or invested in 2009.	2009	Days	
<b>Trade Agreements</b>	36	Please state your Revenues in Free Trade Areas (FTAs) as of Total Revenues in 2009.	2009	per cent of Revenues	Bands

Variable	No.	Question in questionnaire	Data point	Unit	measured in
<b>Type of Value Chain Governance</b>	28	Please indicate the type of governance you experience in the value chain you are involved in.	Today	categories	Market/ Modular/ Relational/ Captive
<b>Upgrading (Functional, Horizontal/Vertical)</b>	29, 30	Please state the number of Horizontal Upgrades in the Value Chain your company has done in the last three (3) years.	2009-2011	Number of upgrades	Bands
<b>Value Chain Flexibility</b>	25c,d	Lead times to customer from production (domestic and international)	2009	days	
<b>Value Chain Reliability</b>	25e	On time delivery	2009	per cent	

#### 6.3.3.7 DATA COLLECTION

The chosen medium for the field study was a web-based survey. The online software used is a comprehensive tool that can administer the development of the questionnaire, management of the address database and the controlling of responses and results (for further information, see Prezza Technologies Inc., 2011). Due to the fact that confidential data (financial figures, etc.) were collected, the responses were fully anonymous and the results could only be accessed by the author.

The data collection was conducted from mid-November 2010 to mid-February 2011. Beforehand presentations were given at a conference of the National Association of Automotive Component and Allied Manufacturers in Durban and at four regional meetings of the National Association of Automotive Component and Allied Manufacturers (Western Cape, Gauteng, East London and Port Elizabeth). This was done to explain the impact of the study and to initiate a higher response rate. The first run of the survey in November/December 2010 led to a low response rate of 8 per cent. Consequently, the survey was repeated in January/February 2011. Already captured results could still be used and the response rate increased to 25 per cent. In order to further improve the

response rate a telephone campaign was conducted in mid-February 2011, which helped increase the response rate to 46 per cent.

#### 6.3.3.8 DATA ANALYSIS

The collected data were analysed with descriptive and inferential statistics. The descriptive statistics were used to build up a picture of the South African automotive component supplier industry. Therefore, the descriptive statistics for each independent and dependent variable were described. To further analyse the differences and specifics of the supplier landscape group comparisons were made. The following groups were chosen for this analysis:

- Ownership: Internationally vs. locally owned suppliers
- Product category: Interior, exterior, chassis, electric/electronics, powertrain, raw material
- Position in value chain and type of market: Tier 1 supplier, Tier 2 supplier, Tier 3+ supplier, aftermarket supplier

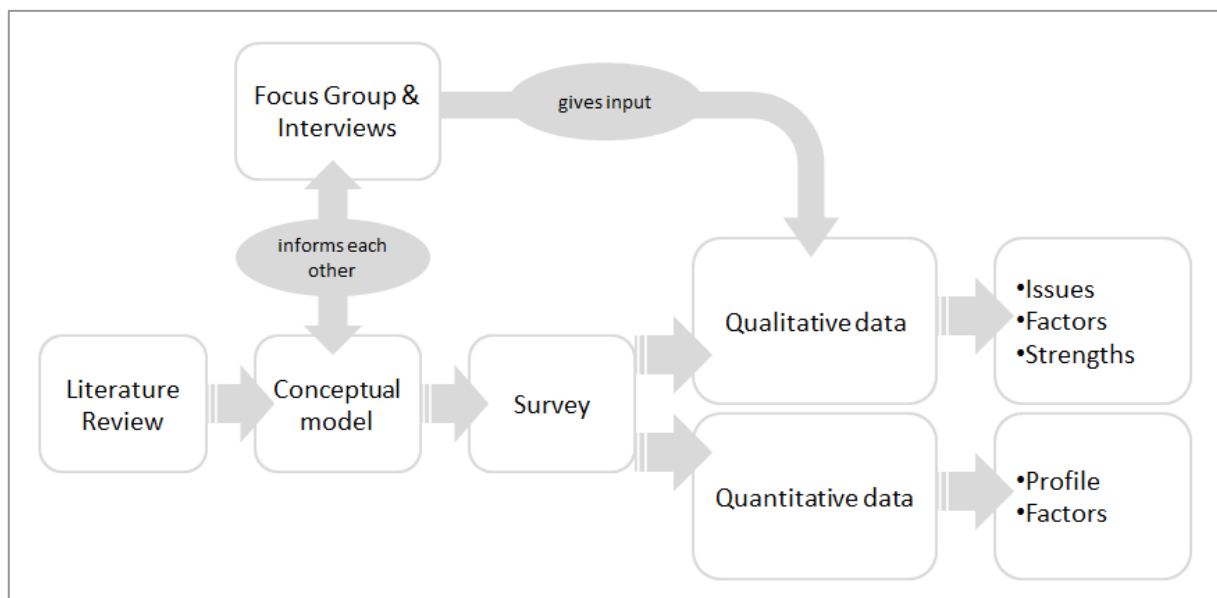
The inferential statistics were used to extract dependencies between the independent and dependent variables. Each independent variable was tested for correlation to the dependent variables. Therefore, the Spearman's rank correlation coefficient was used to analyse the ordinal data, and ANOVA (analysis of variance) statistics were used to test the categorical data.

It must be added that the generalisation of the data is a limitation of the study. As the sample is purposive, homogeneous generalisations as to the total South African automotive supplier industry cannot be made per se. Despite that, the findings section uses the wording, as it would be possible to refer to the total population of component suppliers in South Africa.



## 6.4 SYNTHESIS

In conclusion, the research design shows two interesting features. The first is that the conceptual model and the focus group/interviews inform each other. As explained earlier, this approach was chosen because the conceptual model is viewed as a proposal from the theoretical point of view. In order to align this theoretical view with practical applications the focus group and interviews were used to achieve this objective. In other words, the conceptual model is used as a base for the discussion in the qualitative research to examine the factors for sustainability, issues and strengths in the South African automotive supply chain. The second feature is the twofold design, whereby the data gathering was performed using two different approaches: a qualitative aspect, which was supplied by the focus group, interviews and qualitative questions from the survey, and a quantitative aspect, where the data was gathered through the survey. Figure 6.2 shows an overall view of the research design and methodology with these two distinctive features.



**Figure 6.2: Research design and methodology**

## CHAPTER 7

### FINDINGS

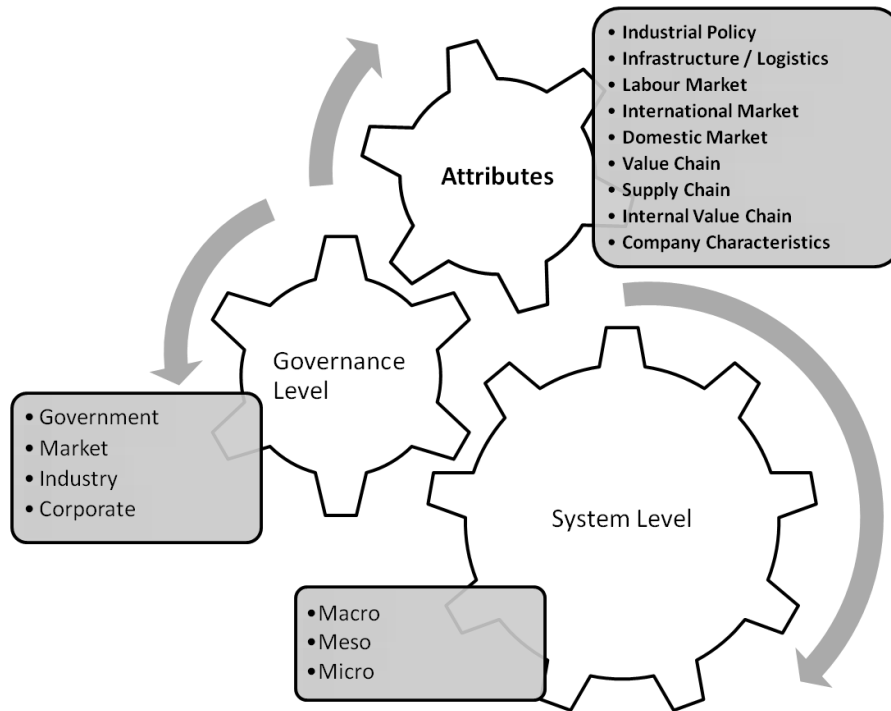
#### 7.1 INTRODUCTION

The quantitative and qualitative data of the survey are analysed according to the concepts and variables used in the conceptual model. Therefore, the variables and the overarching levels of the conceptual model are related to patterns. These patterns are identified to reduce the complexity of the conceptual model in order to show the most relevant findings of the quantitative data in a structured way. Alternatively, it can be stated that the patterns are used to assign attributes to the research variables in order to be able to conceptualise the findings of the research.

The patterns used in the research are the following:

- Industrial policy, which can be related to a nation's plan to officially and strategically influence sectoral development and therefore a specific industry portfolio.
- Infrastructure/logistics: Refers to the physical and organisational structures of the country to support the operations of an industry or enterprise. As logistics cost are directly dependent on the geographical location of the country and the efficient use of the country's infrastructure, the independent variable logistics cost is located on the macro level in this case. This means that logistics cost are not viewed as the effective and efficient use of the available infrastructure which would result in the fact that logistics cost are located on the micro level.
- Domestic market: This is tied to the single market in the particular country and shows the specifics of that market.
- International market: Relates to globalisation and views the influences of trade, investment and technology under the integrations of national economies.
- Labour market: Describes the interactions between workers and employers, and the resulting patterns of wages, employment and income.
- Value chain: Relates to the activities of a firm operating in a specific industry or the various processes of an industry in order to produce goods or services.
- Supply chain: Describes the system and its activities of producing and moving a product from supplier to customer.
- Internal value chain: Is used to describe the activities on a firm level in the context of the research.
- Company characteristics: Accommodates the control variables of the research and is used to describe the units of analysis.

Figure 7.1 gives an overview of the levels and patterns of the conceptual model.



**Figure 7.1: Patterns of the conceptual model**

The associations of the independent variables to the attributes are shown in Table 7.1.

**Table 7.1: Variables and attributes of the conceptual model**

Attribute level	Variables
<b>Industrial policy</b>	Subsidies, local content ,skills/education, social norms
<b>Infrastructure/logistics</b>	Infrastructure, logistics cost
<b>Domestic market</b>	Domestic demand, local technology availability <i>Cost of capital, viable space, economies of scale, domestic market access</i>
<b>International market</b>	Trade agreements, equity ownership, foreign direct investment (FDI), export demand <i>Comparative advantage, exchange rate, export market access</i>
<b>Labour market</b>	Labour cost, labour flexibility

Attribute level	Variables
<b>Value chain</b>	Coordination of informational flows, firms in competition, market share, OEM-supplier linkages, product complexity, product modularity, standards: quality and product, type of value chain, governance, upgrading (horizontal/vertical), market category, market presence, membership in production cluster, position in value chain, product category, product/process-innovation, proximity to customer  <i>Product cycle, control over supply chain, cost of coordination, efficiency of value chain, opportunities for modularisation, powershifts in the value chain, separability of ownership, value transfer</i>
<b>Supply chain</b>	Coordination of physical flows, supplier development, raw material content
<b>Internal value chain</b>	Capacity utilisation, cost control, quality, value chain reliability, value chain flexibility  <i>Productivity, value add, competitive advantage</i>
<b>Company characteristics</b>	Age of company, size of company, HR development

## 7.2 FOCUS GROUP

### 7.2.1 INTRODUCTION

The analysis of the focus group discussions gives input into the conceptual model and the survey as to issues in the South African automotive industry. The analysis, therefore, states findings to topics that are related to the variables of the conceptual model as well as key themes that are relevant for the South African automotive industry. According to Krueger and Casey (2009: 125), this approach follows the constant comparative framework. This framework is used to identify key themes and patterns in qualitative data.

### 7.2.2 CONCEPTUAL MODEL

The discussion about the conceptual model started with the dependent variables and was followed by the independent variables. The independent variables were discussed in the order of macro-, meso- and micro-level variables. The focus group confirmed the dependent variables of the conceptual model.

A focal point of the discussion was the governmental issues that impact on the economic sustainability model that was proposed for the automotive industry in South Africa. With respect to this unique feature and the relating independent variables on the macro-level, the focus group came to the conclusion that industrial policy is a generic term for the variables subsidies, local

content and trade agreements. This finding is considered in the conceptual model insofar as the measured variables are subsidies in terms of monetary subsidies received, local content for the top-product and revenues in areas with trade agreements. In the following discussion the term 'industrial policy' is used explicitly for subsidies. The focus group furthermore concluded that the term 'social norms' should not only include topics like BEE and HIV/AIDS, but also the skill level available in South Africa as well as the cultural characteristics of the country. The skill level is considered by the percentage of graduates in the company in the model; the cultural topic was not been measured due to the limitations of the survey and the study. All other variables on the macro-level were confirmed in the discussion.

The findings on the meso-level are clustered in market issues and industry issues. On the market level the focus group discussed the impact of the diffusion of the local market by imports of international OEMs that are not located in South Africa. Examples of these kinds of OEMs are companies like Hyundai, Kia and Tata. The fact that these OEMs are entering the South African domestic market with entry-level products makes it difficult for South African OEMs and for automotive component suppliers to retain their domestic market share. This issue can be seen as an actual threat for the entire domestic automotive industry, but can only be measured by the number of imports to the South African domestic market. Therefore, this issue is considered in the theoretical part about the South African automotive industry and the conceptual model, but is not added to the survey. An indirect acknowledgement of the import issue is given by the measurement of domestic demand in the form of domestic revenues of the South African automotive component suppliers. Another discussion on the market-level topics debated the availability of technology in South Africa. The focus group participants stated that the technological capabilities are directly dependent on a partnership with firms from the developed countries. Two measures to accommodate this issue are integrated in the conceptual model as well as in the survey. The first is foreign direct investment inflow by company; the second measures the number of production stages that are available locally.

The focus group discussed three issues with regard to industry measures on the meso-level. The first relates to the number of vehicle models in the market and to the fact that the automotive value chain can be regarded as a buyer market which mainly relies on the sophistication of the market. Therefore, economies of scale play an important role in the value chain system. This finding is considered in the model as well as in the conceptual model. On the one hand, the type of value chain governance is measured and on the other hand a ratio of the number of products and the total production volume is calculated. The next issue relates to production flexibility and was discussed in terms of the labour market. The participants stated that the availability of workers through labour brokers increases the flexibility to react to variations in demand. This finding is

considered in the conceptual model and in the survey by measuring the percentage of labour broker workers and temporary workers as a percentage of the total workforce. The next issue that came up in the focus group discussion was the fact that component suppliers need information about demand in the value chain. This finding is considered under the concept of supply chain collaboration and supply chain development, and is accounted for in the conceptual model and measured by the investment in supply chain activities and the supplier development activities in the survey.

### 7.2.3 ISSUES

This section discusses the issues with regard to the South African automotive industry that were found in the focus group discussion. The major issues discussed in the focus group are associated with the macro-level and concern the influences of local government.

The first issue relates to the labour market. Participants criticized the inflexible labour market while operating within highly volatile in- and output markets. The focus group participants stated that especially the recent strike and salary increases make it difficult to operate in the international automotive value chain. An additional factor is labour legislation with the inherent minimum wages while the state wants to overcome the challenge of high percentages of unemployment.

The second issue which can be indirectly related to the first deals with HIV/AIDS, skills and BEE. The participants stated that the topic HIV/AIDS influences their productivity because especially in labour-intensive sectors the companies have to employ and train alternative employees. The participants also commented on the skills development agencies (SETA, the Skills and Education Training Authorities) because it seems difficult to deal with the authorities in terms of reliability. Another topic in this regard is BEE, which enables preferred procurement but is also required by the customers in the automotive value chain. One of the participants viewed BEE and the associated costs as marketing expenses because the customer wants it.

With regard to infrastructure the focus group concludes that one of the major disadvantages in South Africa is the rail network. Due to the fact that the rail system is not reliable or non-existent the logistics and transport have to be handled via road which impacts on the logistics cost structure. The other factor with regard to infrastructure is seen in the high port costs. As South Africa is located far away from the major export markets these two factors have a negative impact on the cost structure of the automotive component suppliers.

Because of the dependence of component manufacturers on export contracts the exchange rate with the major currencies is a significant factor. As the export contracts are mostly dealt in foreign

currencies and most of the inputs are factored in ZAR, the volatility of the rand, and especially the strength of the ZAR to the US dollar and the euro, impacts on the profitability of the suppliers.

Related to the former issue is the fact that the domestic market is too small to be viable on its own. The automotive industry relies on export programmes, and the OEMs in particular are incorporated into the production networks of their parent companies. The small domestic market also makes it difficult to localise production (and therefore technology), as the volumes in the domestic market are limited.

Additionally, it can be found that the locally owned suppliers seem not to be capable of developing components themselves, as access to design information from the lead firms is restricted and is tied to supply relationships. Furthermore, each of the OEMs requires different quality and environmental standards, which the component suppliers have to comply with.

#### 7.2.4 SYNTHESIS

As stated in the conclusion to the previous section, the focus group and interview results are used to inform the conceptual model about specifics in the South African automotive industry. The findings are already incorporated in the conceptual model in order to avoid confusion, but are repeated in short in the following:

- Exchange rate – the exchange needs to be incorporated as the automotive industry in South Africa is dependent on export business
- Skills/education – this factor is specific to South Africa and relates to the skill level available in the country
- Labour flexibility – as flexibility in terms of production is a strength of the South African automotive industry, the availability of flexible labour needs to be assessed
- Supplier development – this issue arises as local suppliers must be able to compete globally
- HR development – this factor relates to the skill and education issue from above

Besides the comments with regard to the conceptual model, the focus group mentioned the following issues about the South African automotive industry:

- Labour market – flexibility is needed in order to cope with volatile demand
- Industrial policy – social norms topics, like skills, BEE, HIV/AIDS, have to be assessed
- Infrastructure – the road and rail infrastructure is an important topic for the automotive industry
- International market – exchange rate stability is crucial, as South Africa's automotive industry is dependent on export business
- Domestic market – the size and variety of models make the domestic market on its own not viable
- Value chain – access to information and overcoming information restrictions from lead firms is important

Figure 7.2 shows the findings in association with the attributes. It can be noted that the majority of the issues can be found on the macro-level and are governed on the government level.



**Figure 7.2: Qualitative comments of focus group participants with regard to issues of the South African automotive industry**



## 7.3 SEMI-STRUCTURED INTERVIEWS

### 7.3.1 INTRODUCTION

Like the analysis of the focus group discussion, the interviews use the constant comparative approach (Krueger & Casey, 2009: 125). The first section discusses the conceptual model and accordingly the variables; the second section focuses on issues in the South African automotive industry. In order to reduce the complexity, the results from the interviews are not differentiated by the interview participants.

### 7.3.2 CONCEPTUAL MODEL

With regard to the conceptual model, the interview participants concluded that the conceptual model is comprehensive except for minor issues. They mentioned that training should be added to the measures. This is covered by the HR development expenses in the survey as well as in the conceptual model. A request for the inclusion of another variable relates to energy management. The interview partner voted to bring in the environmental sustainability issue. This recommendation was not incorporated, as the topic of energy management has not been discussed in the literature review and would open another theoretical area. With regard to the limits of the discussion and the complexity of the topic, the environmental issue discussion is not discussed further.

### 7.3.3 ISSUES

The interview participants mentioned that the current support programme by government for the automotive industry (MIDP) has not helped to grow locally supplied parts. The export-orientated programme fosters the local production of particular components that are demanded on the world market. Therefore, the Motor Industry Development Program has been aimed at increasing volumes instead of localising components and related technology. The Automotive Production Development Program will offer more opportunities for locally owned suppliers, as the upcoming support programme aims at localisation and local content in the automotive industry. This would be in line with the statement of the interview participants that they see South Africa as a gateway to the African market, especially the sub-Saharan region.

Related to the abovementioned topic, the issue of the variety of models in the automotive market arose in the interviews. Due to the diverse number of models, the industry lacks economies of scale, which is one of the major disadvantages for the local component suppliers. The interview participants also recommended building entry-level cars in South Africa, especially for the African market, as the imports by international automotive manufacturers are becoming an increasing threat.

The interview participants mentioned issues with labour legislation and labour flexibility. This matter repeats the comments from the focus group discussion. An interesting statement from the interview participants is that it can be noted that productivity is going up faster than employment. This suggests a diffusion of automation and manual labour taking place in the South African automotive industry.

Another topic which is mentioned in the focus group already is the currency exchange rate. One interview participant was not as concerned about the exchange rate as the focus group members because his company has a balanced import and export ratio. This enables the company to compensate fluctuations in the exchange rate.

The infrastructure was criticised by the interview participants like the focus group members. They mentioned that the rail system is dysfunctional and the road system is falling apart due to depletion. Another infrastructural factor mentioned by the interview participants is the unreliable energy supply, which they said is a challenge for the South African automotive industry.

The last issue mentioned by the interview participants was access to technology, and production and information networks of the globalised players in the automotive industry. Despite the need for these issues, the South African automotive industry is able to produce vehicles and components to the highest quality levels.

#### 7.3.4 SYNTHESIS

As stated in the conclusion to the previous section, the focus group and interview results are used to inform the conceptual model about specifics in the South African automotive industry. The findings are already incorporated in the conceptual model in order to avoid confusion, but are repeated in short in the following:

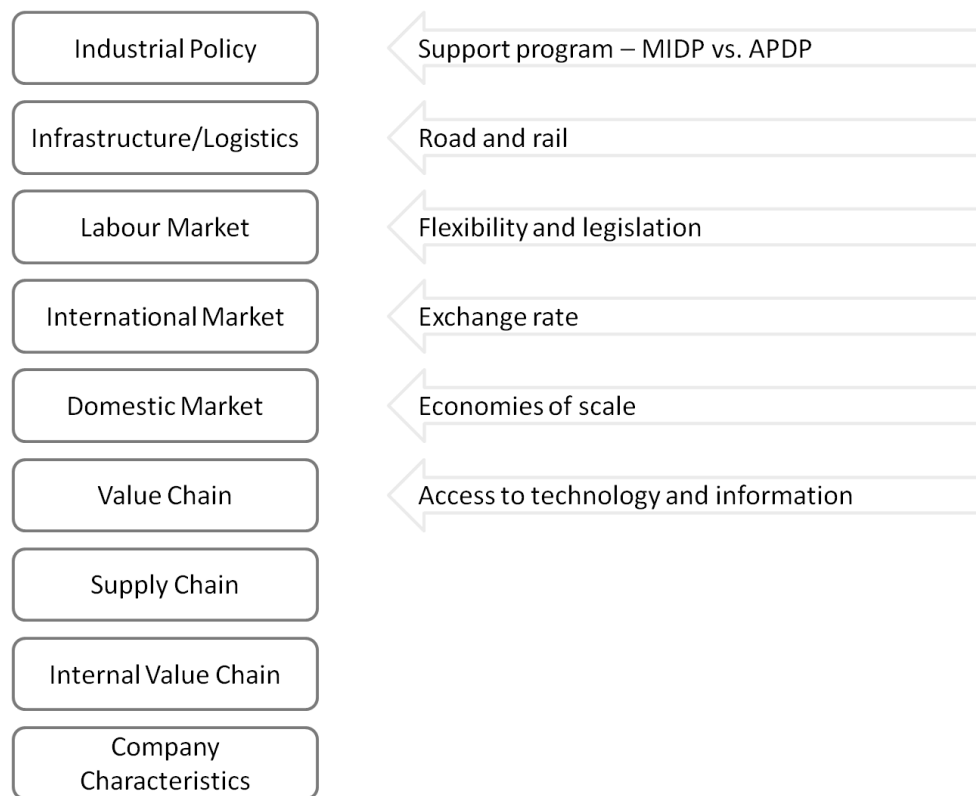
- Cost of capital – this factor needs to be added, as upgrading in the value chain is related to investment.

The interview partners mentioned next to the comments with regard to the conceptual model the following issues about the South African automotive industry:

- Industrial policy – the Automotive Production Development Program is needed for the localisation of business
- Domestic market – economies of scale are needed, which can be accomplished by a smaller range of vehicle models
- Labour market – labour legislation and flexibility are important issues for the sustainability of the South African automotive industry

- International market – the exchange rate volatility should be minimised
- Infrastructure – the road and rail network is falling apart or non-existent
- Value chain – for the supplier industry it is important to get access to technology and information from the lead firms

Figure 7.3 shows the findings in association with the attributes. It can be noted that the majority of the issues can be found on the macro and meso level and are governed on the government and market level.



**Figure 7.3: Qualitative comments of interview participants with regard to issues of the South African automotive industry**

The conclusion of the focus group and the interviews can be regarded as significant because almost identical issues were raised and discussed. Therefore, and in addition to the findings mentioned above, it can be concluded that the conceptual model can be accepted and can consequently be used for the quantitative research section.

With regard to the issues in the South African automotive industry it can be noted that the majority of the issues are seen on the macro-level and fall under the governance of the government.

## 7.4 SURVEY

### 7.4.1 INTRODUCTION

The analysis of the data and the findings of the survey are structured in three sections. The first two sections show the quantitative data and the third section is used to illustrate the qualitative data.

The quantitative data are shown in two different perspectives. The first view of the quantitative data gives an overview of all data collected by analysing and showing the descriptive statistics of each variable. The second view of the quantitative data shows the correlations between the independent and the dependent variables. Univariate correlations are used to identify significant dependencies between the measurements.

Additionally, the qualitative comments of the survey are analysed with regard to factors, issues and strengths of the South African automotive industry.

### 7.4.2 DESCRIPTIVE STATISTICS

#### 7.4.2.1 INTRODUCTION

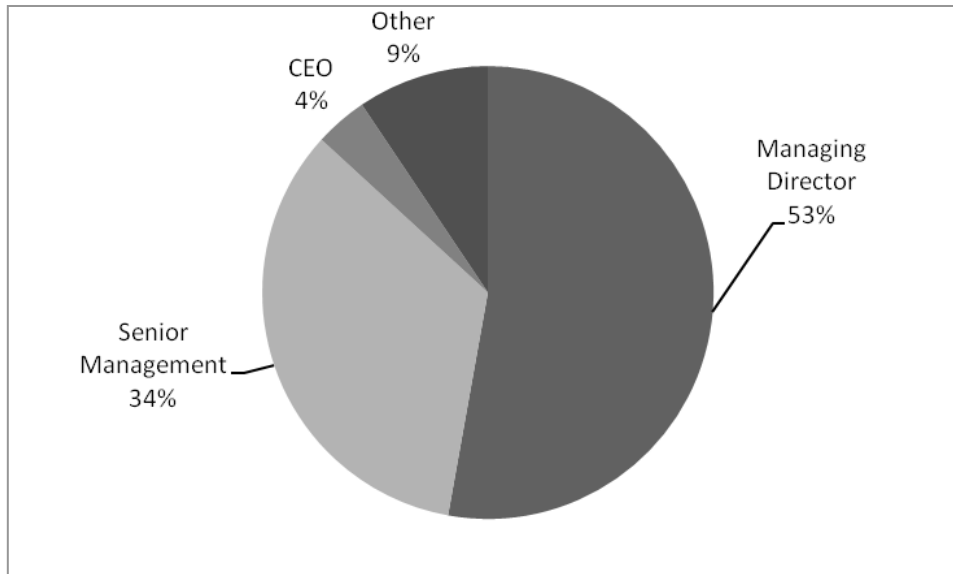
The descriptive statistics of the survey are used to draw a profile of the South African component supplier industry with regard to the independent and dependent variables. This view is used to point out the structure of the automotive component supplier landscape in South Africa as well as structural differences according to the following groups:

- Ownership: Locally owned vs. internationally owned suppliers
- Tier-level: Tier 1 to tier n supplier (additionally aftermarket suppliers are included)
- Product category: Six product categories are used – powertrain, electrics/electronics, interior, exterior, chassis and raw material

These groups are chosen with respect to the findings in the literature review. Differences in the groups are only discussed when substantial differences can be noted, otherwise they are not mentioned at all.

The survey respondents show the following profile, which illustrates that the data and the qualitative comments can be regarded as significant because of the high rankings of the respondents in their respective companies. 57 per cent of the respondents are located on the executive level (MD, CEO, etc.) and the remainder were senior management representatives and

other high-ranked managers. An overview of the structure of the respondents is given in the Figure 7.4.



**Figure 7.4: Profile of the survey respondents**

#### 7.4.2.2 PROFILE OF SOUTH AFRICAN AUTOMOTIVE COMPONENT SUPPLIERS

##### 7.4.2.2.1 OWNERSHIP

The data shows that 47 per cent of the automotive component suppliers in South Africa are internationally owned. 49 per cent of the suppliers are locally owned, with 19 per cent of them using international patents or licences. 4 per cent of the suppliers are joint ventures between locally owned and internationally owned suppliers. Taking revenue into account, the data shows that 78 per cent of the revenues are generated by internationally owned suppliers or joint ventures. The data agrees with the trend shown in Section 2.3.3, where research by Barnes (2000; 2004) points to the development of a supplier base in South Africa the majority of which is internationally owned. Barnes states in an analysis based on a sample of four OEM-supplier structures taking into account purchasing values that 70 per cent of the component supplies originate in an international environment (either wholly owned international suppliers or joint ventures of locally owned and internationally owned suppliers).

The high percentage of locally owned suppliers in terms of numbers of participants in the South African automotive value chain needs attention. Locally owned suppliers account for nearly half of the supplier firms, but are only able to generate 20 per cent of the revenues. This fact is in line with the concept of follow sourcing – lead firms, in this case the automotive OEMs, rebuild their supply

structure in the developing markets. Therefore, it seems valid to conclude that the mechanism of follow sourcing is strongly existent in the South African automotive component market and it can be assumed that the majority of the value-add is accomplished by the internationally owned suppliers. To prove this issue, two structural facts should be taken into account: the tier structure of the internationally and locally owned suppliers, as well as the product categories in which the respective suppliers operate.

#### 7.4.2.2.2 TIER STRUCTURE

The data shows that more than 50 per cent of the South African automotive component suppliers operate on the first tier level. Twenty per cent of the firms occupy the second tier level; a further 10 per cent are third-tier level suppliers; 15 per cent supply the aftermarket; and 5 per cent are integrated in an intercompany network. Although the revenue structure implies that the locally owned suppliers are situated at lower value-add stages, the data does not prove this. The distribution of tier levels with respect to the international and local group is equivalent to the overall findings of the value chain structure. This means that there is no difference in the value chain stage occupation of the internationally owned suppliers versus the locally owned suppliers. The implication of the ownership-related revenue structure can, therefore, not be proven with a difference of the tier structure of the mentioned groups.

Other implications that can be drawn from the results of the survey are that there must be strong competition on the first tier level, as the percentage of the total also shows that the locally owned suppliers are able to get market access on the first tier level, which shows the ability to compete with the internationally owned suppliers.

#### 7.4.2.2.3 PRODUCT CATEGORY

The analysis of the product categories shows the following overall picture: 29 per cent of the South African automotive component suppliers operate in the powertrain business, 27 per cent supply interior parts and 17 per cent manufacture parts for the exterior of vehicles. A further 13 per cent operate in the chassis category, 10 per cent produce electric and electronic parts and 4 per cent supply wheels and tyres. The relatively high percentage of powertrain and interior suppliers can be explained by the fact that most of the components related to these categories are bulky and, therefore, demand high logistics costs. Lead firms, therefore, aim to locate these parts in geographic proximity to their production sites in order to avoid high logistics cost and ensure delivery reliability and flexibility.

Coming back to the implication made above that the revenue structure is influenced by the product categories in which the suppliers operate, it must be stated that there is no difference in the

product structure of the internationally and locally owned suppliers. Therefore, the implication cannot be proven by the current data.

An interesting fact is that the data does not show any raw material suppliers. This leads to an interesting implication. Firstly, raw material suppliers are not integrated into the South African automotive value chain, or at least are not seen as automotive suppliers. The question that arises is why the South African component industry does not integrate one of its potential sources of a major competitive advantage – the availability and proximity to raw materials – into its value chain. As the research is focused on component suppliers, one explanation is that the survey simply has not targeted these kinds of suppliers. Another justification can be made by the fact that most of the raw material suppliers do not only supply the automotive industry, but have a diversified customer portfolio and are, therefore, not regarded as automotive suppliers.

#### 7.4.2.2.4 AGE

The age of the South African automotive component suppliers shows that the industry is in a rather mature stage, meaning that there have not been not a lot of new entrants in the market in the last five years. Only 12 per cent of the companies are five years and younger. The average age of the firms is 17.2 years; two-thirds of the firms are older than 21 years.

As stated in Section 3.2, it can be deduced that the automotive upstream value chain is characterised by high entry barriers with regard to technology and processes. Companies that have participated longer in the industry must have adapted more than younger companies, and are presumably better established. Also, older companies have gained more experience in the industry and are possibly better networked than younger companies. As the automotive industry in South Africa is in the stage of transformation to full manufacturing (see Section 2.3), these established companies will form the backbone of the supply chain, but will also be accompanied by new entrants.

The data shows that JVs and wheel/tyre suppliers are younger than the other groups. However, the conclusions that can be reached are restricted, as they were only two respondents in each of these groups.

#### 7.4.2.2.5 REVENUES

In terms of the revenue structure, the South African automotive component suppliers average ZAR 363 million. Two-thirds of the firms generate revenues below ZAR 200 million and 25 per cent more than ZAR 800 million. These last figures show that the analysis is skewed towards smaller

companies. By looking at the median of ZAR 175 million, it becomes obvious that the majority of firms have revenues below ZAR 200 million, as stated above.

As mentioned in the analysis of the ownership structure, the revenues of the locally owned suppliers are less than the revenues of internationally owned suppliers. A locally owned supplier generates ZAR 187 million on average, whereas the internationally owned suppliers average ZAR 436 million. It can again be concluded that internationally tied suppliers are able to generate more than double the revenue of locally owned suppliers.

Additionally, it can be found that third and lower-tier-level suppliers average ZAR 89 million in revenue – much less than the other tier levels. This finding can be explained by the firm size, as these companies are smaller in terms of employees.

#### 7.4.2.2.6 EMPLOYEES

The average size of a South African automotive component supplier in terms of employees is 289. Fifty per cent of the businesses employ more than 250 people. The majority of the smaller companies with less than 100 employees are locally owned.

Still, the question is whether the higher revenues of internationally owned suppliers can be attributed the concept of follow sourcing only. In order to draw a further conclusion, the next paragraph uses employee numbers as a measurement of size.

By looking at the ratio of revenue per employee it becomes obvious that the locally owned suppliers have lower revenues per employee than the internationally owned suppliers. The locally owned businesses generate ZAR 0.30 million in revenue per employee, whereas the internationally owned suppliers average ZAR 1.35 million per employee. This could mean that locally owned suppliers operate on a more manual basis and are not able to produce the same output per employee as the internationally owned suppliers.

The data also reveals that chassis and electric/electronic suppliers have higher revenue rates per employee (ZAR 1.89 million and 1.32, respectively) than firms in the other product categories. This fact is to be expected for the electric/electronic suppliers due to the nature of their highly sophisticated products, but is unexpected for the chassis suppliers.



### 7.4.2.3 GOVERNMENT INFLUENCES

In this section governmental influences on the automotive component supplier industries is described and analysed.

#### 7.4.2.3.1 SUBSIDIES

Automotive component suppliers in South Africa received an average of ZAR 1.1 million in direct government subsidies in 2009. This financial support, however, went to only 20 per cent of the companies; the remaining 80 per cent did not receive any governmental support. An explanation could be that these companies did not apply for support.

Powertrain suppliers show the highest average in terms of these subsidies. These companies received an average of ZAR 1.95 million, which is the highest value together with electric/electronics suppliers, which average ZAR 1.90 million. Internationally owned suppliers received ZAR 1.82 million, more than twice the subsidies of the locally owned suppliers. The subsidies are also concentrated on first tier suppliers and, unexpectedly, on aftermarket suppliers.

The low levels of direct subsidies can be explained by the logic of the Motor Industry Development Program, which in general rewards duty-free allowances rather than direct subsidies. Therefore, the amount of direct monetary subsidies is low.

#### 7.4.2.3.2 INFRASTRUCTURE

The South African automotive component suppliers state that apart from communications infrastructure, the infrastructure relating to roads, rail, shipping and energy is less developed than that of developed countries. The perception is measured on a seven-point Lickert scale, where the respondents were asked to state whether the particular infrastructure is inferior to developed countries (level 1 on the Lickert scale), comparable (level 4) or superior (level 7).

Road infrastructure is perceived to be on level 3, which implies that businesses find the road infrastructure to be inferior to that of developed countries. Twenty-nine per cent of the suppliers stated that they experience the road infrastructure to be comparable or superior to that of developed countries. Road infrastructure is the only measure in this context where locally owned suppliers perceive the state of infrastructure to be significantly different from the perception of internationally owned suppliers. Locally owned suppliers rate the road infrastructure on 2.5 on the Lickert scale; the internationally owned suppliers put it at 3.5. An explanation is that the locally owned suppliers are not fully integrated into the advanced infrastructure and location of the OEMs and, therefore, their customers. This necessitates higher logistical requirements for these suppliers.

The rail infrastructure was perceived to be inferior to road infrastructure. Rail infrastructure was rated on a level of 1.7 on the Lickert scale; there were no responses stating that the rail infrastructure is superior to road. Fifty per cent of the businesses stated that rail infrastructure is far inferior. The shipping infrastructure in South Africa is perceived to be slightly inferior to that of developed countries. The South African automotive suppliers rate the shipping infrastructure with a mean of 3.5 on the Lickert scale. Only 13 per cent of the companies perceive the shipping infrastructure to be superior to that of developed countries. With regard to the energy infrastructure the perceived level for South Africa is inferior to that of developed countries. The energy infrastructure is rated on a level of 2.4 on the Lickert scale, with no responses stating that the energy infrastructure is superior. The communications infrastructure is perceived to be on the same level as developed countries. 50 per cent of the supplier companies stated that they experience communications to comparable to developed countries, with a mean of 3.8 on the Lickert scale.

It can be concluded that despite its geographical disadvantage, South Africa shows a lack in its level of infrastructural development, except for the communications networks. Important structures in the logistics network for the automotive industry seem not to be taken care of by government or related institutions. This fact might impose a further disadvantage and, therefore, a threat to the automotive industry. It could be questioned whether this disadvantage is inherent in the geographical distance to major markets and customers, and cannot be resolved through improvements in the overall infrastructure to shorten lead times to international and local customers. On the other hand, it can be assumed that a major source of the disadvantages is caused by the state-owned businesses that are responsible for the infrastructure (e.g. Transnet for road, rail and ship and Eskom for energy).

#### 7.4.2.3.3 LOGISTICS COSTS

Taking the argument further, it is important to qualify logistic costs in order to evaluate these findings. The South African automotive component suppliers spend an average of 7.7 per cent of their revenues on logistics. The range of two-thirds of the suppliers lies between 1 and 10 per cent.

Firms focusing on the domestic market show a mean of 9.1 per cent of their revenue spent on logistics; companies that merely supply international markets (export revenues more than 50 per cent) show an average of 5.1 per cent. The following interpretation may be a bit loose, but following on from the conclusion made in the infrastructure section above that South Africa's infrastructure is less developed than that of developed countries could mean that outbound logistics from South Africa to international markets might be less expensive than logistics costs within South Africa itself. Additionally, it could mean that the value-add for export products is much

higher – and, therefore, the revenues. As the logistics cost is measured as a percentage of revenue, this means that exporters generate higher revenues while simultaneously logistics costs remain the same.

Internationally owned suppliers stated that logistics costs accounted for 9.7 per cent of their revenues and locally owned suppliers had an average of 4.9 per cent. It can be assumed that internationally owned suppliers import more parts for their products, which leads to a higher logistics cost proportion. In conclusion it can be said that locally owned suppliers locate their supply chain in the domestic area.

Some exemptions to the general average occur on the product category and tier level. Powertrain and exterior suppliers show considerably lower logistics cost than firms in the other product categories. They average 5.4 per cent compared to 9.3 per cent. Suppliers on the third and lower tier levels have an average of 5.5 per cent of logistics cost, which is substantially lower than the other tier levels.

#### 7.4.2.3.4 LOCAL CONTENT

The average local content of the South African automotive suppliers for their top product (most sold product) is 59 per cent, meaning that 41 per cent of the parts for these products are imported. Thirteen per cent of the suppliers state that their top product only contains local parts. All of these companies are locally owned suppliers. Powertrain products show a higher local content, with an average of 68 per cent. This is the only product category that differs substantially from the average.

Coming back to the above discussion that internationally owned suppliers have a higher percentage of logistics cost in their revenues, the local content of these suppliers averages 52 per cent for their top product. Locally owned suppliers have a higher local content percentage in their top products, with an average of 68 per cent. Therefore, the conclusion can be drawn that internationally owned suppliers import more parts for their products.

#### 7.4.2.3.5 TRADE AGREEMENTS

South African automotive component suppliers generate 20 per cent of their revenues in free trade agreement (FTA) areas. Export-oriented firms have an average of 35 per cent of their revenues in free trade agreement areas, whereas firms focusing on the domestic market average 10 per cent of their revenues in free trade agreement areas. 50 per cent of the automotive component suppliers in South Africa do not export into free trade agreement areas at all. A substantial difference between internationally owned suppliers and locally owned suppliers and the different

tier levels cannot be recognised for this measure. But it can be stated that powertrain components have a high percentage, with 44 per cent being exported into free trade agreement areas.

In general, it can be said that despite the trade agreements of South Africa (which are mentioned in Chapter 5) the percentage of exports going into free trade agreement areas is only 50 per cent of total exports. In conclusion this means that for the remaining 50 per cent of automotive component exports regular duties will be payable. Hence, South African automotive component suppliers do not use the free trade agreements of South Africa to the full extent.

#### 7.4.2.3.6 SOCIAL COMMITMENT

Social commitment spending covers areas like BEE and HIV/AIDS. The average spending of the South African automotive component suppliers in terms of social commitment is ZAR 2.3 million. Therefore, 50 per cent of the firms do not have any expenses in this area.

The only recognisable differences in the groups are connected to their tier level. Firms on the second tier level show a substantially higher average spend on social commitment than the other subgroups.

#### 7.4.2.4 MARKET INFLUENCES

##### 7.4.2.4.1 DOMESTIC AND EXPORT DEMAND

The average of domestic revenues of South African automotive suppliers is 64 per cent. One-third of the suppliers show revenues below 50 per cent in the domestic market. 60 per cent of the suppliers generate between 80 and 100 per cent of their revenues in the local market. Locally, suppliers have always more than 50 per cent domestic revenues. It can be noted that the locally owned suppliers generate 81 per cent of their revenues domestically, whereas internationally owned suppliers make 56 per cent of their revenues in the South African market. Interesting is the figure for the locally owned suppliers using international patents or licences. This group shows an average of 60 per cent domestic revenues, which implies dependence on accessibility to state-of-the-art technology as well as international networks to generate more revenues through export activities.

Additionally it can be found that second-tier suppliers generate only about 50 per cent of their revenues on home turf, whereas aftermarket suppliers average 86 per cent domestic revenues. With regard to product category, powertrain suppliers are the least connected group with regard to domestic demand, with an average 39 per cent of domestic revenues.

A twofold conclusion is possible from this data. Firstly, it can be noted that locally owned suppliers mainly rely on domestic demand while the risk of the internationally owned suppliers is leveraged through their export revenues. Secondly, it can be stated that the ties of the internationally owned suppliers to their home areas is useful to generate export revenues at the same time as the locally owned suppliers have their customers mainly in the domestic market for the same reasons.

#### 7.4.2.4.2 FOREIGN DIRECT INVESTMENT

South African automotive component suppliers received an average of ZAR 21.5 million; 50 per cent of the respondents did not receive any foreign direct investment. All of the foreign direct investment inflow was received by companies with international ties.

This leads to the conclusion that locally owned suppliers have not acquired new international partners or investors. The inflow of foreign direct investment has only been directed towards companies that already have international ties.

#### 7.4.2.4.3 LABOUR

The South African labour market is used by the automotive component suppliers as follows: suppliers make use of temporary workers, with an average of 6.7 per cent of their total employees. More than 50 per cent of the firms use temporary employees in their workforce. In some cases this figure rises to 40 per cent. Additionally, South African automotive component suppliers make use of workers from labour brokers. The average lies at 8 per cent, and, like temporary workers, more than 50 per cent of the firms make use of labour brokers. Extreme values go up to 60 per cent for this category. Averages for the percentage of labour broker and temporary workers are substantially higher on the third and lower tier levels. This implies that the demand for firms on this level is more volatile.

By looking at the percentage of graduates in the firms it can be stated that the average is 8.5 per cent, with the majority of firms employing between 1 and 10 per cent of graduates. Extreme values go up to 80 per cent. Differences in the occurrence with regard to ownership can only be recognised when analysing the percentage of graduates in the particular groups. Locally owned South African suppliers show a percentage of 2.4 per cent, considerably below the average, whereas locally owned suppliers using international patents or licences show a considerably higher percentage, with 26.4 per cent of graduates in such companies. It can also be noted that first-tier suppliers employ a higher average of graduates than the other groups. With regard to the product categories, the highest proportion of graduates can be noted with the electric/electronic suppliers. The findings imply the need for a higher level of graduate employees in certain groups and show the requirements in terms of skilled labour.

The perception of South African automotive suppliers is that labour cost in the country is less than in developed countries. The mean of South Africa's labour cost is 92 per cent of developed countries. This perception includes influences on labour cost, such as strikes, but does not take into account productivity. Internationally owned suppliers rate the labour cost in South Africa at 87 per cent of the cost in developed countries, which is considerably lower than the locally owned suppliers, which rate it at 95 per cent. This implies that labour-intensive production is still a factor for the allocation of production in South Africa.

#### 7.4.2.4.4 TECHNOLOGY

The South African automotive component suppliers state that the availability of production processes and technology in the country is on average 90 per cent. This figure was measured by comparing the needed production stages for a particular product with the locally available production stages. 80 per cent of the suppliers state that at least 90 per cent of the production processes are available locally. The lowest value was for suppliers with electrical/electronic components. This group states that 68 per cent of the production stages are available in the country.

In conclusion it can be stated that there is a deficit of technology available locally, especially for new technology like electrics and electronics.

#### 7.4.2.5 INDUSTRY INFLUENCES

##### 7.4.2.5.1 PRODUCT CHARACTERISTICS

The South African automotive component suppliers mainly supply products on a component level to their customers. 80 per cent of all top products are on a component basis. 13 per cent of the products are modules and 7 per cent of the products are on a system level. There are no considerable differences in the dimensions of ownership and product category with regard to the modularisation level of the products. Hence, the data suggests that there is a basis for the production of modules and systems in terms of capabilities.

By looking at the standardisation of the top products it can be seen that the average top product is customised to customer's needs. 20 per cent of the products are standard items, whereas one-third are specialised components. Taking the ownership structure into account it can be stated that more specialised products are supplied by internationally owned suppliers and more standardised products are produced by locally owned suppliers. A difference with regard to the product categories cannot be seen.

The average raw material content of the top products of the South African automotive component suppliers is 50 per cent. This value differs considerably in the product categories, as interior suppliers in particular state that the raw material content for their products is 66 per cent. This phenomenon can be explained by the fact that seats (and especially leather seats) contain high values of raw material. Interestingly, the data also leads to a considerable difference in raw material content with regard to internationally and locally owned suppliers. The former group states 42 per cent of raw material in their top products; locally owned suppliers operate with 57 per cent of raw material content in their top products.

#### 7.4.2.5.2 VALUE CHAIN

Value chain governance in the South African automotive component supply chain shows that 65 per cent of the suppliers are bound in either a market type or a relational type of governance. 30 per cent of the suppliers operate in a market environment where commodity suppliers supply standard products and the relationship to customers is based on arm's-length markets. 35 per cent of the suppliers find themselves in a relational environment where turn-key suppliers supply complex modular products (or feed into the supply chain of those products), and the relationship consists of mutual interdependence. 20 per cent of the suppliers in the South African automotive value chain are bound in modular relationships to their customers. Modular value chain governance means that turn-key suppliers supply modular products that are customised for a specific customer, but are supplied to different customers in different specifications. The captive type of value chain governance is experienced by 15 per cent of the suppliers. Captive suppliers supply non-standard products that are solely produced to the buyer's needs.

In general, it can be stated that half of the South African automotive component suppliers work in an environment where standardised and customised products are supplied to the customers (market and modular), and the other half of suppliers operate with highly customised products (relational and captive). With regard to ownership and product category, there are no obvious patterns.

Upgrading activities of the South African automotive component suppliers are measured in the number of horizontal (e.g. new products) and vertical upgrades (e.g. new production stage added) in the last three years. The average for horizontal upgrades is 1.7, and for vertical upgrades 1.5. Eighty per cent of the suppliers have at least accomplished one horizontal upgrade and 70 per cent of suppliers were able to achieve at least one vertical upgrade. With regard to horizontal upgrades, 40 per cent of the suppliers have more than three upgrades, whereas 20 per cent have not upgraded in the last three years. More than three vertical upgrades were accomplished by 20 per cent of the suppliers, while 30 per cent did not upgrade vertically at all.

By looking at the structure of upgrades when taking ownership into account it can be observed that the locally owned South African suppliers have considerable higher numbers of upgrades than average. This group averages 2.4 horizontal upgrades and 2.1 vertical upgrades. This could indicate that the locally owned suppliers need to or are willing to upgrade their overall capabilities to play a role in the local and international automotive value chain.

#### 7.4.2.5.3 COORDINATION

Coordination is assessed for informational flows as well as for physical flows. Informational flows were measured by suppliers' perception of whether the customer-supplier linkages are sufficient. The average perception on a seven-point Likert scale is that information flows in the South African automotive component industry are sufficient. The mean lies at 4.2 on the scale and the data is normally distributed. Also, there are no considerable differences between the groups.

In terms of physical flows it can be determined that 60 per cent of the South African automotive component suppliers invested in supply chain activities. The average spending for the improvement of physical flows lies at ZAR 3.9 million. The other 40 per cent have not invested into supply chain improvement at all. Although the overall numbers should not be given too much weight, it can be stated that suppliers on the first and second tier level and suppliers in the interior and exterior business invested the biggest portion on supply chain activities.

#### 7.4.2.5.4 STANDARDS AND QUALITY

In terms of quality development in the industry value chain, two measures were applied. The first one is the investment in standards with regard to product and quality. The South African automotive component suppliers state an average of ZAR 3.2 million. One-third of the firms did not invest in standardisation processes and methods. Locally owned suppliers using international patents or licences invest a considerably higher amount than the other groups, and average ZAR 4.5 million. The analysis also shows that the locally owned suppliers invest below average amounts, whereas the internationally owned suppliers spend above average.

The second measurement taken was supplier development activities. This topic was investigated in both directions – the supplier development that the South African automotive component suppliers have received from their customers and the activities that have been given to their own supply chain. In terms of received supplier development activities, the average lies at 12.6 days. 50 per cent of the suppliers state that they have not received any support. The average of supplier development activities given to their own suppliers lies at 29.5 days. Similar to the received supplier development activities, 50 per cent of the firms have not given any activities to their suppliers.



The group of internationally owned suppliers has received and given considerably more days of supplier development activities. This group averages 16.7 days in received activities and 49.7 days in given activities. This data shows that internationally owned suppliers are on the one hand more in the focus of the activities by their customers and on the other hand more concerned about the development of their own supply chain. It can also be noted that the position in the value chain influences supplier development activities. Suppliers on the first or second tier levels give and receive considerably higher amounts of activities. This group gives 16.4 days and receives 31 days. Again, it can be noted that these firms are more involved in the development of the value chain.

#### 7.4.2.5.5 SALES

The sales organisation of South African automotive component suppliers is assessed by looking at their market presence, their affiliation to automotive clusters and their perception about the impact of geographical proximity to their customers.

75 per cent of the South African automotive component suppliers operate through sales offices and representatives to cooperate with their customers. The remainder use websites to foster their relationship with customers. It can be noted that internationally owned suppliers and suppliers on the first tier level operate to a much higher degree through sales offices. This finding implies that the lead firms demand direct contact with their direct suppliers.

50 per cent of the South African automotive component suppliers are not related to automotive clusters. 45 per cent of the firms belong to regional clusters and 5 per cent are organised in supplier parks. There are no discernible substantial differences in the groups.

The South African automotive component suppliers state that geographical proximity has a medium to high impact on their business success with current and potential customers. 40 per cent of the firms state that the impact is high, and 51 per cent experience a medium impact. 9 per cent of the businesses say that there is no impact on business success. It is interesting that the internationally owned suppliers state that the impact of proximity is rather higher than average, and in this respect separate themselves from the other groups.

#### 7.4.2.5.6 COMPETITION

The average market share of the South African automotive component suppliers is 40.3 per cent. One-third of the firms state that their market share is 50 per cent or higher. It can be noted that there is an increasing market share starting with the locally owned suppliers towards the internationally owned suppliers. These groups average 30.5 per cent 44.0 per cent of market

share, respectively. The other groups do not show substantial differences with regard to market share.

The average number of competitors for South African automotive component suppliers is 4.0. Three clusters, each with one-third of the total, can be identified. The clusters are 1–2 competitors, 3–4 competitors and 5 or more competitors. Similar to the market share statement, it can be noted that the locally owned suppliers experience the strongest competition, with an average of 4.8 competitors, whereas the internationally owned suppliers have to cope with 3.6 competitors. From a tier-level point of view, the first tier level and the aftermarket are the most competitive. These groups average 4.8 and 5.3 competitors, respectively.

#### 7.4.2.6 CORPORATE INFLUENCES

##### 7.4.2.6.1 OPERATIONAL PERFORMANCE

Five measures are taken for the operational performance of the South African automotive component suppliers.

The first is cost control, which is measured in total inventory levels (raw material, work in progress/work in process and finished goods). The average for the firms lies at ZAR 48.1 million. Two-thirds of the companies have inventory levels between ZAR 1 and 40 million. Relative to their revenues, the inventory level mean is 12.5 per cent. Substantial differences can be noted while looking at aftermarket suppliers, which have an average of 26.1 per cent of inventory levels. And another substantial difference can be noted when considering powertrain suppliers, which show an average of 7.9 per cent of inventory levels.

In terms of quality, the South African automotive component suppliers are measured by customer return rates with regard to 0km ppm (parts per million). The average for the firms lies at 305 ppm with 90 per cent of the companies having values between 1 and 500 ppm. It can be noted that the ppm rates are considerably higher on the first tier level, where they average 499 ppm and in the exterior product category, with an average of 1,637 ppm.

With regard to value chain flexibility, the lead times in days to domestic customers and international customers were measured. The average for domestic lead times is 9.5 days with a range of 1–30 days. International customers have an average lead time of 38 days with a range of 1–50 days. The lead times differ considerably for the aftermarket suppliers, which have 26.7 days for domestic lead times and 58.3 days for export lead times. By eliminating the values for the aftermarket the lead times for the suppliers that operate in the 'running' value chain of the

automotive industry go down to 5.6 days. An exception can be found for the domestic lead times in the chassis category, where an average of 21.1 days can be found.

Value chain reliability is tested by measuring the on-time delivery of the suppliers. The average on-time delivery of South African automotive component suppliers is 93 per cent. Recognisable differences can be identified for the aftermarket suppliers, which have an average of 91.8 per cent for on-time delivery, whereas first and second tier supplier have values above 95 per cent.

Capacity utilisation is the fifth measure that is used in terms of operational performance. The average for South African automotive component suppliers is 66 per cent, with one-third of the firms utilising above 80 per cent of their particular capacity. The data does not show any differences in the ownership and product category groups, but it can be identified that the aftermarket suppliers have substantially higher capacity utilisation rates (83.8 per cent) than the other tier levels.

#### 7.4.2.6.2 FINANCIAL PERFORMANCE

The measures for the financial performance of the firms are net income, return on investment, capital expenditure (CAPEX) and cash flow. The financial performance values of South African automotive component suppliers are shown in Table 7.2.

**Table 7.2: Average financial performance values for South African automotive component suppliers**

<b>Net income [ZAR million]</b>	<b>ROI [%]</b>	<b>CAPEX [ZAR million]</b>	<b>Cash Flow [ZAR million]</b>
<b>37.38</b>	<b>6.68</b>	<b>12.00</b>	<b>23.29</b>

Next to the absolute figures Table 7.3 analyses the different groups. When looking at the different groups of ownership, it can be identified that the locally owned South African automotive component suppliers in particular have below average values in each of the measures (see marked row in Table 7.3).

**Table 7.3: Differences in groups according to ownership status of the financial performance of South African automotive component suppliers**

	<b>Net income [ZAR million]</b>	<b>ROI [ %]</b>	<b>CAPEX [ZAR million]</b>	<b>Cash Flow [ZAR million]</b>
Internationally owned supplier	49.57	5.24	13.69	31.64
Joint venture of locally owned South African and international supplier	63.00	16.00	13.00	25.50
Locally owned South African supplier	5.20	5.50	5.20	7.80
Locally owned South African supplier using international patents/licences	17.00	9.17	13.00	8.67
<b>Grand total</b>	<b>37.38</b>	<b>6.68</b>	<b>12.00</b>	<b>23.29</b>

It can be identified that locally owned suppliers generate below average values in net income, capital expenditure (CAPEX) and cash flow (see Table 7.4). This fact could be associated with the lower average revenues, which is investigated in the next section by putting the financial performance measures in perspective to the revenues. As the return on investment is a relative measure, it can be found that the internationally owned suppliers and the locally owned suppliers operate on the same level but below the average of the other two groups.

**Table 7.4: Financial performance measures of South African automotive component suppliers in relation to revenues**

	<b>Net income/ revenues [%]</b>	<b>ROI [ %]</b>	<b>CAPEX/ revenues [%]</b>	<b>Cash Flow/ revenues [%]</b>
Internationally owned supplier	9.3	5.2	5.9	7.9
Joint venture of locally owned South African and international supplier	15.3	16.0	4.4	5.6
Locally owned South African supplier	3.6	5.5	3.6	5.4
Locally owned South African supplier using international patents/licences	6.4	9.2	8.7	5.0
<b>Grand total</b>	<b>8.0</b>	<b>6.7</b>	<b>5.7</b>	<b>6.8</b>

Financial performance relative to revenues shows an especially different result. The locally owned suppliers are still below average with regard to net income relative to revenues despite the fact that return on investment is on the same level as internationally owned suppliers.

By splitting the suppliers in two groups – the first with international ties and including the internationally owned suppliers as well as the joint ventures between international firms and South African firms, and the second with national ties and including the locally owned suppliers and

locally owned suppliers using international licences/patents – the data shows substantial differences in net income and cash flow (see marked fields in Table 7.5). This finding must be seen according to the firm sizes, as internationally tied suppliers are bigger than locally tied suppliers, but especially for the net income figures it must be noted that the internationally tied suppliers are able to generate a higher margin.

**Table 7.5: Differences in financial performance of internationally tied and nationally tied South African automotive component suppliers**

	<b>Net income [ZAR million]</b>	<b>ROI [ %]</b>	<b>CAPEX [ZAR million]</b>	<b>Cash Flow [ZAR million]</b>
Internationally owned supplier	49.57	5.24	13.69	31.64
Joint venture (JV) of locally owned South African and international supplier	63.00	16.00	13.00	25.50
<b>Grand total</b>	<b>51.25</b>	<b>6.59</b>	<b>13.61</b>	<b>30.88</b>
Locally owned South African supplier	5.20	5.50	5.20	7.80
Locally owned South African supplier using international patents/licences	17.00	9.17	13.00	8.67
<b>Grand total</b>	<b>9.63</b>	<b>6.88</b>	<b>9.10</b>	<b>8.13</b>

Table 7.6 and Table 7.7 only state absolute figures, as the relative values to revenues are not representative due to the numbers of respondents in each group. With regard to the tier structure, the first tier suppliers show the highest net income in absolute figures, whereas the third and lower tier suppliers are able to generate the highest return on investment. In terms of cash flow, the second tier suppliers show below average values.

**Table 7.6: Differences in financial performance of South African automotive component suppliers according to main customers**

	<b>Net income [ZAR million]</b>	<b>ROI [ %]</b>	<b>CAPEX [ZAR million]</b>	<b>Cash Flow [ZAR million]</b>
Aftermarket	15.40	5.98	10.40	28.00
Intercompany	13.00	-1.00	13.00	63.00
OEM	56.09	4.77	13.79	23.09
Tier-1	31.50	7.75	9.75	9.50
Tier-2	21.33	16.00	9.75	21.33
<b>Grand total</b>	<b>37.38</b>	<b>6.68</b>	<b>12.00</b>	<b>23.29</b>

When looking at product categories it becomes obvious that the ROIs in the groups are substantially different. Powertrain suppliers are able to generate four times higher return on

investment than the chassis suppliers. Despite the low results in return on investment, the net income by the chassis suppliers is double the average of all groups. The lowest net income results can be attached to the electric/electronic and exterior suppliers. In terms of capital expenditure, the interior suppliers show a substantially lower value than the other groups.

**Table 7.7: Differences in financial performance of South African automotive component suppliers according to product categories**

	<b>Net income [ZAR million]</b>	<b>ROI [ %]</b>	<b>CAPEX [ZAR million]</b>	<b>Cash Flow [ZAR million]</b>
Chassis	80.86	2.52	10.83	25.33
Electric/electronics	12.75	8.95	13.00	22.25
Exterior	16.00	6.63	13.00	22.25
Interior	22.80	6.00	6.50	19.17
Powertrain	25.50	11.75	16.43	28.50
<b>Grand total</b>	<b>37.38</b>	<b>6.68</b>	<b>12.00</b>	<b>23.29</b>

The measures for the financial performance also include figures on the expense level with regard to R&D and HR training expenditures. The average for the South African automotive component suppliers is 2.13 per cent of revenues for R&D expenditures and 1.63 per cent of revenues for HR training expenditures. No differences can be identified across the different groups.

#### 7.4.2.7 SYNTHESIS

The key findings from the descriptive statistics are illustrated in the following overview (see Tables 7.8–7.12). In order to use the suggested structure from the introduction of this section, the findings are related to the attributes, and organised according to the governance levels. This conclusion summarises the findings in terms of the structure, profile, specifics and differences of the groups in the South African automotive supplier industry.

**Table 7.8: Key findings from descriptive statistics on government level**

Attribute level	Key findings
Industrial policy	<ul style="list-style-type: none"> <li>• No substantial monetary subsidies from government</li> <li>• Locally owned suppliers show higher local content levels than other groups</li> <li>• Skilled labour in terms of graduates available on first tier level as well as for electric/electronics suppliers</li> <li>• Social commitment cost on a low level, with second tier suppliers about double the average</li> </ul>
Infrastructure/logistics	<ul style="list-style-type: none"> <li>• Lack of infrastructural development (especially road and rail)</li> <li>• Internationally owned suppliers and domestic market suppliers show substantially higher logistics cost</li> </ul>
International market	<ul style="list-style-type: none"> <li>• 50% of overall exports go to FTA areas</li> </ul>

**Table 7.9: Key findings from descriptive statistics on market level**

Attribute level	Key findings
Domestic market	<ul style="list-style-type: none"> <li>• Locally owned suppliers dependent on domestic market</li> <li>• Low diffusion of production capabilities for new technologies</li> </ul>
International market	<ul style="list-style-type: none"> <li>• Revenue vs. ownership structure implies follow sourcing</li> <li>• FDI inflow only for already internationally tied companies</li> <li>• Internationally owned suppliers make use of their networks to generate higher export volumes</li> </ul>
Labour market	<ul style="list-style-type: none"> <li>• Labour volatility higher in the third and lower tier levels</li> <li>• Perceived labour cost below developed country levels</li> </ul>

**Table 7.10: Key findings from descriptive statistics on industry level**

Attribute level	Key findings
Value chain	<ul style="list-style-type: none"> <li>• Informational flows in the industry are sufficient</li> <li>• Locally owned suppliers have a lower market share than internationally owned suppliers, which is in line with the number of competitors</li> <li>• 80% of the products of the South African automotive suppliers are on a component basis</li> <li>• Internationally owned suppliers supply more specialised products, whereas locally owned suppliers supply more standardised components</li> <li>• Half of the South African suppliers work in a modular or market relationship and the other half in a relational or captive relationship</li> <li>• Locally owned suppliers show a higher average of upgrades</li> </ul>
Supply chain	<ul style="list-style-type: none"> <li>• Biggest portion of supply chain investment from first and second tier suppliers and interior and exterior suppliers</li> <li>• Internationally owned suppliers and suppliers in the first and second tier levels are more involved in supplier and value chain development</li> </ul>

**Table 7.11: Key findings from descriptive statistics on corporate level**

Attribute level	Key findings
Value chain	<ul style="list-style-type: none"> <li>• 50% of the suppliers operate in powertrain and interior</li> <li>• No raw material suppliers</li> <li>• 75% of the South African automotive component suppliers operate through sales offices and representatives, and 50 % are organised in a cluster</li> <li>• Strong competition, but ability to get market access on the first tier level for locally owned suppliers</li> </ul>
Supply chain	<ul style="list-style-type: none"> <li>• Specific product groups with substantially higher raw material content – especially interior</li> <li>• Locally owned suppliers with higher raw material content in their products</li> </ul>
Internal value chain	<ul style="list-style-type: none"> <li>• Average of inventory levels at 12.5% of revenues; aftermarket suppliers inventory levels at 26.1% of revenues</li> <li>• Quality level at 301 ppm in average; first tier suppliers at 499 ppm</li> <li>• Domestic lead times at 9.5 days, with aftermarket suppliers at 5.6 days</li> <li>• Lead times for first and second tier suppliers above 95%</li> <li>• Capacity utilisation at 66% for 2009; aftermarket suppliers above 80%</li> </ul>
Company characteristics	<ul style="list-style-type: none"> <li>• Age of companies implies establishment and maturity</li> </ul>

**Table 7.12: Key findings from descriptive statistics for dependent variables**

Dependent variables	<ul style="list-style-type: none"> <li>• Skewed distribution for revenues towards smaller suppliers</li> <li>• Revenues per employee four times higher for internationally owned suppliers than locally owned suppliers</li> <li>• Locally owned suppliers below average with regard to absolute financial figures</li> <li>• ROI on the same level for locally and internationally owned suppliers</li> <li>• third tier suppliers with the highest ROI and first tier suppliers with the highest net income</li> <li>• Powertrain suppliers with the highest ROI and chassis suppliers with lowest ROI, but the highest net income</li> </ul>
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### 7.4.3 CORRELATIONS

#### 7.4.3.1 INTRODUCTION

An investigation of correlations between the independent and dependent variables is used to identify patterns with regard to the economical sustainability of the South African automotive component suppliers. The independent and dependent variables from the conceptual model are compared using the Spearman's rank correlation coefficient to determine dependencies between the variables. Correlations with a significance of  $p \leq 0.05$  are treated as significant, whereas correlations with a significance of  $0.05 < p \leq 0.10$  are treated as having a tendency towards dependency. The results are clustered according to the system levels from the conceptual model. This is done in order to be able to qualify patterns in terms of the economic sustainability of the South African automotive component suppliers.

#### 7.4.3.2 MACRO-LEVEL

##### 7.4.3.2.1 OVERVIEW

Table 7.13 and the following tables in this section are structured in the same way:

- The system level in the first column shows the category of the independent variable
- The independent variable is named in the second column
- The Spearman rank correlation coefficient is shown in the third column
- The dependent variable is named in the fourth column
- The fifth column shows the significance of the correlation. (Correlations with a significance of  $p \leq 0.05$  are treated as significant, whereas correlations with a significance of  $0.05 < p \leq 0.10$  are treated as having a tendency towards dependency.)

**Table 7.13: Correlations between the independent and dependent variables on the macro-level**

System level	Independent variable	Spearman	Dependent variable	Significance
Macro	TOP – product local content (per cent)	-0.33	Revenues	Tendency
Macro	Logistics cost	0.39	Revenues	Significant
Macro	FDI	0.35	Revenues	Tendency
Macro	Infrastructure – road	0.50	Net income	Significant
Macro	Infrastructure – ship	0.51	ROI	Significant
Macro	FTA revenues (per cent)	0.35	ROI	Tendency
Macro	TOP – product local content (per cent)	-0.35	Cash flow	Tendency
Macro	Infrastructure – ship	0.38	Cash flow	Tendency
Macro	Infrastructure – rail	0.37	Cash flow	Tendency

System level	Independent variable	Spearman	Dependent variable	Significance
Macro	Social commitment	0.61	CAPEX	Significant
Macro	Logistics cost	0.41	CAPEX	Significant
Macro	FDI	0.39	CAPEX	Tendency
Macro	Infrastructure – ship	0.36	CAPEX	Tendency

There are 13 pairs of independent and dependent variables on the macro-level that show a correlation.

#### 7.4.3.2.2 INDUSTRIAL POLICY

Three dominant patterns can be identified when looking at the macro-variables. The first is tied to the issue of local content and, therefore, related to industrial policy. It appears that higher local content leads to lower revenues and lower cash flow. Both correlations are not statistically significant, but the tendencies are inherent in the collected data. How can these mechanisms be explained? The negative correlation of local content vs. revenues can be interpreted in the way that the more local content is contained in the products, the less technologically advanced is the product – and in conclusion smaller revenues are achieved. This is because the technological standards and availability in South Africa are not on the same level as in developed countries. Furthermore, this means that products with a high local content can either not be used in the current vehicle models or cover the ‘old technology’ parts in the vehicles, which means that projects and, therefore, revenues are restricted. The negative correlation of local content to cash flow can be explained by the fact that the supplier industry has to develop the local supply chain to be in a position to compete in an international environment. So the more local content a top product of a South African automotive component supplier contains, the more development in the local supply chain is needed. Hence, because this development needs to be financed from the firm’s cash flow the correlation to the local content is negative.

Another significant correlation can be identified between the social commitment (cost for BEE, HIV/AIDS, etc.) and the capital expenditure (CAPEX) of a firm. The positive dependency between these variables means the higher the cost for social commitment, the higher the capital expenditure of the firm. Again, it can be argued that the adaptation to and the requirements of the specific environment need investment in the organisation, which is financed out of the cash flow of the firm.

#### 7.4.3.2.3 INFRASTRUCTURE AND LOGISTICS

The second pattern is related to logistics and infrastructure. Seven correlations can be identified with regard to this pattern. Five of these correlations are related to the perception of the South African infrastructure compared to the infrastructure in developed countries. The perception of the South African shipping infrastructure correlates positively with the return on investment of the firms in a significant way and to the cash flow and the capital expenditure with a tendency. Additionally, the perception of the South African road infrastructure correlates significantly with the net income and the perception of the South African rail infrastructure relates with a tendency to the cash flow of the firms. What does this mean and how can it be interpreted? Obviously, it is inappropriate to draw conclusions from a perception about an issue and the hard facts of financial figures. Nevertheless, a relation can be built up in the sense that a perception leads to the way in which the firms (and their managers) cope with disadvantages. So why does a better perception about the South African shipping infrastructure lead to better financial performance? One argument is that the firms that cope with the disadvantages achieve better solutions to overcome the inherent issues. This could mean that these companies accept the disadvantages and work their way around them or invest in solutions to overcome the shortfalls. In conclusion, it can be stated that despite the general perception that the South African infrastructure is inferior to developed countries (see paragraph 7.4.2.3.2), the suppliers that perceive the state of the infrastructure better perform better in the abovementioned financial measures.

The other two measures that relate to the logistics and infrastructure pattern are tied to the relative logistics cost to revenues. The first significant correlation is found between the relative logistics cost and revenues, stating that there is a positive relationship for these measures. This means the higher the relative logistics cost to revenues, the higher the revenues of the firm. This phenomenon can be explained by the fact that logistics cost increases faster than revenues. Therefore, it can be argued that there must be a function of logistics cost and revenues whereby logistics costs tend to increase independently and more rapidly than the revenues of a firm. Corresponding to this finding a positive correlation of relative logistic cost and capital expenditure can be found. This means the higher the relative logistics cost, the higher the capital expenditure of a firm. An interpretation is that firms invest in logistics solutions in order to reduce their relative logistics cost. This investment increases the capital expenditure of the firms.

In conclusion, it can be argued that the infrastructural issues in South Africa are a factor for the economic performance and sustainability of the automotive component suppliers, as next to the perceptive relationships the relative logistics cost shows an unexpected function, which cannot only be explained by South Africa's geographical disadvantage.

#### 7.4.3.2.4 INTERNATIONAL MARKETS

The fourth pattern relates to foreign direct investment (FDI) and free trade agreement areas (FTAs). This pattern can be summarised under international markets. Although the relations of the variables just show tendencies, in a statistical sense the dependencies are of interest for the research. The first correlation can be found between the percentage of revenues to FTAs and the return on investment. As the relation is positive it means the more that a firm's revenues are generated in FTAs, the higher the return on investment of the firms. This fact can be interpreted by the opportunity to generate higher margins in FTAs, as duties are less than those of other countries and, therefore, a competitive advantage can be achieved by this opportunity. Related to this matter it can be found that the inflow of foreign direct investment has a positive relation to revenues and capital expenditure of a firm. These relations are also tendencies statistically. An understanding of the relations is that foreign direct investment fosters market access of firms through the effect of increased capital available and the opportunity to gain technological capabilities and competencies. Furthermore, foreign direct investment enables firms to increase their capital expenditure in order to upgrade or expand their business.

#### 7.4.3.3 MESO-LEVEL

##### 7.4.3.3.1 OVERVIEW

This section deals with the independent variables on the meso-level. There are 11 pairs of independent and dependent variables on the meso-level that show a correlation (see Table 7.14).

**Table 7.14: Correlations between the independent and dependent variables on the meso-level**

System level	Independent variable	Spearman	Dependent variable	Significance
Meso	Supplier development – given	0.42	Revenues	Significant
Meso	Supplier development – received	0.37	Revenues	Significant
Meso	Graduates (%)	0.46	Net income	Significant
Meso	Horizontal upgrading	-0.68	Net income	Significant
Meso	Horizontal upgrading	-0.36	ROI	Tendency
Meso	Governance	Categorical	ROI	Tendency
Macro	Labour cost	-0.45	Cash flow	Significant
Meso	Number of competitors	-0.35	Cash flow	Tendency
Meso	Supply chain investment	0.47	CAPEX	Significant
Meso	Supplier development – received	0.39	CAPEX	Significant
Meso	Standardisation	0.64	CAPEX	Significant

#### 7.4.3.3.2 LABOUR MARKET

The pattern that can be identified is labour, or more specifically the labour market. A significant negative correlation is given between the perception of labour cost and a firm's cash flow. This fact could be interpreted that the more the firm's (or the leaders of the businesses) experience that the labour cost of South Africa is unfavourable in terms of a comparative advantage to the developed countries, the more they invest in automation of their processes. This investment is financed out of their cash flow. The question that can be raised in this relation is whether it makes sense to upgrade in automation and processes and replace manual work in an environment that still has an advantage in terms of labour cost compared to the major automotive countries in the developed world. In fact, the answer can only be given in combination with the requirements of the lead firms in the automotive industry. These lead firms request high product and process standards with regard to quality. Therefore, automation with the simultaneous replacement of manual labour might be needed to compete in the global automotive value chain.

Additionally, the percentage of graduates in a firm correlates positively with the net income in a significant way. This finding can be interpreted in the sense that a higher level of education in the firm enables it to raise the value-add of its products and, therefore, earn more net income. As the percentage of graduates in the workforce is directly related to the absolute amount of net income this fact translates into a competitive advantage for the particular firm.

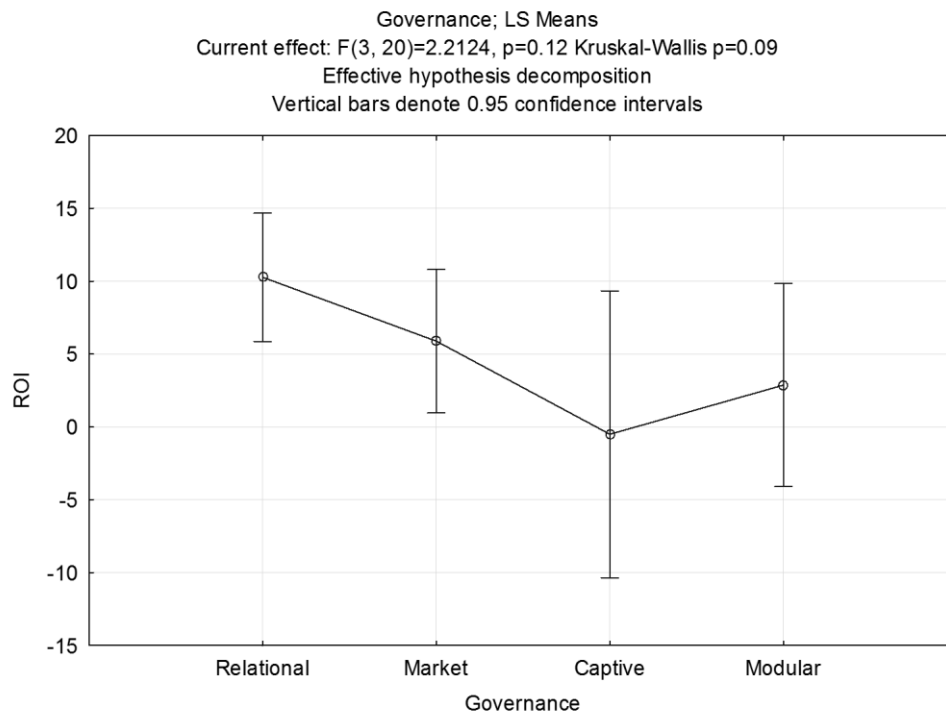
#### 7.4.3.3.3 VALUE CHAIN

A new pattern is connected to issues in the value chain. This pattern is not only found for variables on the meso-level, but is also continued for variables on the micro-level. The first relation relates to the cost of standardisation for products and quality in dependence to the capital expenditure of a firm. This positive correlation states that the greater the cost a firm has for standardisation issues, the higher the capital expenditure. This dependence is explained in the sense that standardisation in quality and product is connected to investment in processes and automation.

The next dependency shows the effect of competition to the cash flow a firm. It states that the higher the number of competitors, the less the cash flow of a firm. This negative relation implies that more competition leads to more expenses of the firm and, therefore, less cash flow. As these expenses cannot be qualified, a further conclusion than the general relationship pointed out before is out of reach.

The third relation that can be pointed out from the dataset is of a categorical nature. The type of value chain governance in which the firms operate is related to the return on investment of a firm. Although the correlation between this pair of variables is a tendency only, the relation is of high

interest for the research. Figure 7.5 points out the relation of the categories of value chain governance to the return on investment. It can be determined that the return on investment of a firm increases in relation to the following types of value chain governance: captive → modular → market → relational. Why is the relational type of value chain governance favourable in terms of return on investment? In theory, the relational type of governance is characterised by a higher degree of coordination and power asymmetry than the market or modular type of governance, which makes them more dependent on a specific customer. This dependency normally leads to financial pressures, as the lead firms are dictating the prices. Therefore, it can be assumed that the finding derives from the power- and activity-shift in the automotive value chain. OEMs divert activities and, therefore, coordination efforts to the suppliers of choice and bind them in a bi-directional relationship. The increased efforts of the supplier are rewarded, which leads to an increased return on investment of the supplier.



**Figure 7. 5: ANOVA analysis for the type of value chain governance in relation to ROI**

The other relations that belong to the value chain pattern are connected to horizontal upgrading of a firm. The data shows a significant negative correlation between the number of horizontal upgrades and the net income of a firm. Additionally there is a tendency that the horizontal upgrades also influence the return on investment negatively. These correlations mean that the more horizontal upgrades an automotive component supplier deploys, the less net income and return on investment the firm achieves. How can this fact be explained and interpreted? It can be

assumed that the diversification of the product portfolio has significant influences on the overall financial performance of a firm. This could be for two reasons. The first is that the new business needs to ramp up (especially as the data show the upgrades in the last three years) to be financially worthwhile; the second reason could be that the new product category is not adding value to the company's business.

#### 7.4.3.3.4 SUPPLY CHAIN

The next pattern that can be identified is related to supply chain activities of the South African automotive component suppliers. Three of the four correlations are connected to the matter of supplier development – either in the form of received activities of the firms' customers or in self-deployed activities to their own supply chain. A significant positive correlation can be found between received and given supplier development activities and the revenues of a firm. This means the more supplier development the firms have received or given, the higher the revenues of these firms. An interpretation is that the development of the downstream and upstream value chain of a particular component supplier has positive influences on the business of these companies. This can be explained by the impact of supplier development on the capabilities and competencies, which lead to increased acknowledgement by the lead firms in terms of awarded contracts. The third correlation associated with supplier development relates to an increasing capital expenditure the more supplier development the firms receive. This fact can be explained by the demands that are involved with supplier development. The supplier development activities are likely to include upgrades processes in order to increase quality, reliability and flexibility of the supplier. Therefore, the 'developed' company has to invest and its capital expenditure increases.

In direct relation to this fact stands the correlation of investment in supply chain and the capital expenditure of a firm. The significant positive correlation states that the more investment in supply chain activities a firm has, the more the capital expenditure. This seems logical, as upgrades in processes and methods with regard to supply chain improvement need investment.

#### 7.4.3.4 MICRO-LEVEL

##### 7.4.3.4.1 OVERVIEW

This section deals with the independent variables on the micro-level. There are 22 pairs of independent and dependent variables on the micro-level that show a correlation.

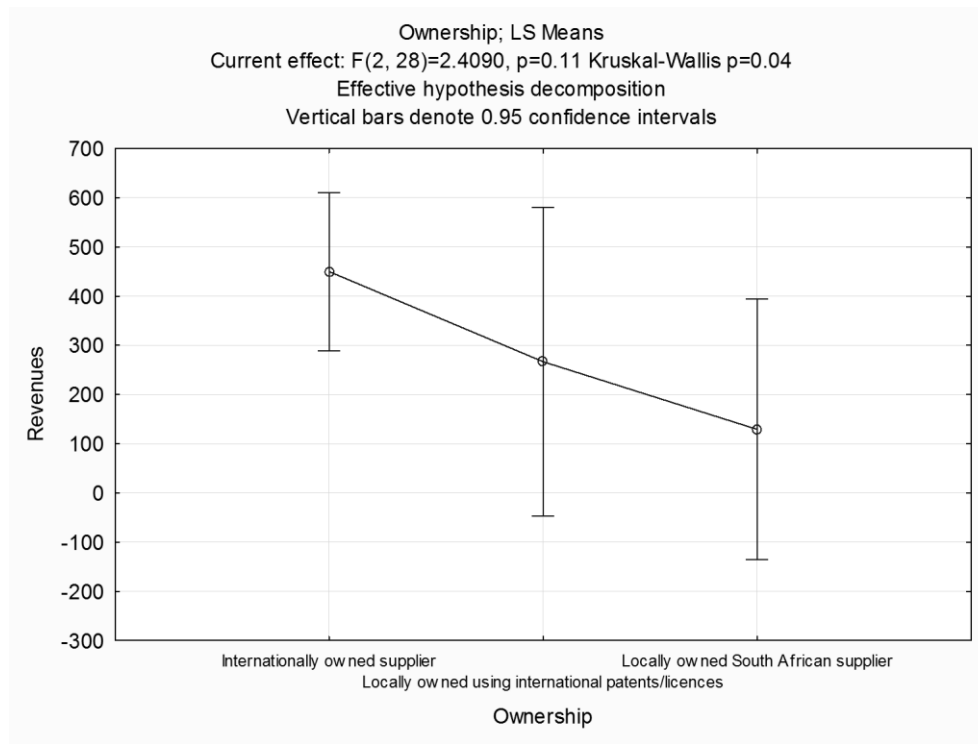
**Table 7.15: Correlations between the independent and dependent variables on the micro-level**

System level	Independent variable	Spearman	Dependent Variable	Significance
Micro	Employees	0.64	Revenues	Significant
Micro	Cost control	0.83	Revenues	Significant
Micro	Value chain flexibility domestic	-0.42	Revenues	Significant
Micro	Market presence	Categorical	Revenues	Significant
Micro	Ownership	Categorical	Revenues	Significant
Micro	Production cluster	Categorical	Revenues	Tendency
Micro	Age of company	-0.58	Net income	Significant
Micro	Value chain flexibility domestic	-0.63	Net income	Significant
Micro	Value chain reliability	0.68	Net income	Significant
Micro	Cost control	0.44	Net income	Significant
Micro	Proximity	Categorical	Net income	Tendency
Micro	Production cluster	Categorical	Net income	Tendency
Micro	Age of company	-0.56	ROI	Significant
Micro	TOP-Product raw material content (%)	0.38	ROI	Tendency
Micro	Value chain flexibility domestic	-0.59	ROI	Significant
Micro	Value chain reliability	0.70	ROI	Significant
Micro	Tier n level	Categorical	ROI	Tendency
Micro	Employees	0.45	Cash flow	Significant
Micro	Value chain flexibility domestic	-0.46	Cash flow	Significant
Micro	Production cluster	Categorical	Cash flow	Significant
Micro	Employees	0.51	CAPEX	Significant
Micro	Cost control	0.41	CAPEX	Significant

##### 7.4.3.4.2 VALUE CHAIN

In continuation from the value chain pattern on the meso-level the data reveals five relations on the micro-level that are related to value chain issues. The first two are related to the type of ownership and the tier level of the firms. The data for ownership shows that there is significant correlation between the ownership and the revenues of a firm. Internationally owned suppliers generate more revenues than locally owned suppliers. In general, it can be stated that the more international ties a company has, the greater the revenue generated.

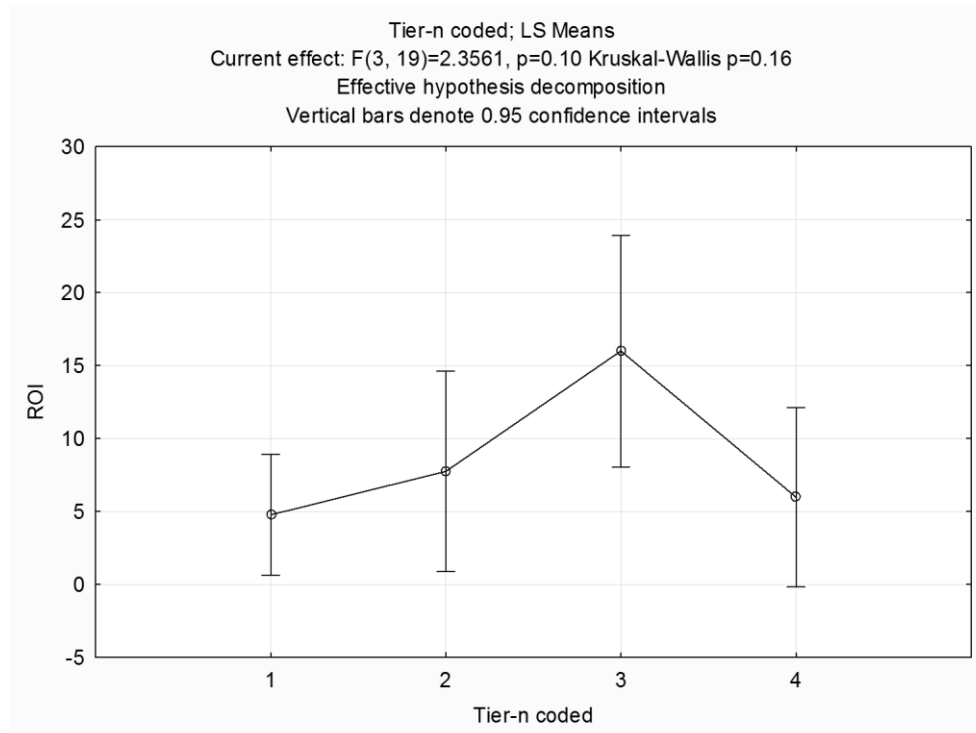




**Figure 7.6: ANOVA analysis for the type of ownership in relation to revenue**

As stated in Section 7.4.2.2 on the profile of the South African automotive component suppliers, this phenomenon can be explained by the concept of follow sourcing in the automotive industry. There are no other direct indications from related measures like tier level or product category that could explain the differences in revenue.

The tier level of a South African automotive component supplier is related to the return on investment with a tendency. As the data is again categorical, Figure 7.7 describes the dependency.



**Figure 7.7: ANOVA analysis for the tier level in relation to ROI**

It can be identified that firms on the first tier level generate substantially lower ROIs than firms on the second, third or higher tier levels. The fourth category in Figure 7.7 contains the aftermarket suppliers. This findings show that the financial pressure from the lead firms in the automotive industry seem to be much higher on the first and second tier levels than the pressures further up in the automotive supply chain. Therefore, the margins that can be achieved are higher on the lower tier levels. Another interpretation that also explains the lower ROIs in the aftermarket business is competition. As the analysis of the data shows, about 50 per cent of the firms in the South African component value chain operate on the first tier level, which fosters and increases competition and, therefore, reduces margins.

The data reveals a relation of market presence to the revenues of a firm. Firms that engage the automotive value chain via sales offices generate the highest revenues. Companies with sales representatives generate less revenue, but are able to have substantially higher revenues than businesses with just a website. This finding supports the fact that due to the complexity of the automotive value chain, and especially the component value chain, an interaction between the partners is needed and expected. In addition to market presence, another factor shows the relation of the ability to interact between customer and producer. The perception of the importance of the geographical proximity to the customer is related to the net income with a tendency. Firms that state that geographical distance has a higher impact for their current and potential business

generate higher net income than firms that think the impact is medium. This fact supports the finding from above with regard to the market presence of the firms. Although it is only a perception that is used to analyse the relationship of the independent and dependent variables, it nevertheless shows the importance of the relation between customer and producer in general.

In addition to the above findings, it can be identified that the affiliation to an automotive cluster is related to the revenue, the net income and the cash flow a firm. Although the first two dependencies are by trend, this agglomeration of correlations shows the importance of clusters in the automotive industry. The data shows the same mechanism of relation for all three pairs of variables: when firms are affiliated to a cluster they generate higher revenues, higher net income and have a better cash flow. This finding adds to the statements from above, as again it seems to be compulsory that the customers in the automotive component value chain not only expect to be supplied with parts, but also to be closely linked to their suppliers through relation- and information management.

#### 7.4.3.4.3 SUPPLY CHAIN

With regard to the supply chain pattern, one further relationship can be identified on the micro-level. The raw material content of the top product is positively correlated to the return on investment of a firm by trend. This means that the higher the raw material content of a top product of a component supplier, the higher the return on investment of the firm. An explanation of this relationship is that the production of products with high raw material content is favourable for the business because the raw material supply chain in South Africa offers advantages in terms of proximity and sources. As explained earlier in the research with the example of the catalytic converter industry, South Africa's wealth of raw-material resources can be advantageous for the component suppliers when it comes to distances to the sources of the specific raw material.

#### 7.4.3.4.4 INTERNAL VALUE CHAIN

The following correlations are value chain measures. In order to differentiate these dependencies, which relate to the operational performance of a firm, from the general value chain measures it was chosen to use the internal value chain as a pattern in this case. In general it can be found that the cost control, the value chain flexibility and the value chain reliability show correlations with the independent variables. All the dependencies are statistically significant.

The first correlation is associated with the cost control of the firm, which is measured by total inventory levels (raw material, work in progress, finished goods). This independent variable is positively correlated to the revenues, net income and capital expenditure of a firm. The relation to revenues and capital expenditure can be explained by the fact that the higher the revenue the firm

generate, the higher the inventory levels, as stocks increase as does capital expenditure, as more investment is needed to support the sustainability of production and sales. The indication from the previous findings and conclusion can also explain the increase in net income. As this variable is measured in absolute numbers, it seems fair to conclude that increasing inventory levels are caused by increasing revenue and whenever the revenue is profitable the net income must increase as well.

The second correlation relates to value chain flexibility, which is measured in lead times from production to domestic and export customers. Although both types of customers are measured, the correlations only appear for the domestic customers. The correlations for the domestic lead times are statistically significant and negatively correlated in all cases. It can be found that the domestic lead time correlates with revenue, net income, return on investment and cash flow of the South African automotive component suppliers. The negative correlation implies that the less lead time the firms have, the more the dependent measures increase in value. Therefore, it can be concluded that shorter lead times are rewarded in the automotive industry. It appears that lead time is an important variable due to concepts of just in sequence and just in time in the automotive value chain.

The third correlation is tied to value chain reliability. This variable is measured in on-time delivery to customers, and relates in a statistically significant way to the net income and return on investment of the component suppliers. The positive relation shows that the greater the percentage of on-time delivery, the higher the net income and return on investment of the firms. This fact continues the trend from above, as the current logistics and production concepts rely on reliable delivery. If a certain percentage of on-time delivery is not achieved, then the entire automotive value chain is at risk. Therefore, performance in this point is consequently rewarded in terms of business performance.

#### 7.4.3.4.5 COMPANY CHARACTERISTICS

Although the following relations are tied to the pattern of labour and the labour market, their origins are at the micro-level of a firm. The age of a company is significantly negatively related to the net income and return on investment of the business. This means the older the company, the less net income and return on investment achieved. So the question is why do older companies generate less net income and are less profitable? An explanation is the older workforce of those companies. As these companies have been in the business for at least more than a decade, their workforce is older (and more experienced) than the workforce of younger companies. This implies that the employees of an older firm earn higher wages and salaries and, therefore, the firm has higher expenses for this cost factor.

The following three pairs of variables are more related to size than to financial performance and sustainability. The data shows that the number of employees is positively and statistically significant to the revenues, cash flow and capital expenditure of a firm. This means the more employees a firm has, the more the value of the three dependent variables increases. As especially the relationship between the number of employees and revenues is a function of a firm's size, it also indicates that manual labour is used in a proportional way in the companies. This is because an increase in revenues could also happen without a significant growth in employees when automation is used to rationalise the effects of an increase in production capacities. Therefore, the correlation to capital expenditure must be directly related to that issue, as high capital expenditure indicates the extension of capacities. This does not mean that an increase in revenue eliminates the possibility of a simultaneous increase in capital expenditure, but it means that it is likely that the capital expenditure is not used for automation. The correlation between number of employees and cash flow indicates that manual labour is still a large factor in the South African automotive industry and its profitability – at least in terms of cash flow – as well. Therefore, it can be concluded that the number of employees not only points towards the size of a firm, but is a signal for the degree of manual labour and the tendency of automation in a firm.

#### 7.4.3.5 SYNTHESIS

The key findings from the inferential statistics are illustrated in the following overview (see Table 7.16). In order to use the suggested structure from the introduction of this section, the findings are related to the attributes and organised according to the governance levels.

**Table 7.16: Key findings from inferential statistics on government level**

Attribute level	Key findings
<b>Industrial policy</b>	<ul style="list-style-type: none"> <li>Local content is negatively correlated (by trend) to revenues due to technological disadvantages of products with high local content</li> <li>Local content is negatively correlated (by trend) to cash flow due to needed investment in local supply chain development</li> <li>Cost of social commitment positively correlated to CAPEX due to investment in issues like HIV/AIDS, BEE, etc.</li> </ul>
<b>Infrastructure/logistics</b>	<ul style="list-style-type: none"> <li>South African infrastructure rating is positively correlated to ROI, net income, cash flow and CAPEX of the suppliers</li> <li>Relative logistics cost is positively correlated to revenues and CAPEX, which indicates the disproportionate weight of logistics cost</li> </ul>
<b>International market</b>	<ul style="list-style-type: none"> <li>FTA revenues are positively correlated (by trend) to the ROI, as higher margins can be achieved in FTAs</li> </ul>

**Table 7.17: Key findings from inferential statistics on market level**

Attribute level	Key findings
<b>International market</b>	<ul style="list-style-type: none"> <li>FDI inflow is positively correlated (by trend) to revenues and CAPEX due to market access and increased funds available</li> </ul>
<b>Labour market</b>	<ul style="list-style-type: none"> <li>Labour cost rating is negatively correlated to cash flow due to investment in automation</li> <li>Percentage of graduates is positively correlated to net income due to potentially increased value-add</li> </ul>

**Table 7.18: Key findings from inferential statistics on industry level**

Attribute level	Key findings
<b>Value chain</b>	<ul style="list-style-type: none"> <li>Cost of standardisation is positively correlated to CAPEX due to investment in processes</li> <li>Number of competitors negatively correlated to cash flow</li> <li>Type of governance is related to ROI (captive → modular → market → relational), which can be explained by the power shift in the supply chain</li> <li>Horizontal upgrading is negatively correlated to net income and ROI due to a ramp-up process of new products</li> </ul>
<b>Supply chain</b>	<ul style="list-style-type: none"> <li>Supplier development is positively correlated to revenue due to increased capabilities</li> <li>Received supplier development is positively correlated to CAPEX, which can be traced to the need for investment in capabilities</li> <li>Investment in supply chain is positively correlated to CAPEX</li> </ul>

**Table 7.19: Key findings from inferential statistics on corporate level**

Attribute level	Key findings
<b>Value chain</b>	<ul style="list-style-type: none"> <li>• Equity ownership is related to revenue; more international equity leads to more revenue due to access to networks</li> <li>• Tier level is related to ROI: third → second → aftermarket → first in decreasing order, which indicates increasing price pressure on the first tier level</li> <li>• Market presence is related to revenue; sales offices generate higher revenue due to informational flows</li> <li>• Geographical proximity is positively related to net income, which indicates advantageous circumstances of nearby locations</li> <li>• Membership in production cluster has positive impact on revenue, net income and cash flow (follows the geographical proximity issue)</li> </ul>
<b>Supply chain</b>	<ul style="list-style-type: none"> <li>• Raw material content is positively correlated to ROI due to the advantages of the local raw material supply chain</li> </ul>
<b>Internal value chain</b>	<ul style="list-style-type: none"> <li>• Cost control is positively correlated to revenue, net income and CAPEX</li> <li>• Domestic lead time is negatively correlated to revenue, net income, ROI and cash flow, which implies an advantage of short delivery times</li> <li>• Delivery reliability is positively correlated to net income and ROI, which follows the same pattern as lead time</li> </ul>
<b>Company characteristics</b>	<ul style="list-style-type: none"> <li>• Age of a company is negatively correlated to net income and ROI, which could be related to an older workforce (and, therefore, more expensive)</li> <li>• Number of employees is positively correlated to revenue, cash flow, and CAPEX mainly relates to the size of a firm</li> </ul>

The following independent variables do not show any correlation to the dependent variables. As it cannot be concluded that these variables can be disqualified from the conceptual model, a short annotation for each variable is provided in order to assess the situation:

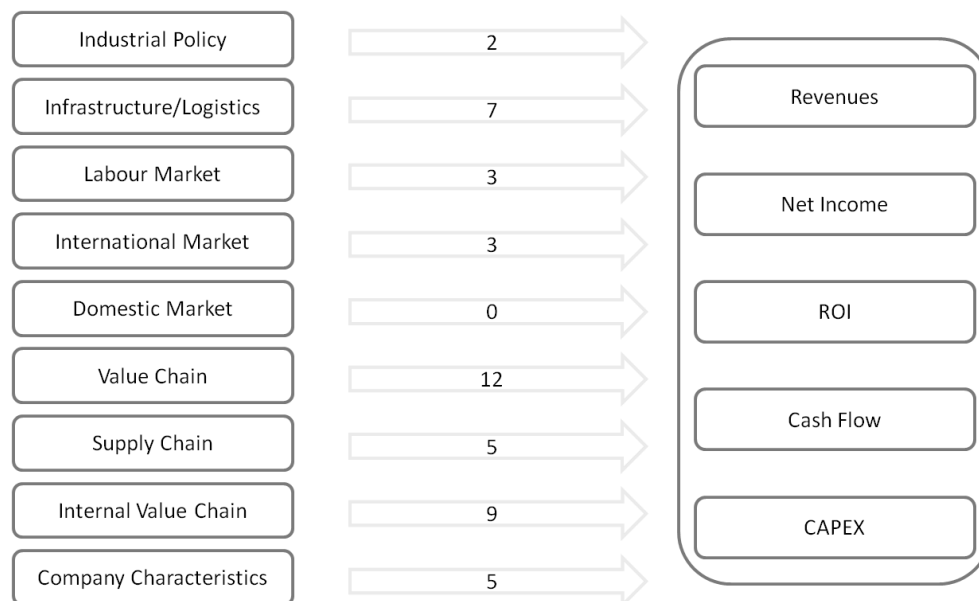
- HR development – seems to play a role on the national education/skill level, but is not directly related on a firm level.
- Product/process innovation – seems to play a role on the industry level, but is not directly related on firm level.
- Capacity utilisation – developing countries are not as over-utilised as developed countries, therefore no correlation.
- Quality – is a basic for market access, but not rewarded in financial terms.
- Product category – no differences in economic performance of old and new technology can be seen.
- Market share – economic sustainability is not directly dependent on market share.

- OEM-supplier linkages – the informational linkages in the industry and between OEMs and suppliers are not directly linked to economic sustainability.
- Product complexity – the complexity of the product in terms of standard vs. specialised features does not influence the financial figures of a company.
- Product modularity – the modularity of the product in terms of components vs. modules does not influence the financials of a company.

The following variables were identified in the qualitative data to be of a major impact on the economic sustainability, but this direction cannot be recognised and supported in terms of the quantitative findings. Therefore, it can be concluded that these variables play a major role for the stakeholders in the South African automotive component industry and may have implications for the future:

- Subsidies
- Domestic demand
- Local technology availability
- Labour flexibility

The conclusion also aggregates the identified and discussed correlations. Therefore, the correlations from the above are sorted according to the attributes as introduced in the beginning of the findings section. The summary is presented in Figure 7.8.

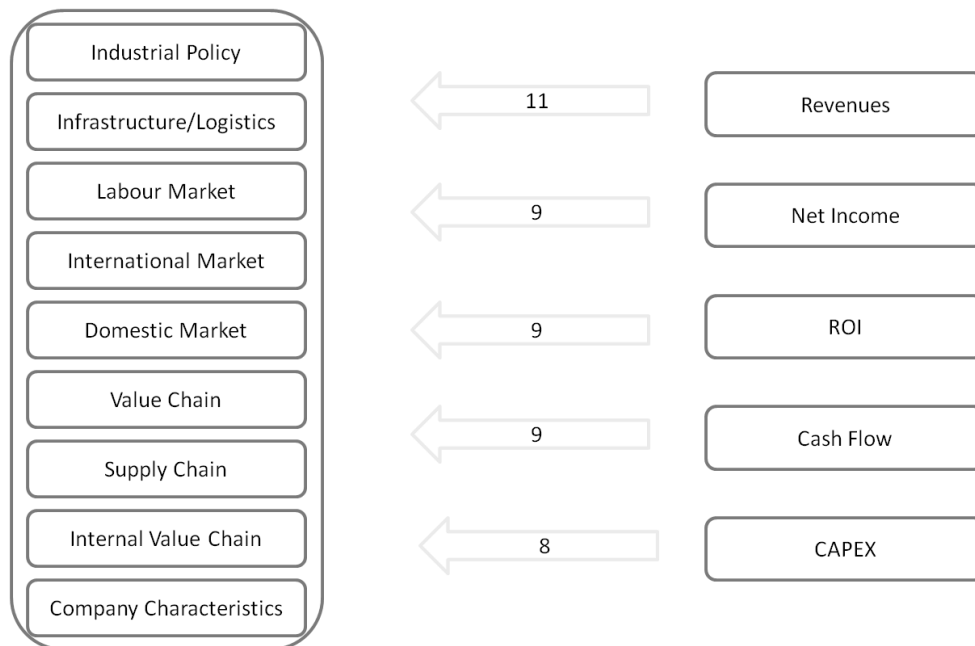


*Absolute number of significant correlations and relationships by trend*

**Figure 7.8: Correlations from an attribute to the group of dependent variables**



The most dominant patterns are associated with variables from the value chain, internal value chain and logistics/infrastructure attributes, as can be seen in Figure 7.8. It can be noted that especially the two most dominant attributes – internal value chain and value chain – are located on the micro- and meso-levels. This can be interpreted in the sense that a major impact on the economic sustainability derives from variables and attributes that are governed on the corporate and industry levels. In fact, more than twice the correlations to the dependent variables are found on the micro- and meso-levels, which can be interpreted in two ways. Either the dependent variables are more influenced by independent variables on the micro- or meso-levels because of their nature to measure performance on a firm-level, or it can be noted that the economic sustainability of a firm is mostly influenced at the corporate and industry levels. The latter would also mean that influences on the government and market levels can be considered of minor importance in terms of economic sustainability on a firm-level.



*Absolute number of significant correlations and relationships by trend*

**Figure 7.9: Correlations from a dependent variable to the group of attributes**

By looking at the correlations from another angle it can be stated that the number of correlations to the dependent variables show no pattern in terms of differences of each dependent variable (see Figure 7.9). Every dependent variable is attached to nearly the same number of correlations to the independent variables. This could be noted as an indicator that the dependent variables are assembled in a correct way.

## 7.4.4 QUALITATIVE COMMENTS

### 7.4.4.1 INTRODUCTION

This section analyses the qualitative feedback from the survey. Therefore, the comments of the respondents with regard to factors for the sustainability and strength of the South African automotive industry, and issues in the South African automotive value chain are related to the attributes of the conceptual model. The answers are weighted according to their entries and summarised as a percentage of overall entries. Additionally, the main patterns of each attribute are stated.

### 7.4.4.2 FACTORS

The entries with regard to the factors of economic sustainability show three high-ranked attributes (see Figure 7.10). Factors associated with industrial policy are entered in 29 per cent of the cases and mainly related to the need for a support programme for the automotive industry and the issue of education in the country. 27 per cent of the entries are related to the labour market and the call for labour flexibility and labour legislation. The third point relates to the infrastructure and logistics attribute, where 18 per cent of the respondents see the electricity, road and rail infrastructure as a major factor for economic sustainability in the automotive supplier industry.



**Figure 7.10: Qualitative comments of survey respondents with regard to factors for economic sustainability of automotive suppliers**

#### 7.4.4.3 STRENGTHS

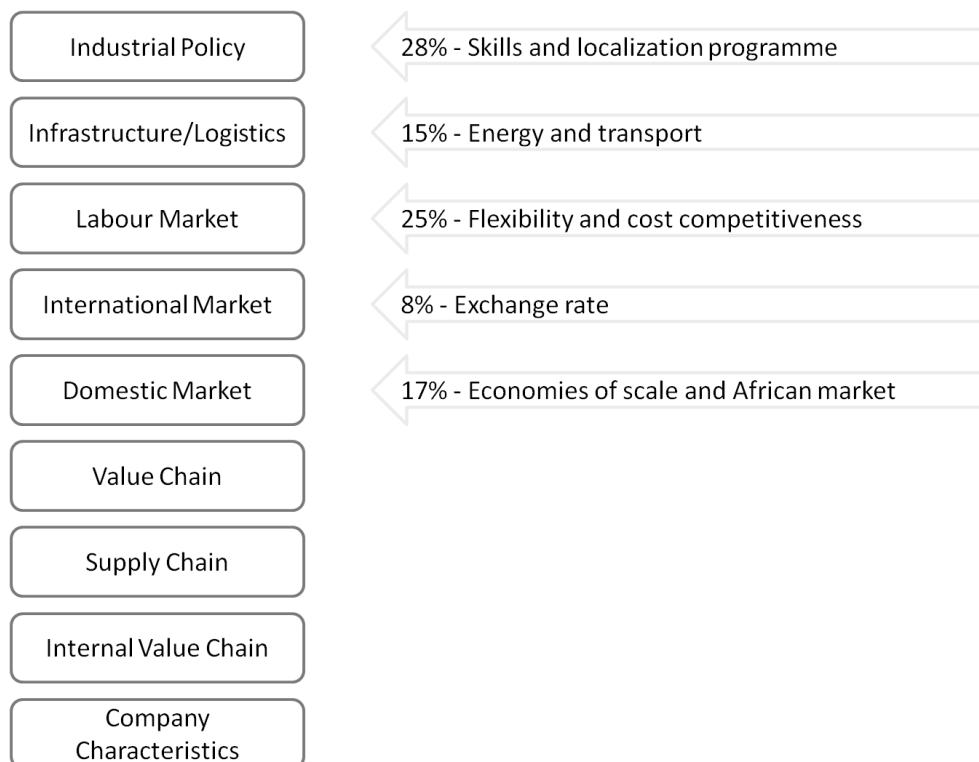
The strengths of the South African automotive industry can be related to five attributes of the conceptual model (see Figure 7.11). 30 per cent of the entries are related to the internal value chain of a supplier company. The major advantages of the South African suppliers can be seen in their production flexibility as well as in their manufacturing quality. 21 per cent of the entries see South Africa's infrastructure with the stable financial system and the good IT infrastructure as a strength of the automotive industry. The new industry's support programme (the Automotive Production Development Program) and the stable environment in South Africa are seen as another strength for the local South African automotive component industry. 15 per cent of the entries of the respondents see the related attribute of industrial policy as a strength. Additionally, the industry's establishment and the presence of international players are regarded as positive characteristics of the South African automotive industry. Respectively, 12 per cent of the entries are mentioned regarding the named characteristics.



**Figure 7.11: Qualitative comments of survey respondents with regard to strengths of the South African automotive industry**

#### 7.4.4.4 ISSUES

The most important issue in the South African automotive industry was shown to be related to industrial policy (see Figure 7.12). The respondents named the availability of skills and the need for a localisation programme as the most pressuring factors with 28 per cent of the entries. The next issue is related to the labour market and was indicated by 25 per cent of the respondents. The call for labour flexibility and increased cost competitiveness (which relates to labour productivity) was named. The third issue is tied to the domestic and regional African market. 17 per cent of the respondents mentioned that economies of scale in the domestic market and better access to the African market through trade agreements are an issue. The South African infrastructure with regard to energy supply and the availability of suitable transport and logistics for the products of the automotive industry were mentioned by 15 per cent as the fourth issue. With regard to international money markets, the exchange rate is regarded as an issue in the automotive industry. Due to the exposure of the suppliers to the global value chain, 8 per cent of the respondents referred to the stability of the exchange rate.



**Figure 7.12: Qualitative comments of survey respondents with regard to issues of the South African automotive industry**

#### 7.4.4.5 SYNTHESIS

In the qualitative sections, a major role is played by factors and issues on the macro- and meso-levels, whereas the quantitative data shows that the majority of factors for economic sustainability are tied to the micro- and meso-levels. There seems to be a difference between the perception of the stakeholders and the actual data in the automotive value chain. This is quite an interesting fact and will be discussed further in the next section.

## CHAPTER 8

### CONCLUSION

#### 8.1 INTRODUCTION

Up until now, the research has described the sustainability problem of local automotive component suppliers with respect to the South African automotive value chain. The following theories and key points considering the role of automotive component suppliers have been discussed:

- Trends in the automotive industry with a focus on globalisation and the location of production
- The South African automotive industry with regard to the current status, historical development and structural challenges
- The automotive value and supply chain with respect to governance issues
- The market access and upgrading strategies for local suppliers in emerging markets

The theoretical aspects have been used to identify factors for the economic sustainability of local suppliers in the South African automotive value chain in order to build a conceptual model. The factors of the conceptual model have been structured according to their system and governance levels in order to provide a structure on the micro-, meso- and macro-levels of the research problem. The conceptual model proposes that the factors that are translated into independent variables have an influence on the dependent variables that constitute economic sustainability.

The model has been assessed and confirmed in the qualitative research. Consequently, the conceptual model has been tested with modelling data from primary research in the South African automotive component value chain. The analysis of the data leads to the research objectives where the influence of the factors on a firm level is assessed. The evaluation of the conceptual model will be discussed in Section 8.2.

Sections 8.3 and 8.4 deal with the secondary objective of the research, which aims to show factors for the economic sustainability of automotive component suppliers, which should improve or change. This is addressed by using the qualitative data. Therefore, the focus group, the semi-structured interviews and the qualitative data from the survey are analysed according to patterns with regard to issues in the South African automotive value chain, and particularly the supplier industry. In combination with the descriptive statistics from the quantitative data the status of the South African component supplier industry can be shown as well.

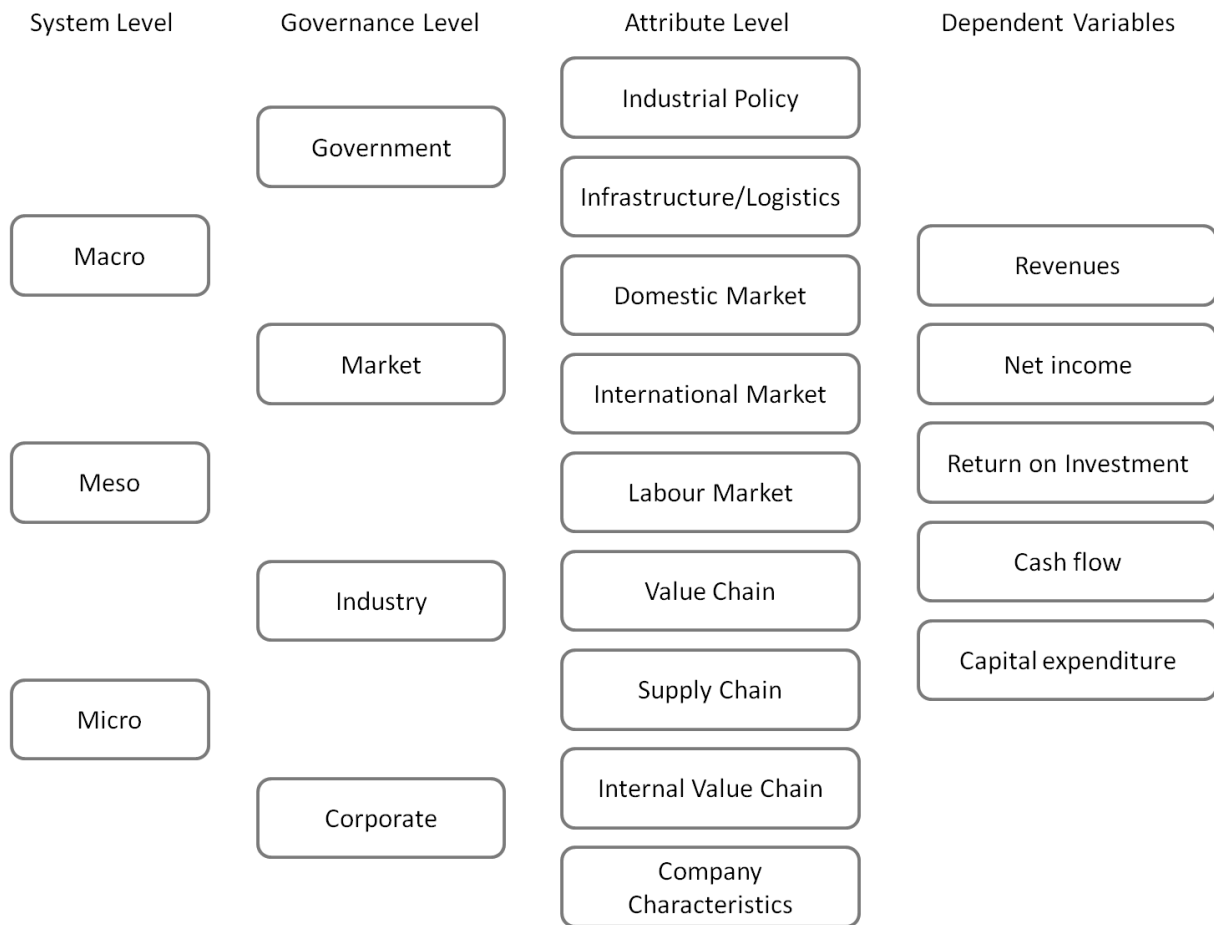
The limitations and implications for further research are presented in Section 8.5.

## 8.2 THE EVALUATION OF THE MODEL

The proposed conceptual model has been tested in two ways:

- Qualitative research: A focus group and semi-structured interviews confirmed the conceptual model with minor changes. Changes had been recognised especially on the macro-level, where the influence of industrial policy and other governmental issues were added. The structure of the model with respect to the system and governance levels is proven in the qualitative research.
- Quantitative research: A firm-level survey was employed to gather the relevant modelling data. This data was used to test the influence of the proposed factors on economic sustainability by analysing the correlations between each independent and dependent variable. The correlations were used to test the effectiveness of the factors on the economic sustainability, but not all of the factors could be confirmed. This fact needs further investigation. Nevertheless, significant and underlying dimensions of local supplier sustainability were established.

In order to further structure the model, attributes were introduced that were identified by the main patterns with regard to theory and practice. These latent variables have to be tested and confirmed in further research. At this stage they are used to decompile the complexity of the conceptual model. The revised and structured research can be presented in the following illustration (see Figure 8.1).



**Figure 8.1: The model for the sustainability of local suppliers in the South African automotive value chain**

Furthermore, the qualitative research can be used to identify significant and underlying dimensions on the macro-, meso- and micro-levels of local supplier sustainability. As stated earlier in the findings section, a conclusion can be made with regard to the major patterns of correlation between the independent variables (the proposed factors for economic sustainability) and the dependent variables. Significant correlations can be found on each system and governance level, which shows that the economic sustainability of automotive component suppliers is influenced by:

- long-term goals on sustainability and growth on a macro-level;
- medium to short-term goals on geographical and sectoral optimisation on the meso-level; and
- short-term goals on shareholder maximisation on the micro-level.

It can also be concluded that the economic sustainability of an automotive component supplier firm in South Africa is not only governed (and therefore influenced) by market forces and corporate performance, but it is also affected by regulations and activities on the government level and factors that are controlled on the industry level.



In terms of dominant patterns of the influence on the economic sustainability, it can be concluded that factors connected to the automotive value chain, the corporate performance and the infrastructural environment play the dominant role.

### 8.3 IMPLICATIONS FOR THEORY

The research contributes to theory in the following ways:

- The development of a conceptual model where the factors for the economic sustainability of automotive component suppliers in emerging markets is aggregated and structured.
- The testing of the model in terms of integrity and totality with qualitative industry data.
- The identification of factors that influence the measures of economic sustainability through primary quantitative industry data.
- The discussion of the status of the South African automotive component suppliers with regard to the factors of economic sustainability.

The uniqueness of the approach derives from the fact that the relevant parts of the theoretical aspects are subsumed in an overarching model. This model is developed in order to include and allow for the specifics of the automotive industry as well as those of emerging markets (in this case, South Africa). The answers and solutions offered by the research are more tied to the 'what' is contributing towards the research objective than to the 'how' of the characteristics of the research problem. This means that further research is needed to investigate the effectiveness of the conceptual model. In conclusion, it can be stated that the research summarises the theoretical aspects with regard to the research problem and builds up a holistic approach as a problem solution.

An interesting conclusion of the analysis of the qualitative and quantitative data is that the main patterns differ substantially in direction. The qualitative data identifies factors on the government level (and, therefore, predominantly on the macro-level) with regard to the economical sustainability of the South African automotive component suppliers, whereas the quantitative section of the research points towards factors on the corporate and the industry levels (mainly on the micro- and meso-levels). This could mean that the subjective interpretation of the stakeholders from the quantitative research – in this case, the automotive component suppliers – points towards more governmental regulation and attendance in the South African automotive industry. Nevertheless, theory and this research tell a different story. The quantitative data shows that the major factors of economic sustainability derive from the corporate and industry levels and are accompanied by infrastructural factors on the government level. An answer to this phenomenon could arise from differences between developing and developed countries. Due to the historical

development of the South African automotive industry and the history of protection of the domestic industry, the call for governmental support could be inherent in the industry. It must also be stated that the survival of the South African automotive industry in the medium to long term is at least partially dependent on government regulations and initiatives, as the quests for economies of scale and increased competitiveness must be supported by national structures and regulations. Nevertheless, the immediate responsibility lies with the industry and especially with the OEMs and suppliers as a major part of the automotive value chain.

#### 8.4 IMPLICATIONS FOR PRACTICE

The following discussion points to the conclusion of the more practical applications of the research. However, the practical issues are tied to the theoretical implications and will be related to these:

- Local content: Despite the local content requirements and demands for increased local content by government and industry, the negative relation of local content to revenue and cash flow of a supplier firm shows another direction. Hence, it must be concluded that the current dependencies on local content are caused by deficiencies in local supply chain in terms of technological capabilities.
- Logistics cost: Due to the fact that the South African automotive industry is dependent on export volumes to achieve sufficient economies of scale, the state of the country's transport infrastructure needs attention. Additionally, the fact that the logistics cost shows a disproportional function to the revenue of a supplier firm indicates that the cost (and productivity) of the South African infrastructure providers must be questioned.
- Markets: The research data reveals that locally owned suppliers are more dependent on the domestic market than internationally owned suppliers and those with incoming foreign direct investment. These latter two groups make use of their international production and sales networks, and generate higher export volumes, which make them more independent in the South African domestic market. Additionally, it can be recognised that the use of export markets seems to be more efficient when these export markets are located in free trade agreement areas.

- Value chain positioning and governance: Positive effects on economic sustainability can be recognised when the supplier is operating on the second or third tier levels (leads to higher return on investment compared to first tier level or aftermarket). It can also be noted that higher revenues are generated by suppliers that have more international ties (as mentioned above), but there is no conclusion on the financial productivity measures with regard to foreign equity. In terms of value chain governance, the automotive suppliers should try to establish the relational or market types of governance, as these offer the highest return on investment expectations. This positioning of the supplier's firm in the automotive value chain must be seen in relation to the types of products which the supplier feeds into the value chain. The fact that most of the products of the South African automotive suppliers are on a component basis, and that products by locally owned suppliers also represent standardised products, puts the suppliers in a specific position in the automotive value chain. From a value chain governance view, the standardised component relates to the market type of governance, whereas a specialised component would belong to the relational type of governance.
- Fragmentation: The location of production and the presence in the market play a substantial role in supplier sustainability. The research data shows that proximity to customers, the establishment of sales offices and representatives, and ultimately the membership in a production cluster have positive implications on the economic sustainability of a firm in the automotive value chain in South Africa. Especially the cluster development should be promoted by government and industry in order to achieve efficiencies through linkages in the supply chain and transfer of capabilities between international and local suppliers. Additionally it can be found that supplier development activities are directly related to higher revenues in the industry. On the one hand, these activities could be related to supplier development and, therefore, the opportunity to upgrade own capabilities and qualify for the lead firm's supply chain. On the other hand, it could mean that the own supply chain has been developed and, therefore, qualified to serve into the automotive value chain.

Another contributory factor for practice is presented by pointing out the status of the South African automotive value chain with the focus on the supplier component industry. By doing this, conclusions can be made to factors that should change or improve in the immediate environment of the supplier, as well as to factors that are situated at the industry, market and government levels.

## 8.5 LIMITATIONS AND IMPLICATIONS FOR FURTHER RESEARCH

The main limitation of the research derives from the limited data available for the South African automotive value chain with respect to the component suppliers. In order to overcome this limitation, primary research was undertaken, but it must be found that the gathered data cannot be used for the generalisation of the findings. Nevertheless, the findings give clear indications and direction because of the structure of the respondents and the firms.

Due to the limitations in the completeness of the responses in the survey the analysis of the data is also limited – and, therefore, the validation of the research by quantitative means. This means that in general the principal causality of the model and variables is tested. For further analysis with a regression or factor analysis the data is not satisfactory because of the fact that especially financial data has not been supplied by the respondents due to company policies and secrecy issues.

In order to solve the issue of limited data it is necessary to get access to or create other data sources. Only by integrating information from different data sources on the national, industry and firm levels can a repeatability of the study be achieved. These data sources should also be able to supply data on the macro- and meso-levels in order to incorporate the factors that cannot be translated into firm-level variables. The next issue relates to benchmarking figures that are needed to evaluate the measures for economical sustainability. Access to data from the developed countries and other emerging markets are needed in order to make judgements and discuss developments.

In addition to the limitations with regard to the data, there are several research requirements with regard to the further development of the conceptual model. Despite the complexity of the model, it should be possible to update the model by integrating new factors and removing old factors. In addition, it is worthwhile incorporating the OEMs' view and environmental aspects into the model. This should be done in order to cope with the developments in the automotive value chain. Furthermore, the dependent variables need to be advanced in order to take into account revenue, cost and financial structures.

As mentioned above, the longitudinal approach of the survey should be used in further research. This would incorporate the time factor and allow for growth observations. Through this dynamic approach, implications of the different governance levels could be identified in order to improve the factors for the economic sustainability.

## APPENDIX AND ATTACHMENTS

### ***Appendix A: Discussion guide for Focus Group and Interviews***

Produced by: Solutionworkshop (Venetia Amato) and Christian Nitschke

Last Change: 12.10.2010

*This guide is to be used during the conducting of the focus groups. It will be used to keep structure to the group, however if certain topics are raised that need further investigation, this should be done.*

#### INTRODUCTION (10 min)

- Welcome everyone and get each to introduce themselves
- Each can explain their positions and how long they have been in their current position
- Explain purpose of the study, objectives and duration

#### GENERAL INDUSTRY PROBE (10 min)

- What is the SA automotive industry like at the moment?
  - Probe general issues
  - Probe the feelings around this
- What generally are the opportunities and threats for the SA automotive industry currently and looking towards the future
- How sustainable are local suppliers in this industry?

#### TRENDS (15 min)

- What are the global trends that are currently happening in this industry?
- How is this related to SA / Is SA following these trends?
- What are the regulation trends that are happening nowadays?

- Are there any supplier issues that need addressing locally?
- Any infra-structural issues that are affecting the industry locally?
- Are major production increases expected with the start of the APDP in 2013? (*an estimated guess*)

#### THE MODEL / INFLUENCES (60 min)

- Let us now take a look at the holistic model that is being put forward
  - On the right, there is a block – “*sustainability of local suppliers*” and in there are 3 contributors to economic sustainability, namely: *revenue growth, net income growth and return on investment*
  - *Do we all accept that this is the case and these 3 aspects do all contribute to sustainability?*
- If we look at how this model works – there are 3 groups or categories, namely MACRO, MESO and MICRO
- Within each of these is a list of contributing aspects / factors which we need to discuss
- Let’s start on the MACRO level
  - What issues are there around government that are impacting on economic sustainability of this industry (*Probe each as depicted on the model*)
    - (*probe each as depicted on the model*)
    - Determine whether it does impact?
    - To what extent it impacts?
    - What else will impact that is not on this list? In other words, is anything missing from this list?
- Repeat discussion - on the MESO level, what market or Industry issues are there that are impacting on this industry / influencing it (*probe each as depicted on the model*)
  - (*probe each as depicted on the model*)
  - Determine whether it does impact?

- To what extent does it impact?
- What else will impact that is not on this list? In other words, is anything missing from this list?
- On the MICRO level, what issues are there on a corporate level that are impacting on this industry, influencing it
  - (*probe each as depicted on the model*)
  - Determine whether it does impact?
  - To what extent it impacts?
  - What else will impact that is not on this list? In other words, is anything missing from this list?
- What are the influences of the stakeholders (government, OEM, international suppliers, customers) on the local supplier base

#### SA MARKET

- Is there a viable space for locally owned suppliers in the future SA automotive value chain? / Does this differ for internationally owned suppliers who distribute locally
- What has to be done to increase the competitiveness of locally owned SA automotive suppliers and how will this be supported?
- What are the strategic and operational options for locally owned suppliers in SA?

#### THE FUTURE

- What are the feelings regarding the following:
  - Will the local content claims by the OEM's be achieved (60 per cent to 80 per cent) and will the overall competitiveness of the SA market rise with higher local content

- What are the inefficiencies that need to be addressed in the SA automotive value chain
  - Give examples and describe
  - How could these be addressed – get specific solutions if possible

Thank respondents for participation



## Appendix B: Questionnaire

*Development of a model for the sustainability of Local Suppliers in the South African automotive value chain*



Dear Sir or Madam

Thank you very much for taking part in the survey in advance!

Please note the following information:

- If your company policy does not allow to state financial figures (like ROI, etc.) please leave out these questions - your answers to the other questions are still highly valuable and appreciated!
- The survey is part of a PhD-study at the University of Stellenbosch Business School and complies with academic requirements
- The results will add value to your company and the whole industry (please see attached document: [Survey](#))
- It will be highly appreciated if you can finish the questionnaire until 17th February 2011
- You will need financial information about your company and your products
- You will also need some supply chain and logistic figures
- All questions refer to the year 2009 or today if not stated differently
- Please state only integers and rounded off figures to make the use of the questionnaire easier
- Please take the units of measurement which are stated in the questions into account
- All information is anonymous and confidential and cannot be linked to you or your company
- You are more than welcome to forward the survey-link to suppliers which are not organized within NAACAM
- The results of the survey will be available in a "raw-format" end of February 2011 so that you might use them for your planning process in this year
- As soon as there is a further analysis of the results available it will be distributed through NAACAM and can also be requested at the contact below
- Additionally there is the offer that you can get an electronic version of the full PhD-dissertation in the course of 2011

If you have any feedback on the survey or experience problems while doing it you can send an email to [christian\\_nitschke@web.de](mailto:christian_nitschke@web.de) or call on 071 579 2295.

Additionally you can contact Dr. Jan Havenga - he is the supervisor of the PhD-study - [janh@sun.ac.za](mailto:janh@sun.ac.za) or 084 588 8884.

*Development of a model for the sustainability of Local Suppliers in the South African automotive value chain*



**1. Please indicate your current position in the company.**

- MD
- CEO
- Senior Management
- Other: Please specify

**2. Please indicate the age of your company today.**

*[in years]*

- 1-3
- 4-5
- 6-10
- 11-20
- 21 and older

**3. Please indicate the type of ownership of your company.**

*This question relates to the equity holders in your company.*

- Locally owned South African supplier
- Locally owned South African supplier using international patents/licences
- Joint Venture (JV) of locally owned South African and international supplier
- Internationally owned supplier

**4. If internationally tied please indicate the FDI (Foreign Direct Investment) in the last 5 years.**

*[in Mio. ZAR]*

- 0
- 1-10
- 11-50
- 51-100
- 101-200
- >200

**5. Please indicate the overall number of employees in your company today.**

*[Number of employees]*

- <10
- 10-30
- 31-50
- 51-100
- 101-250
- 251-500
- >500

**6. Please state the percentages of the following categories of your employees in 2009 - compared to the total number of employees.**

	Temporarily Workers [in %]	Labour Broker Employees [in %]	Graduates [in %]
2009	<input type="text"/>	<input type="text"/>	<input type="text"/>



- 0
- 1-2
- 3-4
- 5-6
- 7-8
- 9-10
- 11-15
- 16-20
- >20

**14. Please state the cost for "Social Commitment" in 2009.**

*This includes cost for BEE, HIV/AIDS, Training and other ethically and/or socially related points.*

*[in Mio. ZAR] for 2009*

- 0
- 1-2
- 3-4
- 5-6
- 7-8
- 9-10
- 11-15
- 16-20
- >20

*Development of a model for the sustainability of Local Suppliers in the South African automotive value chain*



**15.**

**Please rate your market presence.**

*Please use the following scale.*

Website	Sales Representative(s)	Sales Offices	
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	2	3	N/A

**16.**

**Please rate your membership in a production cluster.**

*Please use the following scale.*

No Cluster	Regional Cluster	Supplier Park	
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	2	3	N/A

**17.**

**Please rate the impact of your geographical distance to current & potential customers on your business success.**

*Please use the following scale.*

no impact	medium impact	high impact	
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	2	3	N/A

**18.**

**How would you rate the Supplier-Customer linkages in terms of information flows in your business.**

*Please specify your general impression.*

not sufficient		sufficient		value adding			
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
1	2	3	4	5	6	7	N/A

**19. Please state the category of your main customers or the type of market you operate in.**

- OEM
- Tier-1
- Tier-2
- Tier-3
- Aftermarket
- Non-Automotive
- Other: Please specify

**20. Please state the number of competitors in your market.**

*This question relates to the South African market. Nevertheless, when you are an export-focused business please refer to global competition.*

- 1-2
- 3-4
- 5-6
- >6

**21. Please state your market share for 2009.**

*[in %] for 2009*

- 1-10
- 11-20
- 21-30
- 31-40
- 41-50
- 51-60
- 61-70
- 71-80
- 81-90
- 91-100

Development of a model for the sustainability of Local Suppliers in the South African automotive value chain



**22. Please categorize your TOP-product.**

Please indicate from a revenue point of view.

Select:

**23. Please complete the following questions with regards to your TOP-product.**

Please refer to the subcategories.

A list of Product names/types is supplied here: [Type/Name of Product](#)

Local content of product [in %]	Raw material content of product cost [in %]	Sales to domestic customers [in %]	Classification of product	Standardization category of your product							Name/Type of TOP-Product. (e.g. Battery, Axle, etc.)		
				Standard			Customized			Special			
				1	2	3	4	5	6	7		n/a	
TOP-Product <input type="text"/>	<input type="text"/>	<input type="text"/>	Select: <input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text" value="Product"/>

**24. Please state the cost involved with Standardization in Quality and Product for 2009.**

Quality standardization is related to standards like ISO TS 16949 and ISO 9001-x.  
Product standardization relates to industry, environmental and regulatory standards.

[in Mio. ZAR] for 2009

- 0
- 1-5
- 6-10
- 11-15
- 16-20
- 21-25
- 26-30
- >30

Development of a model for the sustainability of Local Suppliers in the South African automotive value chain



**25. This question relates to the operational performance of your business in 2009.**

Please state the answers accordingly to the subcategories.

The subcategories involve questions with regards to Cost Control, Quality, Value Chain Flexibility and Value Chain Reliability.

	Total inventory levels (Raw material, WIP, Finished Goods) [in Mio. ZAR]	Customer return rates [0km ppm]	Lead time to customer from production (Domestic customer) [in days]	Lead time to customer from production (International customer) [in days]	Overtime delivery [in %]
2009	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

**26.**

How many of the production stages for your main product(s) is/are available locally?

Example: If a production process includes 5 stages and 3 of them are available locally, it would be 60%.



**27. Please state the amount of Supplier development activities you have received and/or invested in 2009.**

	Received [in days per year]	Given [in days per year]
2009	<input type="text" value="0"/>	<input type="text" value="0"/>



**Development of a model for the sustainability of Local Suppliers in the South African automotive value chain**



**28. Please indicate the type of governance you experience in the value chain you are involved in.**  
Please refer to the following illustration and state the classification from a supplier point of view.

For an illustration click here [Governance](#).

- Market: Commodity supplier who supplies standard products and the relationship is based on arm's length markets
- Modular: Turn-key supplier who supplies customized products but is using a modular production network to serve different customers
- Relational: Similar to modular but more complex interactions are needed and mutual interdependence to customers is existent
- Captive: Supplier who supplies non standard products which are solely customized to the buyer's needs

**29. Please state the number of Horizontal Upgrades in the Value Chain your company has done in the last three (3) years.**

Horizontal upgrade means for example that a new product categories was developed.

- 0
- 1-2
- 3-4
- 5-6
- 7-8
- 9-10
- >10

**30. Please state the number of Vertical Upgrades in the Value Chain your company has done in the last three (3) years.**

Vertical upgrade means for example that an additional production stage was developed.

- 0
- 1-2
- 3-4
- 5-6
- 7-8
- 9-10
- >10

**31. Please state the overall number of products in your portfolio and the total volume of units.**

This questions asks for the economies of scale in your business.

Example: 10 different products (e.g. one product customized for each customer so that is has to be produced seperately) with a total volume of 100.000 units per year for all products.

	Number of products [in full numbers]	Total units per year of all products [in Units]
2009	<input type="text"/>	<input type="text"/>

**32. Please state the investment in Supply Chain Capabilities and Collaboration in 2009.**

This includes cost for improvements in IT to improve information flows as well as in Tools/Hardware to improve physical flows.

[in Mio. ZAR] for 2009

- 0
- 1-2
- 3-4
- 5-6
- 7-8

- 9-10
- 11-15
- 16-20
- 21-25
- >25

**33. Please state the Logistic Cost of your business in 2009.**

*[in % of Revenues] for 2009*

- <1
- 2-5
- 5-10
- 11-15
- 16-20
- 21-25
- 26-30
- >30

Development of a model for the sustainability of Local Suppliers in the South African automotive value chain



**34. Please state your Revenues in 2009.**

*[in Mio. ZAR] for 2009*

- <25
- 25-100
- 101-250
- 251-500
- 501-750
- 751-1000
- >1000

**35. Please state your Domestic Revenues as of Total Revenues in 2009.**

*[in %] of Revenues for 2009*

- 0
- 1-25
- 26-50
- 51-75
- 76-100

**36. Please state your Revenues in Free Trade Areas (FTAs) as of Total Revenues in 2009.**

**FTAs refer to AGOA (USA), SADC and partially EU.**

*[in %] of Revenues for 2009*

- 0
- 1-25
- 26-50
- 51-75
- 76-100

**37. Please state your R&D expenditures as of Total Revenues in 2009.**

*[in %] of Revenues for 2009*

- 0
- <1
- 1-3
- 4-6
- 7-10
- >10

**38. Please state your HR-Training expenditures as of Total Revenues in 2009.**

*[in %] of Revenues for 2009*

- 0
- <1
- 1-3
- 4-6
- 7-10
- >10

**39. Please state your Net Income in 2009.**

*[in Mio. ZAR] for 2009*

- < or = 0
- 1-25
- 26-50
- 51-75
- 76-100
- 101-250
- >250

**40. Please state your Return on Investment (ROI) in 2009.**

*[in %] for 2009*

- < 0
- 0.0 - 2.5
- 2.6 - 5.0
- 5.1 - 7.5
- 7.6 - 10.0
- 10.1 - 15.0
- > 15

**41. Please state your Capital Expenditure (CAPEX) in 2009.**

*[in Mio. ZAR] for 2009*

- 0
- 1-25
- 26-50
- 51-75
- 76-100
- 101-250
- >250

**42. Please state your Operating Cash Flow in 2009.**

*[in Mio. ZAR] for 2009*

- < or = 0
- 1-25
- 26-50
- 51-75
- 76-100
- 101-250
- >250

**43. Please state your Capacity Utilization in 2009.**

*[in %] for 2009*

- 0
- 1-25
- 26-50
- 51-75
- 76-100

*Development of a model for the sustainability of Local Suppliers in the South African automotive value chain*



**44. What is your opinion on the factors of a model for the economical sustainability of local South African automotive suppliers?**

*Please state the three most important points and explain shortly.*

- Factor 1:
- Factor 2:
- Factor 3:

**45. What are the STRENGTHS in the South African automotive value chain compared to other developing/emerging markets and how can they be retained to prepare the industry for a sustainable future?**

*Please state the three most important points and explain shortly.*

- Strength 1:
- Strength 2:
- Strength 3:

**46. What are the ISSUES in the South African automotive value chain compared to other developing/emerging markets and what should change and/or improve to prepare the industry for a sustainable future?**

*Please state the three most important points and explain shortly.*

- Issue 1:
- Issue 2:
- Issue 3:

*Development of a model for the sustainability of Local Suppliers in the South African automotive value chain*



Thank you very much for participating in the survey – you have added value and impact!

Please give any feedback you might have to Christian Nitschke – [christian\\_nitschke@web.de](mailto:christian_nitschke@web.de) or 071 579 2295.

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