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**ON THE BRINK? SKILLS DEMAND AND
SUPPLY ISSUES IN THE SOUTH AFRICAN
AUTOMOTIVE COMPONENTS INDUSTRY**

**Sector Studies
Research Project**

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On the brink?

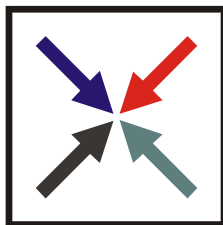
Skills demand and supply issues in the South African automotive components industry

HSRC Research Report

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Foreword

This research report has been compiled for the Human Sciences Research Council (HSRC), at its request for the completion of a sector report focusing on the skills development challenges within the South African automotive components industry. Benchmarking and Manufacturing Analysts SA (Pty) Ltd (B&M Analysts), as the HSRC's contracted research company, was responsible for the completion of the project and hence the content and production of this report.

It is important to acknowledge that a team of consultants at B&M Analysts supported the authors responsible for compiling this report. The contribution made by Mr Sean Ellis, Mr Revern Sasti and Ms Elaine Reddy is hereby acknowledged.

Whilst every care has been taken to ensure the accuracy and integrity of the data and analysis presented in this report, B&M Analysts and its staff members take no responsibility whatsoever for decisions derived from its content.

Contents

Foreword.....	1
Contents	1
Acronyms.....	4
Introduction	6
The changing operating environment.....	6
Report structure.....	6
Research methodology	8
1. Profile of the international and South African automotive industries	10
1.1. Present sector profile.....	10
1.1.1. Overview of the global automotive value chain	10
1.1.2. Location of the automotive industry.....	13
1.1.3. Sales	14
1.1.4. Major production categories.....	15
1.1.5. Major export categories	15
1.1.6. Profile of firms by ownership.....	17
1.1.7. Profile of firms by size.....	18
1.1.8. Profile of employment	19
1.1.9. Employment and racial breakdown.....	20
1.1.10. Operating profile.....	21
1.2. Recent performance	22
1.2.1. Investment trends.....	22
1.2.2. Return on Investment levels	23
1.2.3. Employment growth	23
1.2.4. Turnover growth.....	24
1.2.5. Skills expenditure.....	25
1.2.6. Competitiveness development.....	25
1.2.7. Product development trends.....	26
1.3. The MIDP	27
1.3.1. Introduction	27
1.3.2. Technical parameters of MIDP	27
1.3.3. The MIDP and Component Manufacturers.....	30
1.3.4. Outlook for the MIDP	30
1.4. Summary of the South African automotive industry's present strategic position	31
2. Skills demands in the South African automotive components industry – 2010 and 2015.....	34
2.1. Background Research on Industry Skill Demands.....	34
2.2. Labour force composition: Status quo	35
2.3. Labour force composition projections: 2010 and 2015	36

2.3.1.	<i>Growth Trends: 2001 to 2006</i>	37
2.3.2.	<i>Extrapolated growth trend to 2010 and 2015</i>	37
2.3.3.	<i>Calculating the employment growth rate to 2010 and 2015</i>	39
2.4.	Extrapolated skills demands: 2010 and 2015	41
2.4.1.	<i>Anticipated skills demands based on employment creation and employee turnover rates</i>	42
3.	Skills supply into the South African automotive industry	46
3.1.	TEI and FET Graduates.....	46
3.2.	Key Support Institutions.....	47
3.2.1.	<i>Nelson Mandela Metropolitan University</i>	48
3.2.2.	<i>Tshwane University of Technology</i>	48
3.2.3.	<i>University of Pretoria</i>	49
3.2.4.	<i>Rhodes Investec Business School</i>	50
3.2.5.	<i>University of KwaZulu-Natal</i>	50
3.2.6.	<i>Durban University of Technology</i>	51
3.3.	Evaluation of Institutions.....	51
3.3.1.	<i>Institutions favoured by firms when recruiting key technical skills</i> 51	
3.3.2.	<i>Institutions avoided by firms when recruiting for key technical positions</i> 52	
3.4.	Skills deficiencies noted in firm-level interviews	53
3.4.1.	<i>Current skills deficiencies</i>	54
3.4.2.	<i>Anticipated Skills Demands to 2010</i>	55
3.4.3.	<i>Average recruitment lead times</i>	56
3.5.	Reflections on future skills deficiencies in the components industry57	
3.5.1.	<i>Absolute and Relative Scarcities</i>	57
3.5.2.	<i>Employee Retention</i>	57
3.5.3.	<i>Salary Issues</i>	58
3.5.4.	<i>Training of Personnel</i>	58
3.6.	Summarising skills supply issues in the South African automotive components industry	59
4.	Scarce and Critical Skills Identification	63
4.1.	Defining ‘scarce’ and ‘critical’ skills	63
4.2.	Identifying Scarce and Critical Skills in the South African Automotive and Components Industry	64
4.2.1.	<i>Scarce and Critical Skills : The firm-level findings</i>	64
4.2.2.	<i>MERSETA Sector Skills Plan</i>	65
4.2.3.	<i>DoL National Scarce Skills List</i>	66
4.3.	Comparisons between the findings of the DoL, MERSETA and firm-level research	67
5.	Conclusions	68

References	71
Primary sources	71
<i>Firm Interviews:</i>	71
<i>Industry Representatives:</i>	71
<i>Primary Documents:</i>	71
Secondary sources.....	72
Expanded bibliography	74
Appendix A: Market Share by OEM (2005).....	76
Appendix B: Breakdown of Vehicle Exports by Destination (2005).....	77
Appendix C: Breakdown of Component Exports by Destination (2005)	78
Appendix D: Top 11 Parts and Components Imported (in R millions)	79
Appendix E: Key Academic Support Institutions to the SA Auto Industry	80
Appendix F: Schedule of Interview Questions	81

Acronyms

ABET	Adult Basic Education and Training
ACIS	Automotive Competitiveness Investment Scheme
AECDP	Automotive Experiential Career Development Programme
AGOA	African Growth and Opportunity Act
AIDC	Automotive Industry Development Centre
AIEC	Automotive Industry Export Council
ANC	African National Congress
ASGISA	Accelerated and Shared Growth Initiative South Africa
BBBEE	Broad Based Black Economic Empowerment
BEE	Black Economic Empowerment
CBU	Completely Built Unit
CKD	Completely Knocked Down
COSATU	Congress of South African Trade Unions
CPI	Consumer Price Index
CSIR	Council for Science and Industrial Research
CV	Commercial Vehicle
DAC	Durban Automotive Cluster
DFA	Duty Free Allowance
DoL	Department of Labour
DPRU	Development Policy Research Unit
DTI	Department of Trade and Industry
EBIT	Engineering, the Built Environment and Technology
ECSA	Engineering Council of South Africa
EMS	Environment Management Systems
EU	European Union
FDI	Foreign Direct Investment
FET	Further Education and Training
FRIDGE	Fund for Research into Industrial Development Growth and Equity
GDP	Gross Domestic Product
GSP	General System of Preferences
HBU	Historically Black Universities
HET	Higher Education and Training
HRD	Human Resources Development
HRDS	Human Resources Development Strategy
HSRC	Human Sciences Research Council
IAMER	Institute for Advanced Manufacturing and Engineering Research
ICS	Investment Climate Survey
ICT	Information Communication Technology
IEC	Import Export Complementarity
IRCC	Import Rebate Credit Certificate
ISETT	Information Systems, Electronics and Telecommunications Technologies
ISO	International Standards Organisation
JIPSA	Joint Initiative for Priority Skills Acquisition
JIT	Just-in-time
MERSETA	Metals Engineering and Related Services Education and Training Authority
MIBCO	Motor Industry Bargaining Council
MIDC	Motor Industry Development Council
MIDP	Motor Industry Development Programme
MNC	Multinational Company
NAACAM	National Association of Automotive Component and Allied Manufacturers
NAAMSA	National Association of Automotive Manufacturers of South Africa
NAFTA	North American Free Trade Agreement
NMMU	Nelson Mandela Metropolitan University
NPI	National Productivity Institute
NQF	National Qualifications Framework
NSA	National Skills Authority

NSDA	National Skills Development Authority
NSDS	National Skills Development Strategy
NSF	National Skills Fund
NTI	National Tooling Initiative
NUMSA	National Union of Metalworkers of South Africa
OEM	Original Equipment Manufacturer
OES	Original Equipment Supply
OFO	Organisational Framework of Occupations
OICA	International Organisation of Motor Vehicle Manufacturers
PAA	Productive Asset Allowance
PDI	Previously Disadvantaged Individual
PGM	Platinum Group Metals
ppm	Parts per million
QMS	Quality Management Systems
R&D	Research and Development
RIBS	Rhodes Investec Business School
ROI	Return on Investment
SAABC	South African Automotive Benchmarking Club
SACU	South African Customs Union
SADC	South African Development Community
SAQA	South African Qualifications Authority
SETA	Sectoral Education Training Authority
SDA	Skills Development Act
SLA	Service Level Agreement
SMME	Small Medium and Micro Enterprises
SSP	Sector Skills Plan
TEI	Tertiary Education Institution
TIKZN	Trade and Investment KwaZulu-Natal
TMC	Toyota Motor Corporation
TSA	Toyota South Africa
UCT	University of Cape Town
UKZN	University of KwaZulu-Natal
USA	United States of America
WITS	University of Witwatersrand
ZAR	South African Rand

Introduction

The changing operating environment

The automotive assembly and components industry is the leading manufacturing sector in South Africa. This is evident across a range of broader economic and more specific firm-level competitiveness Key Performance Indicators (Barnes and Black, 2004). However, notwithstanding the successes of the South African automotive industry over the last few years, it is presently under severe competitiveness pressure. As revealed in a recent **Financial Mail Special Report** (August 31, 2007), titled 'On the Brink', the industry appears to be at a crossroads of sorts, with growing international competitiveness pressures, local policy issues and a perceived lack of firm-level competitiveness, blending together into a potentially dangerous cocktail that could undermine the industry's future development.

This summary of the industry's present position may sound dramatic, but the automotive industry's progress to date is no guarantee of its continued growth. Supported in large part by the benefits of the Motor Industry Development Programme (MIDP), benefits that are slowly being reduced, the industry still represents work in progress – away from its highly closeted past and towards a far more open domestic and international trading environment. As such, its success or failure over the next few years is likely to be a litmus test for the South African manufacturing sector more generally.

To put it rather simplistically:

- If the South African automotive industry is successful, then it is likely to prove that South Africa is capable of manufacturing high value added products for discerning local and global markets
- Conversely, if the industry fails, then serious questions are likely to be raised in respect of South Africa's high value adding manufacturing capabilities

This research report is therefore more than simply an exploration of skills demand and supply issues in the South African automotive components industry. It is a report that explores the South African institutional environment's ability to supply a high value adding manufacturing industry that has been identified through both ASGISA and the National Industrial Policy Framework as a priority sector within the domestic economy, with the requisite human capital to sustain its growth over the next three and eight year periods.

Report structure

Structured into five sections, this report endeavours to present an understanding of the skills challenges confronting the South African automotive components industry as it grapples with international competition, a changing policy environment, substantial domestic market growth, surging imports, South Africa's transformation imperative, and finally, increasingly demanding customers that are squeezing component firms on both price and non-price factors.

The first section is contextual. It outlines international and South African automotive trends, South Africa's automotive policy framework (in particular the Motor Industry Development Programme) and the profile characteristics of South African automotive component manufacturers. Whilst a virtual smorgasbord of issues are discussed in this section, it is necessarily broad insofar as a wide variety of issues are presently shaping the South African automotive industry generally, and the automotive components industry more specifically, and it is essential that these be understood.

The second section then outlines the changing nature of skills demands in the South African automotive components industry. Drawing extensively on South African Automotive Benchmarking Club (SAABC) and National Association of Automotive Component and Allied Manufacturers (NAACAM) data, overall employment growth within the industry is projected to 2010 and 2015, along with a disaggregated perspective on employment growth in particular high skills employment categories, namely management, professional skills and artisans. A breakdown of the skills profile within each of these employment categories is also presented, providing a projection on skills demand within the domestic automotive components industry to 2010 and 2015. As revealed in this section, employment growth will continue over the next three and eight year period, although the rate of this growth is expected to be slower than experienced over the period 2001 to 2006. Substantial additional demand for new skills will however be evident, driven partly by employment growth, but interestingly, more so by employee attrition rates.

Section Three shifts the focus of the report to skills supply issues within the industry. This section considers graduation numbers in South Africa, some of the key Tertiary Education Institutions (TEIs) supporting the industry; and then based on 12 firm-level interviews straddling each of the automotive components industry's 12 sub-sectors, considers the particular skills supply issues confronting the industry. In this regard, focus is given to recruitment lead times, perceptions of the skills levels of graduates from particular institutions, and more general sentiments relating to skills supply issues into the industry.

This section is gravely concerning, revealing long recruitment lead times for priority skills, the perception of deteriorating performance in this regard over the last few years, and an expectation that this will deteriorate even further into the future. As revealed in this section, the TEI and Further Education and Training (FET) environment appears to be failing the automotive components industry, with only a few institutions perceived as offering suitably qualified graduates (in insufficient numbers); although it is equally striking that South African based automotive component manufacturers do not spend as much on employee development as their international counterparts, thus perpetuating the institutional deficiencies noted.

Building on the skills demand and supply issues unpacked in Sections 2 and 3, as well as the contextual findings presented in Section 1, Section 4 interrogates the critical skills deficiencies identified by the Department of

Labour and the MERSETA, and compares them against the findings of the primary research completed for this report. As revealed in this section, there is a high level of alignment between the various analyses of skills deficiencies in the automotive industry. This is in itself very concerning however, with skills gaps widening over the last few years, despite the desperate need for interventions being noted as far back as 2001.

A short conclusion that focuses on the analytical implications of the findings generated in the first four sections completes the report. Before considering the various research findings, it is necessary to reflect on the research methodology employed for the study, as outlined below.

Research methodology

Given its multiple objectives of providing an overview of the performance profile of the South African automotive assembly and components industry, and then assessing skills related issues, the research methodology employed for the study encompassed an interrogation of both firm-level data and secondary published research. As a cross-disciplinary project, the research completed also incorporated several methodological tools, including both qualitative and quantitative research methods.

In recognition of the fact that the automotive report would be one of many reports compiled for the HSRC, as part of its broader agenda of wanting to understand priority skills issues in various economic sectors, planning of the study's scope and structure commenced in February 2007 in a brainstorming session with HSRC coordinators. The aims and objectives of the project were outlined and authors of the respective sector reports allocated. The research design of individual sector reports was however largely left to the discretion of individual contributors.

Structured qualitative interviews were then conducted with Human Resources representatives from 12 South African automotive components firms in June and July 2007. The primary aim of these interviews was to ascertain the formal qualifications of employees¹, the fundamental skills shortages experienced within the industry, and which scarce and critical skills were likely to be undersupplied in the near future². Of these 12 firms, three can be classified as 'small' firms, and were regarded as such for the purposes of the research, whilst interviews were also spread across the country, and across each of the automotive component industry's 12 sub-sectors³. From these interviews, key skills data was compiled electronically and analysed for critical trends emerging throughout the sector. Although the firms in question vary greatly in terms of number of employees, qualifications, sub-sector of

¹ This includes the various tiers of management, as well as professional staff, artisans, and production workers.

² See Appendix F for the complete interview schedule.

³ The 12 sub-sectors are discrete (i.e. completed and functional) components, electronics, foundries and forges, glass, harness assembly, injection moulding, Just-in-Time assembly, metal forming, metal fabrication, precision machining, trim components, tyre and rubber.

operation, etc., this was not considered a hindrance in any way, but rather a confirmation of the broad profile of the sector.

For a quantitative perspective, critical measurement data was extracted from the South African Automotive Benchmarking Club (SAABC) database. This database is comprised of firm-level benchmarking data from 75 South African automotive component manufacturers that are member firms of the SAABC. The data used in the study generally covered the 2001-2006 period, except in particular instances where this was not possible – due to data unavailability. With regard to the projected employment data to 2010 and 2015, this was generated through an estimation model created by B&M Analysts, as explained in Section 2.

Concurrent to these two primary research activities, researchers undertook a comprehensive literature review, focusing on primary and secondary material relating to the automotive industry. The majority of the primary literature reviewed related to policy texts from the national government departments, as well as reputable industry stakeholders, such as NAAMSA, NAACAM and OICA. Secondary material consisted of recent academic reports and automotive articles in daily newspapers, weekly financial magazines, and industry-specific magazines. The purpose of this was to ascertain the current profile of the automotive and components industries - domestically and internationally. Previous research reports compiled by B&M Analysts were also revisited. Regarding the skills literature review, an extensive list of primary and secondary material was consulted. The former category consisted largely of government initiatives, legislation, and departmental reports. In the latter category, a number of academic reports were reviewed, as well as current material from periodicals and short commissioned reports from within the South African business community.

The findings presented in this report are therefore based on a meaningful and comprehensive cross-section of data, interviews and secondary research material.

1. Profile of the international and South African automotive industries

This Section comprises four parts. The first section outlines the existing profile of the international and South African automotive assembly and components industries, focusing on the present structure of international value chains, particular competitiveness pressures, and the existing structure of the South African industry. The second section then explores the recent performance of the South African automotive industry, focusing on both economic and firm-level competitiveness data. The fourth section then shifts focus away from performance levels to an overview of the Motor Industry Development Programme (MIDP), the government architecture that has guided the development of the South African automotive industry since 1995. The final section concludes the Section by summarising the major findings presented, and unpacking the implications for skills development within the South African automotive components industry.

1.1. Present sector profile

1.1.1. Overview of the global automotive value chain

As the world's largest manufacturing sector, the automotive industry accounts for approximately 15% of global gross domestic product (GDP) (OICA, 2005). In value terms, this equated to US \$645 billion in 2003. This figure is moreover expected to reach US \$903 billion by 2015 (MPL and Bentley West, 2005). Unsurprisingly, given its scale of operation, the automotive industry is one of the largest employment sectors globally. OICA estimates that the industry is responsible for one in nine jobs in developed countries. At a broader level, OICA estimates that approximately 8.8 million (primarily skilled) jobs are directly linked to the automotive manufacturing sector worldwide (OICA, 2005).

The last 10 years have witnessed increased industry consolidation through mergers, acquisitions and alliances (MPL and Bentley West, 2005). This trend towards global integration has been propelled by ever lower trade barriers (in line with individual countries' World Trade Organisation commitments), the increasing dominance of regional trade blocs, as well as the increasingly global strategies of the major international firms that dominate the industry.

Although production and sales continue to be concentrated in the Triad economies of North America, Western Europe and Japan, these economies have been plagued by production overcapacity (exceeding 20% of market demand), cost pressures and low profitability. At the same time, the share of developing countries in global production and exports has increased substantially due to expanding markets in these developing regions, as well as the drive by global automotive firms to source both assembled vehicles

and components from these cheaper locations. In fact, in recent years developing countries have begun to outperform their Northern competitors in increases in sales and production in absolute terms (Humphrey and Memedovic, 2003).

Against this context, South Africa presently ranks 19th among the world's vehicle producing nations (NAAMSA, 2005: 9) - holding a 0,79% market share of global vehicle production, and recently securing growth rates ahead of even China. By far the largest vehicle manufacturer in Africa, South Africa produced 525,271 units in 2005, while Egypt, the continent's second-largest producer, manufactured a mere 69,223 units (Barnes and Comrie, 2007).

The South African automotive industry's sales, as well as indicators relating to export, employment and capital investment all reflect robust recent performance, as well as an increasing contribution to the domestic economy (Barnes and Comrie, 2007), although year to date performance through 2007 has been far less positive. According to the National Association of Automobile Manufacturers of South Africa (NAAMSA), the vehicle and component manufacturing industry represents the largest manufacturing sector in the South African economy, accounting for approximately 28% of national manufacturing output (NAAMSA, 2006). The Department of Trade and industry (DTI) reports that the automotive industry contributed 7.4% to the South African GDP in 2005 (DTI, 2006a), which was exceeded only by the mining and financial sectors. Furthermore, productivity has improved rapidly, and there is considerable evidence of improvement in a range of benchmarks, such as quality, reliability and operational shop floor efficiency (Barnes and Kaplinsky, 2001, Barnes and Morris, 2007).

1.1.1.1. Original Equipment Manufacturers

A producer-driven value chain, the global automotive industry is comprised of three broad market segments: Original Equipment Manufacturers (OEM), Original Equipment Suppliers (OES)⁴, and the independent aftermarket. OEMs include passenger, commercial vehicle and bus manufacturing, in addition to component sales through dealerships (MPL and Bentley West, 2005). The International Organisation for Motor Vehicle Manufacturers (OICA) identifies 49 vehicle manufacturers throughout the world, 15 of which can be considered internationally significant, defined as producing substantially more than one million units per annum (OICA, 2005). Ten of these 'major player' OEMs have manufacturing operations in South Africa⁵, or manufacture locally in partnership with another OEM (Barnes and Comrie, 2007). Furthermore, a number of smaller global OEMs have Commercial Vehicle (CV) manufacturing facilities in South Africa (e.g. MAN, Scania, Volvo).

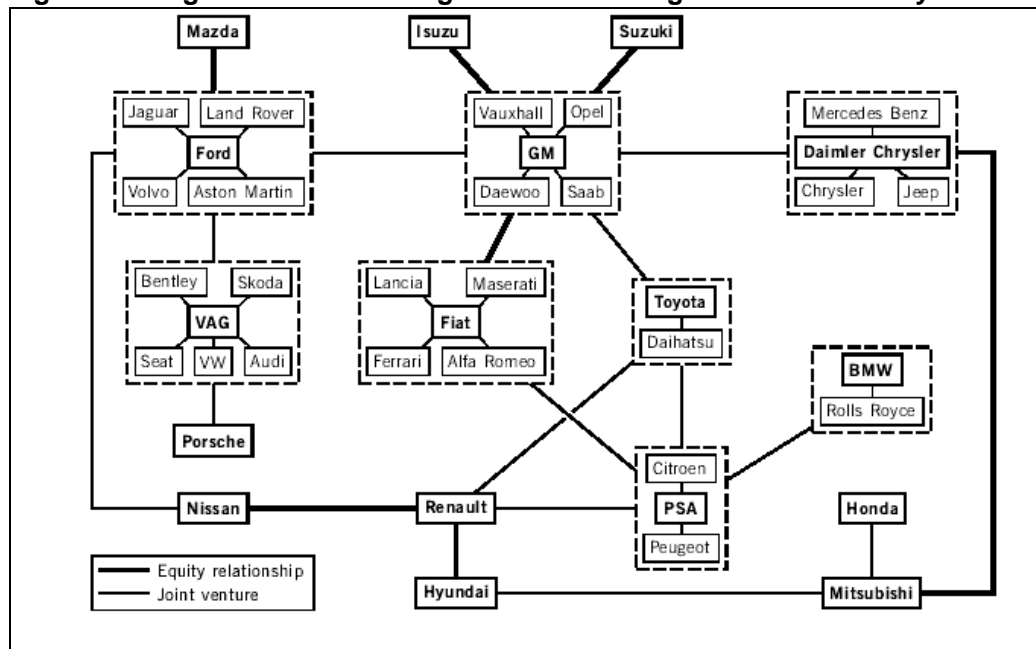
⁴ Original Equipment Suppliers (OES) sell their products to the OEMs, as well as through the vehicle assemblers' official dealerships – as opposed to independent used vehicle dealerships, wholesalers and vehicle repair outlets (the independent aftermarket).

⁵ These include: BMW, Nissan, Fiat and Ford (incorporating Mazda, Land Rover and Volvo), Volkswagen, DaimlerChrysler, General Motors and Toyota.

The network of major OEMs and their associated alliances in 2003 are presented in Figure 1. Interestingly, whilst the majority of linkages remain a number of important changes have taken place over the last four years:

- DaimlerChrysler have terminated their 'merger', with Chrysler acquired by a private equity fund in early 2007. Daimler and Chrysler are therefore presently operating as two stand-alone organisations. Daimler has also reduced its equity holdings in Mitsubishi and Hyundai.
- Ford has sold Aston Martin to a private shareholder in the United Kingdom, and has been attempting to sell Jaguar and Land Rover to potentially interested parties. Apart from private equity funds, the two OEMs that have shown the most interest in acquiring the two 'British' brands are Tata and Mahindra of India.
- General Motors has substantially reduced its shareholding in both Isuzu and Suzuki. It only holds nominal shares in these two companies, with Toyota now in fact owning even more Isuzu shares than General Motors (although still below 10% of its share capital)

Figure 1: Mergers and dominating alliances in the global auto industry in 2003



Source: Dicken, 2003

Finally, whilst not reflected in the graphic above, the recent emergence of Chinese vehicle manufacturers is another notable development within the global automotive industry. Firms such as Shanghai Automotive, Dongfeng, Geely and Cherry, have rapidly established themselves as volume producers in the growing Chinese market, whilst also expanding their export presence in a number of developing economies.

1.1.1.2. Tier One and Tier Two Suppliers

As the size and scope of the global vehicle assemblers expands, so too do the operations of their major component suppliers. As an illustration of their substantial recent growth, in 2004, the eight largest multinational component

manufacturers⁶ reported combined sales in excess of US \$150 billion — for an average of \$21.9 billion — as opposed to a mere \$13.2 billion in sales in 1997 (Barnes and Comrie, 2007). Importantly, moreover, each of these firms has a subsidiary, joint venture, or licensee operation in South Africa.

South Africa has approximately 278 Tier 1 component suppliers, and over 300 Tier 2 and Tier 3 suppliers. These tier classifications indicate the manufacturers' role in the automotive value chain. First tier suppliers produce components that are supplied to the vehicle assemblers and aftermarket retailers (MPL and Bentley West, 2005). Tier 2 and Tier 3 suppliers then provide a range of parts to Tier 1 supplier and assemblers. As international automotive production has become increasingly globalised, South African firms have progressively opted to merge with the strategic operations of their parent companies. In turn, this has progressively led to the foreign sourcing of components. In the case of the local production of components, there is therefore a decreasing presence of locally owned component suppliers, and very few component suppliers using local technology (Barnes and Kaplinsky, 2000).

Barnes *et al* (2003) argue that despite substantial progress made in recent years, the local components sector has not yet met the operational standards of the “global frontier”, although the upper tier of South African component suppliers operate at levels that are very close to this frontier (Barnes et al., 2003). Furthermore, based on detailed firm-level benchmarking data extracted from the South African Automotive Benchmarking Club (SAABC) database, it is encouraging that the upper quartile of South Africa's major components exporters outperforms the upper quartile of leading international firms in certain areas.

1.1.1.3. Independent Aftermarket

NAAMSA reports that the South African vehicle ‘parc’⁷ is currently eight million units — a considerable jump from 6.9 million units of just four years ago (Barnes and Comrie, 2007). As a result of the sizeable growth of the South African vehicle market, the market for accessories and replacement components has likewise matured. This independent aftermarket consists of the manufacture and sale of replacement and accessory parts through independent retailers and repair shops directly to the consumer, as opposed to the vehicle assemblers (Barnes and Morris, 2003).

1.1.2. Location of the automotive industry

The South African vehicle assemblers and supporting component manufacturers are located in four hubs/clusters within South Africa:

- KwaZulu-Natal (primarily Durban, but also Pietermaritzburg), which is home to Toyota's assembly plant, South Africa's largest producer of vehicles, and approximately 20% of the automotive components industry.

⁶ These include: Bosch, Delphi, Denso, Magna, Johnson Controls, Visteon, Lear, and Aisin Seiki (Barnes and Comrie, 2007: 14).

⁷ Number of vehicles operating

- Port Elizabeth/Uitenhage, which is home to General Motors and Volkswagen, and about 30% of the automotive components industry.
- East London, which is the residence of Daimler's assembly plant and roughly 6% of the automotive components industry.
- Gauteng (Rosslyn, Silverton and Erkhuleni), which has the largest concentration of automotive manufacturing in South Africa, with three OEMs (BMW, Ford and Nissan) and approximately 40% of the South African automotive components industry.

There are also a handful of component manufacturers in the Western Cape, making up about 4% of the automotive components industry.

1.1.3. Sales

Domestic vehicle sales for 1995-2005 show strong growth, as evidenced in each category of vehicle sold (DTI, 2006a). In this time frame, vehicle exports grew from 15,764 units to 139,912 units (Barnes and Comrie, 2007). Between 2004 and 2005, the volume of new vehicle sales increased by 25,7%, culminating in an all-time record of 617, 000 new vehicle sales, making South Africa the best performing market internationally, at least in terms of its percentage growth rate (DTI, 2006a). Industry analysts therefore agree that recent production growth has been underpinned by strong demand in the domestic market, as well as robust export sales.

1.1.3.1. Domestic vehicle sales

In 2005, South African local automotive sales, inclusive of retail and manufacturing sales, totalled R 138 billion, while component exports totalled R 23 billion and vehicle exports R 22 billion (Barnes and Comrie, 2007).

In terms of market share, sales continue to be dominated by long-established players in the domestic market. With 26 years of domestic market dominance, Toyota holds a 20.5% market share, while Volkswagen, General Motors and Ford also enjoy a sizeable market presence of between 12% and 16% share (Barnes and Comrie, 2007). Daimler Chrysler, Nissan and BMW enjoy market shares of between 4% and 10%, although BMW holds a particularly coveted position due to dominance of the premium market. Among the importers⁸, Renault, Tata and Peugeot enjoy the highest market share at 3.2%, 1.8% and 1.5% respectively (ibid).

The greatest proportion of vehicles sold in South Africa (51.6%) fall under the Model Segment C categorisation (e.g. Toyota Corolla), a market segment that is largely dominated by rental car company, government and fleet purchases. Segment D (e.g. BMW 3-Series) and Segment B (e.g. VW Polo) are also significant at 16.4% and 14.2% of the total market respectively (Barnes and Comrie, 2007). Individually, the biggest selling light vehicle models in South Africa are the Toyota Corolla, VW Polo, VW Citi Golf, Toyota Hilux, BMW 3-Series, Toyota Yaris and VW Golf (Barnes and Comrie, 2007). With the

⁸ Some importers such as Kia and Hyundai do not report their sales figures to NAAMSA.

exception of the Toyota Yaris, all of these models are primarily manufactured in South Africa.

1.1.3.2. Imports

South African vehicle imports have increased considerably under the Motor Industry Development Programme's (MIDP) import-export complementation mechanism, as well as the growth of the domestic market. In 1995, a mere 27,289 units were imported into South Africa. This figure grew to 139,975 units in 2004, before jumping a further 69.4% in 2005, reaching a total of 232,091 imported units (NAAMSA, 2006). These imports of CBUs are primarily from Germany (34%), Japan (17%) and South Korea (10%), whilst smaller volumes are imported from France (7%), Spain (6%), the UK, the U.S., India and Australia (3-5%), amongst others (NAAMSA, 2006).

In 2005, imports of Light Commercial Vehicles (LCVs) increased to 37.6% of total domestic new vehicle sales, compared to 28.3% the previous year (NAAMSA, 2006).

1.1.4. Major production categories

South African vehicle production volumes have increased steadily since 1995, despite a slight downturn in 1998. This positive sales trend is evident for each category of vehicle sold, inclusive of passenger vehicles, light commercial vehicles (LCV)⁹, medium commercial vehicles (MCV), and heavy commercial vehicles (HCV)¹⁰ (Barnes and Comrie, 2007). The DTI divided local vehicle production for 2005 by vehicle type, with passenger cars comprising 324,875 units, followed by light commercial vehicles with 172,522 units, heavy trucks with 26,727 units, and buses with 1,147 units (DTI, 2006b).

It should be noted that the increased production volumes enjoyed by South African vehicle assemblers has been achieved in part due to the reduction in the total number of vehicle platforms produced. In 1995, there were a total of 42 platforms produced in South Africa and this reduced to 22 in 2005 (NAAMSA, 2006). By 2006, there were five models produced in volumes exceeding 40,000 units, while just ten years prior, there had been none. Consequently, the average number of units produced per model at each OEM has risen from 10,745 to 22,594 units (ibid.).

1.1.5. Major export categories

The South African automotive industry exported passenger cars and commercial vehicles to 80 countries in 2005 (NAAMSA, 2006). Exports of CBUs reached 139,912 units in 2005, a figure that is projected to nearly double to 250,000 units in 2007 due to the introduction of a new generation of export programmes by certain OEMs (DTI, 2006b). In Rand terms, 2005 vehicle exports reached R 22 billion, as compared to R 17.5 billion the previous year (NAAMSA, 2006).

⁹ This includes bakkies and minibuses (NAAMSA, 2006).

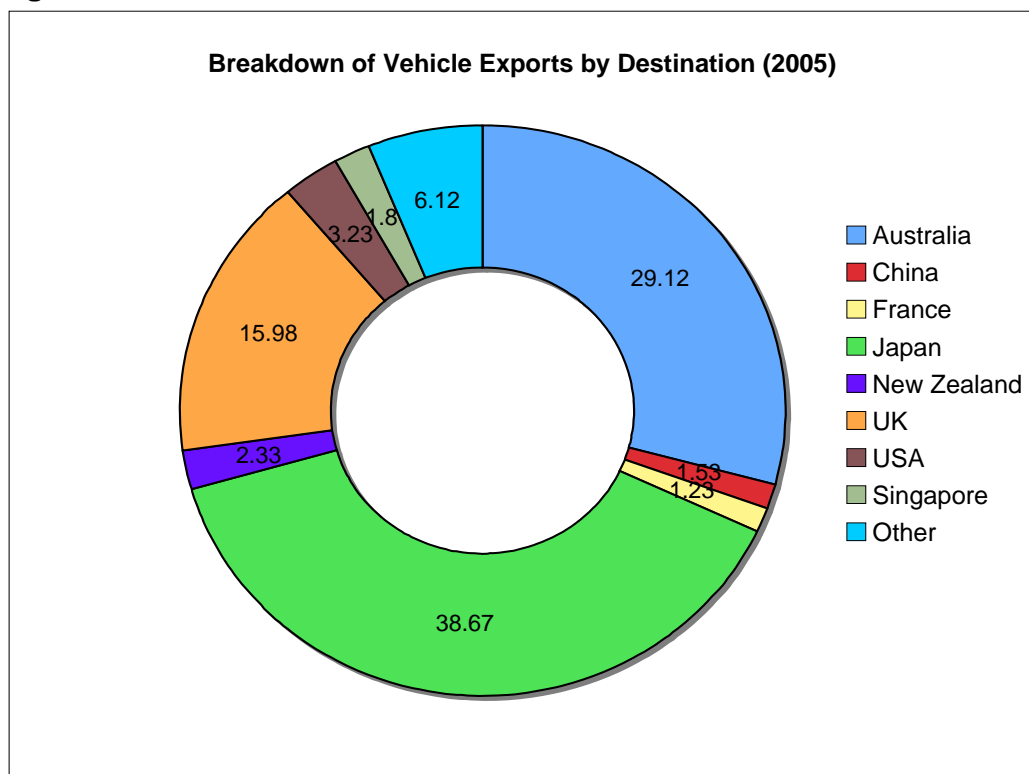
¹⁰ Including trucks and buses (ibid.)

The export capabilities of the South African vehicle assemblers are witnessed in the principal destinations of the units produced. In 2005, new car and light commercial vehicle exports were primarily destined for Japan (35%), Australia (24%), and the United Kingdom (20%) (NAAMSA, 2006). The European Union (EU) was the recipient of 23.6% of South African new car and LCV exports, followed by the Southern African Development Community (SADC) (4.2%), and North America (3.7%) (ibid.). South African based OEMs therefore primarily export their products to discerning developed economy markets, renowned for their fastidious standards, with the Japanese market, in particular, noted for its exceptionally high quality demands.

Major vehicle export platforms (and their destinations) include:

- Toyota Corolla (Australasia)
- Volkswagen Golf (Australasia, UK)
- Volkswagen Polo (Australasia, UK)
- Mercedes Benz C-Class (Japan, Australia)
- BMW 3-Series (Japan, Australia, UK, USA)
- Toyota Hilux (Western Europe, Africa)
- Ford Focus (Asia)

Figure 2



Source: NAAMSA, 2006

In addition to vehicles, major automotive exports include catalytic converters, stitched leather components and seat covers, engines and engine parts, tyres, road wheels, automotive tooling, wiring harnesses, silencers and exhausts, and automotive safety glass, amongst others (NAAMSA, 2006).

However, the biggest contributor to the South African automotive component export sector is the catalytic converter manufacturing industry, which exports over 12 million converters each year, valued at over R 9,8 billion (DTI, 2006b) in 2005. This industry represents nearly 40% of total automotive component exports from South Africa, while producing approximately 14% of the global output of catalytic converters (ibid.).

Consistent with the vehicle export data, South African manufactured components are exported worldwide (NAAMSA, 2006), although Germany emerges very clearly as the most important destination for component exports in 2005, at 36.9% of all exports by value (Barnes and Comrie, 2007). This was followed by exports to a variety of European Union (EU) member states (including the United Kingdom, Spain and France, with each receiving between 8 and 10% of total exports) and the USA (receiving 7.4% of total exports) (ibid.).

Interestingly, 2005 marked the beginning of a new wave of export programmes, which were announced or implemented by vehicle manufacturers, and exports of South African vehicles increased by the sizeable margin of 29,405 units (or 26.6%) — compared to the previous year (NAAMSA, 2006). The major driver of this new export thrust has been Toyota SA, which presently has large volume exports of its Hilux model into the European Union, soon to be followed by the next generation Corolla. After reducing its exports through 2006 and early 2007, Daimler will also be ramping up its new C-Class export programme through the latter part of 2007 and early 2008. Export incentives and the MIDP in particular will be discussed in further detail in *Section 1.3*.

1.1.6. Profile of firms by ownership

The ownership structure of the South African automotive industry is one of its most distinctive features. Prior to the 1990s, major OEMs typically operated licensed operations in South Africa, with the exception of German companies (BMW, Mercedes and Volkswagen) (UNCTAD, 2002). Presently, all of the South African based OEMs are wholly or partly owned by their respective parent companies in Japan, the United States of America, or Europe. Toyota, Ford, Daimler-Chrysler, Nissan and General Motors have all acquired their South African operations since 1990, while BMW and Volkswagen have maintained their 100% equity holding in their South African operations (Barnes and Comrie, 2007).

The evolving ownership profile of South African based OEMs is presented in Table 1. As highlighted, of the eight South African OEMs, seven are now wholly foreign-owned multinationals, while Toyota South Africa is 75% owned by Toyota Motor Corporation of Japan, with Wesco Investments Ltd locally owning the remaining 25% (DTI, 2006b). This is moreover expected to change over the next few years, with Toyota Motor Corporation likely to acquire full equity sooner rather than later. When this happens every South African based OEM will be a full subsidiary of a Multinational Corporation (MNC).

Table 1: Changing ownership structure of South African based OEMs

South African assembler	Ownership: 1990	Ownership: 1998	Ownership: 2007	Ownership: 1990 to 2007
Toyota	100% local (listed on Johannesburg Stock Exchange)	Local: 72% (JSE listed), Toyota (Japan): 28%	Toyota: 75% Wesco (South Africa): 25%	<i>SA to MNC-dominated Joint Venture</i>
Volkswagen	Volkswagen AG: 100%	Volkswagen AG: 100%	Volkswagen AG: 100%	<i>MNC</i>
BMW	BMW AG: 100%	BMW AG: 100%	BMW AG: 100%	<i>MNC</i>
DaimlerChrysler	DaimlerChrysler (Mercedes Benz): 50%, Local 50%	DaimlerChrysler (Mercedes Benz): 100%	Daimler: 100%	<i>Joint Venture to MNC</i>
Ford	100% local (Anglo American)	Anglo American: 45%, Ford: 45%, Employee trust: 10%	Ford: 100%	<i>SA to MNC</i>
Nissan	87% local, Nissan Diesel: 4%, Mitsui and Co. (Japan): 9%	Sankorp (local): 37%, Nissan: 50%, Nissan Diesel: 4%, Mitsui: 9%	Nissan: 87%, Nissan Diesel: 4%, Mitsui: 9%	<i>Primarily SA to MNC</i>
General Motors	100% local (management)	Local managers: 51%, General Motors: 49%	General Motors: 100%	<i>SA to MNC</i>

Source: own interviews

Within the components domain, it is evident that the bulk of export expansion has not been by well established component manufacturers with a long history of operating in South Africa, but by an emergent group of primarily foreign-owned firms, frequently with connections to OEMs (UNCTAD, 2002). This extensive foreign ownership of vehicle assemblers and components manufacturers, as well as the close links developed with parent companies has helped the industry integrate into international markets (UNCTAD, 2002). Furthermore, this growing global connectivity has undoubtedly facilitated technology and skill transfers, as well as other positive spillovers (ibid).

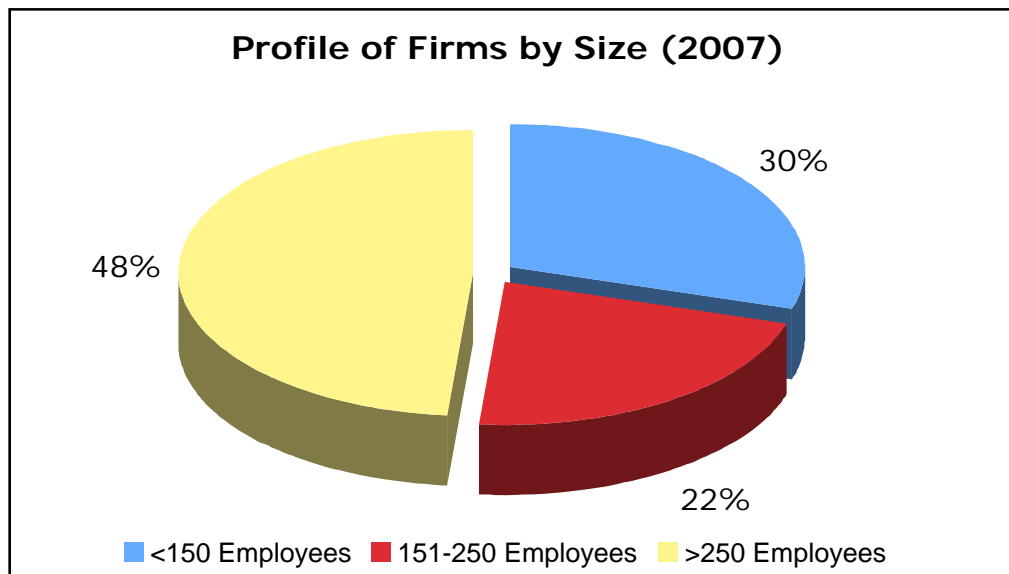
Based on firm numbers, approximately 63% of the South African automotive components industry comprises locally owned firms, while multinational companies (MNCs) own the remaining 37% (B&M Analysts, SAABC database). However, this is misleading. Given the substantially larger average output figures of the MNCs, they contribute at least 80% of the automotive components industry's total domestic and export sales. The ownership trend evident in the South African automotive components industry is moreover consistent with that for the OEMs, with MNCs having acquired a greater share of the industry over the last few years.

1.1.7. Profile of firms by size

According to data compiled by B&M Analysts on behalf of the SAABC in 2007, approximately 29.7% of South African automotive component manufacturers had less than 150 employees. A further 21.6% had between 151 and 250

employees, whilst the remaining 48.7% of firms had 251 or more employees (B&M Analysts, SAABC database). This is graphically depicted in Figure 3.

Figure 3



Source: B&M Analysts, SAABC database

1.1.8. Profile of employment

Since South Africa's political and economic transition in the early 1990s, employment in the automotive industry has made slow but steady gains. Looking at the 1993-1996 period, employment increased by 9.6%, but decreased by 13.8% from 1996 to 2002, despite some annual increases during the latter period (Barnes, et al, 2004). Although, on the aggregate, automotive employment declined by 5.6% from 1993 to 2002, these figures nevertheless compare favourably to the 7.7% employment loss recorded by the total manufacturing sector over this period (ibid). In the 2002-2006 period, the average total employment trend shows a consistent albeit gradual increase - according to both SAABC and NAACAM data.

According to a 2005 report commissioned by the Fund for Research into Industrial Development, Growth and Equity (FRIDGE), the South African automotive industry has been successful in generating employment over the last decade, although these gains were generally marginal. Employment figures for the industry increased from 102,164 employees in 1995 to approximately 111,000 in 2004. Over the 2001-2004 period, more companies reported job gains (as opposed to job losses), although this seemed to vary by company type. For example, while components manufacturers have experienced increased employment in recent years, OEM employment has declined (MPL and Bentley West, 2005). Although the study also found a substantial increase in non-permanent employment, this was largely influenced by a few companies, which employed large numbers of individuals on a non-permanent basis.

NAAMSA reported that in 2005, the vehicle manufacturing sector employed 34,305 people, while the component manufacturing sector employed 78,000 people (Barnes and Comrie, 2007). It should be noted, however, that this figure jumps substantially when including automotive retail employment with manufacturing employment — totalling 317,105 employees (Barnes, et al, 2004). According to NAAMSA, by the end of 2006, employment in the vehicle production industry had grown to 38,903 — the highest aggregate industry level in a decade (NAAMSA, 2006). NAAMSA attributes this employment growth to increased production associated with higher sales levels of domestically produced vehicles, and particularly the initiation of major vehicle export programmes (ibid).

With regard to employment profiling, there are a number of critical competitiveness indicators to be considered. Based on SAABC data, the national labour turnover rate is approximately 6.4%, a figure that compares favourably to the international firms benchmarked by B&M Analysts in 2006, which had a labour turnover rate of 9.0% (Barnes and Comrie, 2007). Again, with regard to national absenteeism¹¹, the South African average in 2005 was approximately 3,8%, as compared to the international firms that had rates of 4,2% (Barnes and Comrie, 2007). Moreover, SAABC firm-level data confirms that the national average rate of absenteeism has steadily declined over the past five years, from 4,7% in 2001 to only 3,3% in 2006 (B&M Analysts, SAABC database). The average rate of unionisation among employees has remained around 70% for the last five years (B&M Analysts, SAABC database).

1.1.9. Employment and racial breakdown

The table below uses SAABC firm-level data to illustrate the employment profile of automotive component manufacturers, as well as the racial profile of each employment category. For each category of employment, Table 2 outlines the average number of persons employed at an automotive component manufacturer, the average number of Previously Disadvantaged Individuals (PDIs) employed, and then finally the percentage of employment in that category that this PDI proportion represents. As depicted:

- The South African automotive components industry provides a healthy mix of both high-level and semi-skilled employment, with the average firm employing 10 managers, 11 professional staff, 19 supervisors, 16 artisans, 201 production workers, seven learners/apprentices and 32 administrators, clerks, etc. (classified as 'other').
- Whilst the vast majority of individuals employed in the automotive components industry are PDIs, the industry continues to struggle in respect of its employment equity profile, with only 17% of managers, 44% of professional staff, and 51% of artisans PDIs. More encouragingly, however, 77% of employees in learnerships or apprenticeships are PDIs.

¹¹ The absenteeism rate described here excludes holidays, but includes all compassionate and sick leave.

This suggests a likely change in the employment equity profile of the industry over the next few years.

Table 2: SA automotive components industry: Employment by category (2005)

	2005
Average management	10.20
Average PDIs in management	1.76
% PDIs	17.3
Average professional staff	10.75
Average PDIs in professional staff	4.68
% PDIs	43.5
Supervisors	19.44
Average PDIs in supervisory positions	12.49
% PDIs	64.2
Artisans	16.08
Average PDIs in artisans	8.30
% PDIs	51.2
Production Workers	201.16
Average PDIs in production	187.26
% PDIs	93.1
Apprentices/learners	7.20
Average PDIs in apprenticeships/learnerships	5.54
% PDIs	76.9
Other	31.96
Average PDIs in 'other'	22.24
% PDIs	69.5

Source: B&M Analysts, SAABC database

1.1.10. Operating profile

The average operating profile of South African based automotive component manufacturers is depicted in Table 3. As revealed, South African based automotive component manufacturers operate an average of 239 days per year, with an average of 2.1 shifts per day of 8.3 hours duration. By international standards, this is comparatively low. For example, international firms in the SAABC database work an average of 285 days per year on 2.4 shifts of 8.8 hours duration. This equates to each international firm working their factories a total of 6,021 hours per year versus only 4,168 hours at the South African based firms.

Table 3: Operating parameters of South African based automotive component manufacturers (n=75) versus international counterparts (n=72)

Operating parameter	SA average	International average
Average annual operating days	239.1 days/year	285.1 day/year
Average shifts per day	2.1 shift/day	2.4 shifts/day
Average hours per shift	8.3 hours/shift	8.8 hours/shift
Average annual operating hours	4,168 hours	6,021 hours

Source: B&M Analysts, SAABC database

In summary, this suggests that South African operations are not 'sweating' their assets as effectively as their international counterparts, thus requiring higher operating margins over the substantially less hours worked in order to secure a reasonable return on the often considerable investments that they have made.

1.2. Recent performance

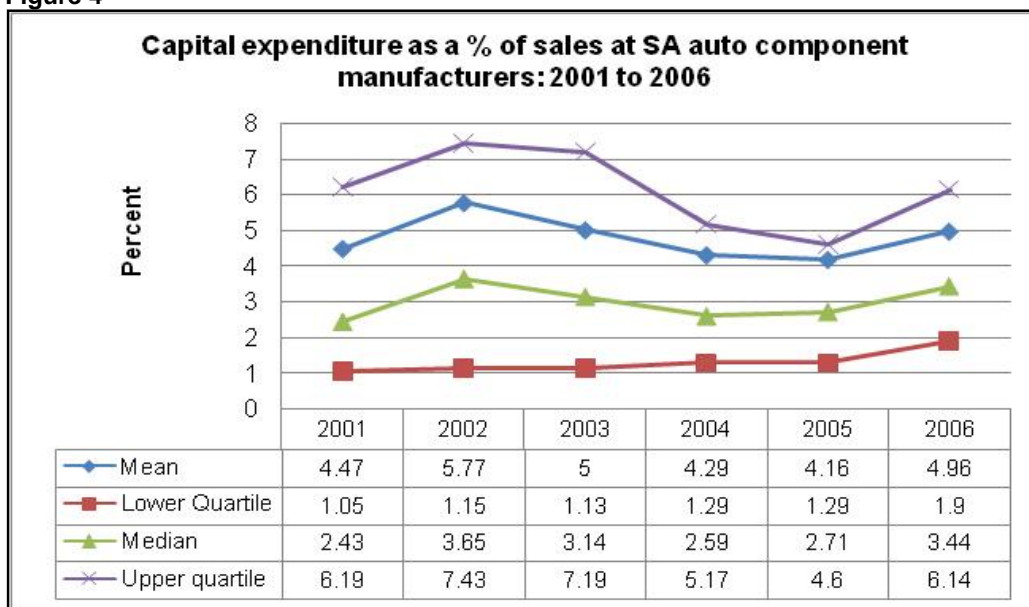
1.2.1. Investment trends

NAAMSA reports that capital expenditure amongst South African based OEMs increased to an impressive R 3,6 billion in 2005 — as compared to only R 2,2 billion in 2004, and a comparatively insignificant R 841 million in 1995 (NAAMSA, 2006).

SAABC data, on the other hand, reflects that average capital expenditure (expressed as a proportion of total turnover) increased from 4.5% at automotive component manufacturers in 2001 to a peak of 5.8% in 2002, and then declined steadily over three years, before increasing again to 5.0% in 2006 (B&M Analysts, SAABC database). This is clearly revealed in Figure 4, as is the fact that substantial variations in performance are evident. For example, the bottom 25% of firms in the SAABC database spent less than 2% of their turnover on capital expenditure, whilst the top 25% of firms spent more than three times this level, at over 6%. In terms of actual Rand values spent, capital expenditure at individual component manufacturers has increased from an average of only R 4.7 million per firm in 2001 to R 10.1 million in 2006. This represents an extremely healthy aggregated growth in capital investment within the automotive components industry, reflecting continued investment off a larger industry base.

According to COEGA, total capital investment by South African OEMs over the last few years has been in excess of R 20 billion, with investment in plant and equipment by the component supplier industry estimated to be in excess of R 10 billion (COEGA 2007).

Figure 4



Source: B&M Analysts, SAABC database

Both the South African automotive assembly and components industries have attracted significant foreign direct investment (FDI) in recent years. According to a recent UNCTAD study (2002) this FDI has usually translated into increased commitment from parent companies to their local subsidiaries, which should have led to a range of positive spillovers - technology transfers, skills development, and increased access to export markets. These findings are moreover consistent with the experience of FDI in previously South African owned firms that are members of the SAABC, many of whom have been acquired by multinational organisations over the last few years.

1.2.2. Return on Investment levels

Despite growing investment in the South African automotive industry, return on investment (ROI) levels at South African automotive component manufacturers has declined fairly steadily over the 2001-2006 period. According to SAABC firm-level data, after a slight peak to nearly 39% in 2002, ROI levels slipped to 28% in 2004, and then decreased again to less than 26% in 2006 (B&M Analysts, SAABC database¹²). Whilst ROI data is unavailable for South African based OEMs, a similar trend is likely, given global cost pressures and declining MIDP benefits (see below).

1.2.3. Employment growth

According to the DTI, the higher production levels of South African automotive and component manufacturing firms has led to significant improvements in capacity utilization within the industry, and therefore, improvements in job creation (DTI, 2006b). This is reflected in growing employment at South African based OEMs over the last few years, as well as growth amongst automotive component manufacturers over the same period. As depicted in

¹² B&M Analysts data is derived from the SAABC database. All statistics referred to as 'B&M Analysts SAABC database' refers to the database as of 07/07/2007.

Table 4, aggregated employment has grown from 18,947 in 2001 to 23,499 in 2006. Whilst this is extremely positive, signifying 24% growth in five years, a very minor decline in employment was recorded in 2006 relative to 2005 levels (0.2%). Whilst this represents an insignificant number of actual jobs lost (50 out of 23,549), it is striking that this is the first time in five years that jobs have been lost amongst the automotive component manufacturing members of the SAABC.

Table 4: Employment creation at SAABC members

	2001	2002	2003	2004	2005	2006
Total employment at SAABC members (n=75)	18,947	20,436	21,039	22,118	23,549	23,499

Source: B&M Analysts, SAABC database

1.2.4. Turnover growth

According to data generated by B&M Analysts on behalf of the SAABC, the majority of South African automotive component manufacturers have turnover above R 100 million per year. Table 5 illustrates the breakdown of turnover amongst South African component manufacturers, which reveals that only 9% of firms have turnover levels below R 30 million, with 26% between R 30 million and R 100 million, 38% between R 100 and R 250 million and the balance of 28% over R 250 million.

Table 5: Turnover of SA Automotive component manufacturers

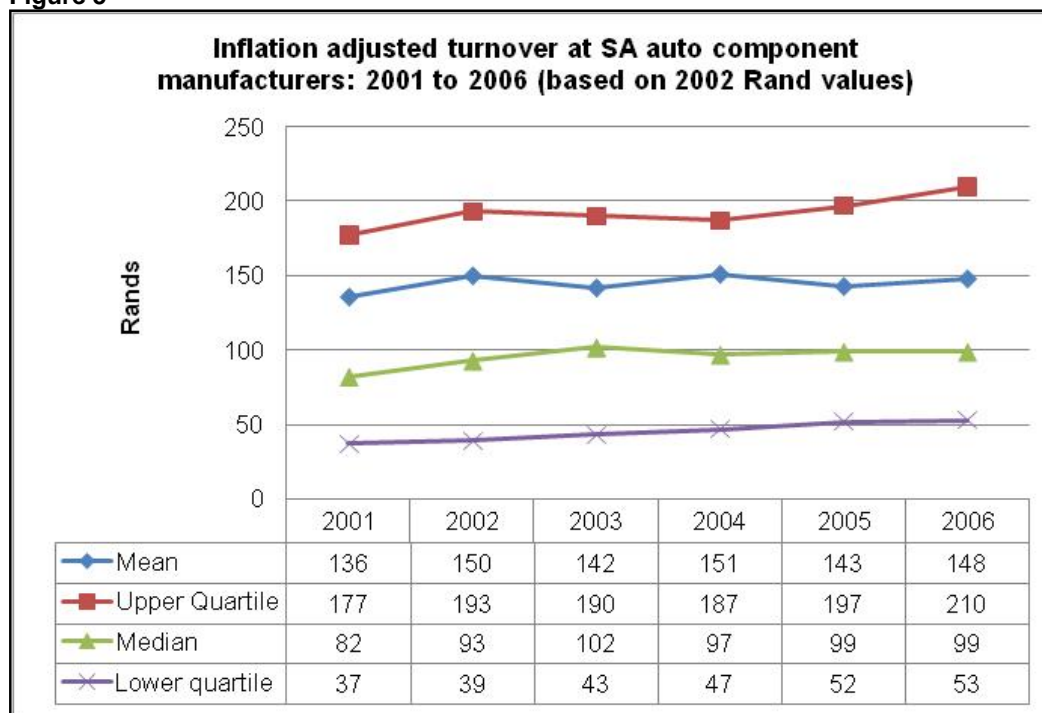
2006 Turnover (in R millions)	Percentage of firms
0-30 m	8.7%
30 - 100m	26.1%
100 - 250m	37.7%
250m+	27.5%

Source: B&M Analysts, SAABC database

The non-inflation adjusted turnover trend for South African automotive component manufacturers shows that turnover averaged R 151 million per firm in 2001, with this steadily increasing in the following years, reaching an average of R 207 million in 2006 (B&M Analysts, SAABC database).

On an inflation adjusted basis, turnover trends have been less impressive, however. Based on 2002 Rand values, and using South Africa's CPIX as the deflator, 2001 figures averaged R 136 million, reaching a high of R 151 million in 2004, before dropping again to R 148 million in 2006. The top 25% of firms in the database have not followed this trend however, with the upper quartile figure improving from R 187 million in 2005 to R 210 million in 2006, revealing comparatively much stronger absolute and trend performance amongst the leading automotive component manufacturers, relative to the average and weaker firms (i.e. those in the bottom 25% of the database).

Figure 5



Source: B&M Analysts, SAABC database

1.2.5. Skills expenditure

Training expenditure at South African automotive component manufacturers has been relatively low over the 2001-2006 period. For example, based on SAABC data, average training spend¹³ decreased from 2.1% in 2001 to 1.6% in 2003-2004, and then increased to 1.8% in 2006. In this time frame, multinational owned firms based in South Africa invested more on training than locally owned firms, although the gap has narrowed recently (B&M Analysts, SAABC database). For example, in 2001, MNC owned firms invested 2.9% on training, while locally owned firms invested 1.6%. A similar trend continued into 2002, although by 2006, MNCs were investing 2.1%, with local firms trailing closely behind at 1.7% (ibid.).

1.2.6. Competitiveness development

When assessed against a range of critical competitiveness indicators, the profile of the vehicle and components manufacturing sectors shows substantial progress in recent years. As indicated earlier, the average number of vehicles produced per platform has increased from 10,745 units to 22,594 units (Barnes and Comrie: 2007). With these improved economies of scale, as well ongoing capital expenditure (See Section 1.2.1), a foundation for improved employee efficiencies has been achieved.

These improved efficiencies can be witnessed in the increased average number of vehicles produced per employee at South African OEMs — from 11 in 2000 to 15,3 in 2005 (Barnes and Comrie, 2007)¹⁴. Furthermore, the

¹³ Training investment as a percentage of the total remuneration bill (wages and salaries)

¹⁴ Whilst this represents strong improvement, South African performance is still far from Western European and North American levels (which range from 40 to 60 vehicles produced

average valued added per employee in the automotive components industry has steadily risen over recent years, from R 279, 000 in 2001 to R 312, 000 in 2006 (B&M Analysts, SAABC database). This is despite significant deflationary pressures in the automotive components industry.

On a range of non-price critical success factors in the international automotive industry, the performance findings of the South African automotive components industry are similarly impressive:

- The average customer return rate at South African based automotive component manufacturers has decreased from 10,790 parts per million (ppm) in 2001 to 254 ppm in 2006, a multifold improvement that has taken performance standards in the industry to levels ahead of many of the industry's international competitors.
- The average internal reject rate has also improved from 4.6% to 2.6% over the same period – an improvement of 43%.
- The number of deliveries to customers that are not on time and in full has progressed from 10.1% in 2001 to 6.5% in 2006 - despite far more onerous delivery demands being placed on firms by OEMs¹⁵.

Unsurprisingly, the vast majority of South African based automotive component manufacturers are also now ISO-TS 16949 accredited (86.6%), whilst a further 60% of firms are ISO 14001 certified (B&M Analysts, SAABC database). This suggests that firms have fully accepted the need for international accreditations and have aligned their operating systems with global norms and standards – an extremely positive finding.

1.2.7. Product development trends

With regards to research and development (R&D) spending¹⁶ in 12 sub-sectors of the South African automotive components industry, it is notable that six¹⁷ demonstrated decreases in R&D spending over the 2001-2006 period, while two categories¹⁸ showed increases. R&D spending in the foundries and metal forming sub-sectors were slightly erratic during this time, whilst the paint and rubber sub-sectors maintained stable spending (B&M Analysts, SAABC database). Consistent with this data, the proportion of sales generated from new products (i.e. released in the last year) within the South African automotive components industry declined in the 2003-2006 period; from 17.4% in 2003 to 13.5% in 2004, 18.0% in 2005 and only 10.6% in 2006 (B&M Analysts, SAABC database).

per employee), as well as the exceptional performance of Japanese based assemblers, which average over 70 vehicles per employee.

¹⁵ For example, customers like Toyota SA now expect multiple deliveries a day from their key suppliers (up to eight deliveries a day). A decade ago these suppliers were making deliveries on a weekly basis.

¹⁶ Research and development expenditure is calculated as a percentage of total turnover.

¹⁷ These sub-sectors are harnesses, electronics, JIT assembly, discrete components, glass, and precision machining.

¹⁸ These sub-sectors are trim and metal fabrication.

In 2006, an average of 22.8% of products at South African automotive component manufacturers were in the 'growing' phase of their lifecycle¹⁹, while 47.2% of products were currently in their 'mature' phase, and 30.0% in their declining phase. This suggests a slightly aging profile of products being sold at South African automotive component manufacturers, with more products in their declining, rather than growth phase (B&M Analysts, SAABC database).

1.3. The MIDP

1.3.1. Introduction

The introduction of the MIDP in 1995 heralded a fundamental shift in the vision and aims for the automotive manufacturing industries from one of import substitution to one of export orientation. Following an intensive period of stakeholder consultation and comparative policy analysis in other economies, five objectives for the industry were formalized:

- Improve the international competitiveness of firms in the industry
- Enhance its growth through exporting
- Improve vehicle affordability
- Improve the industry's highly skewed trade balance
- Stabilise employment levels

To achieve these aims, a series of export-oriented incentives were introduced, coupled with a reduction in import tariffs. These collectively formed the MIDP.

1.3.2. Technical parameters of MIDP

The set of technical parameters designed to give structure to the MIDP can be summarised as follows (see Barnes and Black, 2003²⁰):

- **Import Rebate Credit Certificates (IRCCs):** Minimum content provisions were abolished and an import-export complementation scheme was introduced that allowed both automobile and component manufacturers to earn duty credits from exporting (IRCCs). These duty credits were tradable and could be used to offset import duties on cars, components or materials. It thus allowed assemblers to either earn their own credits from exporting or to buy credits from component exporters to finance their importing of either CBUs or components not produced locally, or which they preferred to source from abroad.
- **Tariff phase down:** A tariff phase down schedule was introduced, originally designed to reduce nominal rates of protection to 40% for CBUs, and 30% for Completely Knocked Down (CKD) components by 2003.

¹⁹ Proportion of sales generated through products in their first, second and final phase of lifecycle

²⁰ Barnes, J. and Black, A. (2003), "Motor Industry Development Programme: Review Report", Unpublished mimeo for the Department of Trade Industry, Government of South Africa, 24 Feb. 2003.

- **Duty Free Allowance (DFA):** An import allowance for South African OEMs, equal to 27% of the wholesale value of their production, was introduced.
- **Small Vehicle Incentive (SVI):** The SVI provided a subsidy for the manufacture of more affordable vehicles. This operated via a duty drawback mechanism linked to the value of the motor vehicle.

Since its inception, the MIDP has been through two extensive reviews (1999 and 2002):

- The first review extended the programme to 2007, and introduced the Productive Asset Allowance (PAA), providing duty credits equivalent to 20% of investments, spread out over a five-year period (but only for investments that facilitated the rationalisation of particular product lines). It also withdrew the Small Vehicle Incentive, and introduced a phase down of export benefits from 2003 to 2007.
- The second review extended the MIDP to 2012, focusing on ensuring the predictability of the incentive scheme. This took the form of a further decline in export facilitation support and the continued gradual reduction in import tariffs, with vehicle and CKD duties to reach 25% and 20% respectively by 2012 (from 2007 levels of 30% and 25% respectively).

Table 6: Basic parameters of MIDP to 2012

Year	Value of Export Performance			Ratio of Exports against Imports			J PAA		
	A CBU Duty	B CKD Duty	C DFA	D CBUs	E Components	F Qualifying PGM value		G Component s, HCVs, Tooling exported vs. CBU LVs imported	H Components, vehicles, tooling exported vs. components, HCVs, tooling imported
1995	65%	49%	27%	100%	100%	100%	100:65	100:100	N/A
1996	61%	46%	27%	100%	100%	100%	100:65	100:100	N/A
1998	54%	40%	27%	100%	100%	100%	100:65	100:100	N/A
2000	47%	35%	27%	100%	100%	100%	100:65	100:100	N/A
2002	40%	30%	27%	100%	100%	50%	100:65	100:100	20%
2004	36%	28%	27%	90%	90%	40%	100:60	100:100	20%
2006	32%	26%	27%	82%	82%	40%	100:60	100:100	20%
2008	29%	24%	27%	74%	74%	40%	100:60	100:100	Presently being reviewed
2010	27%	22%	27%	70%	70%	40%	100:60	100:100	
2012	25%	20%	27%	70%	70%	40%	100:60	100:100	

Source: Barnes and Black, 2003; NAAMSA Annual Report, 1997

The overall profile of the MIDP's various technical elements to 2012 (as of the end of September 2007) is presented in Table 6. Columns A and B show the declining tariff rates protecting the vehicle assembly and components industries respectively, whilst Column C indicates the value of the Duty Free Allowance (DFA) given to vehicle assemblers in South Africa. Columns D, E and F highlight the MIDP's valuation of exports for fully built up units (D),

components (E) and the proportion of Platinum Group Metals (PGM) that can be claimed when exporting catalytic converters.

As evident, the valuation on CBU and component exports is being reduced (to 70% by 2009), whilst only 40% of the PGM value in catalytic converters can be calculated in export benefits. Columns G, H and I reveal the ratio of imports that can be rebated for every type of export valuation. Whilst there is no change in valuation when importing components using vehicle exports, or vehicle imports when using vehicle exports, there is a substantial discount on the export valuation when using component exports to import fully assembled vehicles (see Column G). Finally, Column J outlines the investment benefit embedded within the Productive Asset Allowance (PAA).

To provide clarity on the export benefits of the MIDP, the two tables below outline the value of the Import Rebate Credit Certificate that would be earned if exporting R100 of local content, as per Columns H and I above (see Table 7), as well as if exporting R100 of local content as per Column G (see Table 8). As revealed, the existing benefit of the MIDP for exporting firms (i.e. for 2007) ranges from 14.04% to 19.5%, with this to reduce to between 10.5% and 14.0% in 2012.

Table 7: IRCC benefits when exporting R100 worth of components for components imports and vehicles for vehicles imports

Year	A Export value*	B Value discount	C CKD Duty	D IRCC value
2003	R 100.00	0.94	0.29	R 27.26
2004	R 100.00	0.9	0.28	R 25.20
2005	R 100.00	0.86	0.27	R 23.22
2006	R 100.00	0.82	0.26	R 21.32
2007	R 100.00	0.78	0.25	R 19.50
2008	R 100.00	0.74	0.24	R 17.76
2009	R 100.00	0.7	0.23	R 16.10
2010	R 100.00	0.7	0.22	R 15.40
2011	R 100.00	0.7	0.21	R 14.70
2012	R 100.00	0.7	0.2	R 14.00

* Assuming the entire amount is comprised of local content.

Table 8: IRCC benefits when exporting R100 worth of components for CBU imports

Year	A Export value*	B Value discount	C CBU adjustment	D CBU Duty	E IRCC value
2003	R 100.00	0.94	0.6	0.38	R 21.43
2004	R 100.00	0.9	0.6	0.36	R 19.44
2005	R 100.00	0.86	0.6	0.34	R 17.54
2006	R 100.00	0.82	0.6	0.32	R 15.74
2007	R 100.00	0.78	0.6	0.3	R 14.04
2008	R 100.00	0.74	0.6	0.29	R 12.88
2009	R 100.00	0.7	0.6	0.28	R 11.76
2010	R 100.00	0.7	0.6	0.27	R 11.34
2011	R 100.00	0.7	0.6	0.26	R 10.92
2012	R 100.00	0.7	0.6	0.25	R 10.50

* Assuming the entire amount is comprised of local content.

The benefits of the Productive Asset Allowance are also secured in the form of duty credit certificates, although in the case of the PAA, the valuation is based on the dutiable value, rather than nominal import value. Payable at 4% per year over a five year period this means that on R100 million invested in 2007, a vehicle assembler would secure a total of R20 million in duty credits through to 2011, or R4 million per year. The value of imports that could be imported by an assembler making a R100 million investment in 2007 is R87.3 million.

1.3.3. The MIDP and Component Manufacturers

The vast majority of exports emanating from the South African automotive components industry are being secured through vehicle assemblers as a mechanism to generate IRCCs for the vehicle assemblers. An estimated 97% of all component manufacturer export contracts are secured in this manner. While some independent exporting by component firms does take place, particularly into the international independent aftermarket, the bulk of component exports are being facilitated by OEMs through their parents companies and in conjunction with multinational Tier 1 firms.

Exporting component manufacturers therefore typically benefit from the incentive under one of the following scenarios, depending on how the exporting process was initiated and how it is structured:

- A South African based OEM's parent company demands a certain portion of its global procurement from a Tier 1 supplier located in South Africa for export (generally to the European Union). Under this arrangement all IRCC benefits are almost always ceded to the South African OEM operation.
- A multinational Tier 1's South African operation sells the product on an ex-works basis to a South African OEM, who then takes responsibility for exporting the product. Under this arrangement the South African OEM retains the IRCC benefit (minus the transport and logistics cost of landing the product in foreign markets).
- Lastly, the South African component manufacturer can secure an export contract independently of a South African OEM and earn IRCC credits based on the value of its exports. In order to derive benefit from the credits the firm will then sell the IRCC credits to a South African OEM at discounted face value based on the prevailing discounted market rate. Given strong domestic demand in 2006, the market rate was approximately 85%, meaning that independent exporters would have secured about R16.58 on R100 worth of exports (85% of the calculation presented in Table 7).

1.3.4. Outlook for the MIDP

The MIDP potentially contravenes the World Trade Organisation's Agreement on Subsidies and Countervailing Measures. As such, the export subsidy that is deemed to exist within the MIDP has come under question, although the

national government has consistently argued that it is essentially a trade facilitation measure. Given WTO questioning, the MIDP is presently under review, although it is likely that the programme will be retained in its current form until at least the end of 2009, after which major adjustments are likely to be made. In this regard, the Australian automotive industry's Automotive Competitiveness and Investment Scheme (ACIS) is being studied as an alternative. ACIS principally works on the basis of a production incentive tied to duty rebates, as opposed to an export incentive. As the incentive is linked to both domestic and export production and is capped at 5% of the total sales of recipient firms, it is fully WTO-compliant.

1.4. Summary of the South African automotive industry's present strategic position

As revealed in this section, the global automotive industry generates an enormous amount of wealth. Its leading status amongst manufacturing industries is therefore well grounded, with a number of major developed and developing economies benefiting from the economic contribution of their automotive assembly and components industries. This occurs directly in the form of value adding output and employment, and indirectly in the form of technology spillovers, skills development and exposure to leading international practices – in respect of product development and manufacturing processes.

In recognition of the potential benefits of the automotive industry to the South African economy, the national government's Department of Trade and Industry promulgated the MIDP in September 1995 as a mechanism to integrate the domestic industry into the international environment, with the expectation that positive adjustments would occur and its strategic position would be re-aligned within a global, as opposed to national framework. This has largely occurred, with the South African automotive assembly and components industries taking on strong outward orientations. Evidence of this abounds – from large scale vehicle export programmes to the substantial growth of catalytic converter and leather seat cover exports from South Africa. In addition to the economic growth of the automotive industry and its growing contribution to the national economy (and more specifically the regional economies of KwaZulu-Natal, Eastern Cape and Gauteng) in the form of investments, manufacturing value addition and employment, it has also substantially contributed to the modernisation of the South African manufacturing sector, with lean manufacturing systems and cutting edge product technologies introduced as export programmes have expanded.

The expansion of the automotive industry over the last decade has not been without its pressures however, with many of these pressures becoming more, rather than less pronounced over the last couple of years. To put it rather crudely, international demands have become substantially more severe, placing ever more pressing cost stresses on South African based firms as their MNC parents look to purchase more from cheap Asian producers. Despite increasing their competitiveness over the last few years, performance

at South African firms consequently remains some distance from where it needs to be to compete successfully without the significant benefits of the MIDP.

Some of the underlying reasons for the lack of genuine competitiveness in the South African automotive industry are legacy based, relating to diseconomies of scale in the domestic market (despite its significant recent growth) and a comparatively high cost base (wages and salaries are much higher in South Africa than competing Asian economies). Other reasons are more industry specific, however, relating to its continued comparative under-investment in people, equipment, manufacturing processes and new products. B&M Analysts' SAABC database is very clear on this. Whilst the industry has performed extremely well since 1995 (particularly in relation to the poor performance of the manufacturing sector more generally), a major reason for this is the MIDP and the firm-level benefits associated with its Import-Export Complementation (IEC) scheme. These benefits have been sufficient to compensate for higher production and logistics costs in South Africa and have therefore encouraged exports.

As the MIDP's benefits have scaled down (See Table 7 and Table 8), particularly since 2002, serious questions have been raised in respect of the sustainability of the industry's recent growth. The two key questions are:

- How much of the industry's recent strong performance is entirely MIDP dependent? And how much could be retained without the MIDP?
- Is the industry's performance slow-down through 2006 a short-term aberration? Or is it symptomatic of the industry's lack of real competitiveness, which is being exposed as MIDP benefits decline?

These questions obviously have important policy connotations and are central to the analysis underpinning the present review of the MIDP, which is likely to culminate in the establishment of a fully WTO compliant MIDP stage loosely derived from the Australian government's ACIS programme. Based on government press statements this new stage is moreover likely to run from January 2010 to December 2020.

At a Human Resources level, and central to the thrust of this research report, the two key questions posed suggest that the South African automotive industry may not have done enough to improve its competitiveness over the last decade. This is perhaps a harsh comment, but as the profile data presented in this section highlights, the industry has substantially improved its competitiveness – despite spending very little on skills development, Research and Development, and even new capital. In comparison to firms benchmarked by B&M Analysts in competitor economies as part of the activities of the SAABC, South African based component manufacturers have clearly not invested as heavily in their operations. This is summarised in Table 9 below. As revealed South African based firms have spent only slightly more than half the international average on training, R&D expenditure and capital equipment.

Table 9: Summary of investment indicators amongst South African automotive component manufacturers versus international firms in the SAABC database

Investment Indicator	South African average					International average: 2006
	2003	2004	2005	2006	2003-6	
Training expenditure as a % of remuneration	1.58	1.58	1.69	1.82	1.67	3.20
R&D expenditure as a % of sales	1.54	1.98	1.56	1.48	1.64	2.98
Capital expenditure as a % of sales	5.00	4.29	4.16	4.96	4.60	7.13

Source: B&M Analysts, SAABC database

The implications of these findings from a skills development perspective are obviously concerning, as discussed in more detail in Section 2.

2. Skills demands in the South African automotive components industry – 2010 and 2015

Building on the profile information presented in Section 1, in this section we endeavour to project employment growth and the likely skills demands of the South African automotive components industry over the next few years. To achieve this objective, it is divided into four sections. The first provides an overview of anticipated employment growth trends in the industry, by factoring in the recent empirical performance of the industry, as well as key dynamics that are presently shaping its outlook. The second then uses 2006 employment data from the SAABC database to disaggregate the current composition of the industry's labour force. This groundwork is used in the third section to make projections of the industry's labour force composition for 2010 and 2015. Finally, Section 4 uses this data, along with primary data collected from firms explicitly for this study, to extrapolate skills demands for the same periods.

2.1. Background Research on Industry Skill Demands

As suggested throughout Section 1, the South African automotive and components industry is steadily expanding, with industry analysts projecting favourable production growth trends into future years. This anticipated expansion will necessarily have implications in respect of industry skills demands. It is also important to note that 2005 marked the beginning of a new wave of export programmes, which were announced or implemented at South African based OEMs. CBU exports increased 26.6% (29,405 units) from 2004 to 2005, totaling 139,912 units (NAAMSA, 2006), whilst this figure is expected to increase to 250,000 units in the next couple of years. In value terms, 2005 exports reached R 22 billion, as compared to R 17.5 billion the previous year (NAAMSA, 2006). SAABC figures also indicate likely future growth in the automotive components industry (see Section 1.2), with average turnover increasing from R 151 million in 2001 to R 207 million in 2006 (B&M Analysts, SAABC database).

Whilst the total number of different vehicle models manufactured in South Africa is projected to remain steady at 19 through to 2010, a host of new vehicle models²¹ are to be assembled in South Africa over the next few years, ensuring that additional skills demands will also certainly materialise. In addition to the direct pressures that will emerge at the OEMs, increasing customer demands will put added pressure on the industry to both broaden and deepen its employee skills base. From an export perspective, South African OEMs and component manufacturers will, for example, meet with increased quality demands from their overseas customers. At the same time, imports of CBUs and components are also growing steadily, ensuring that

²¹ These new models include the Toyota Corolla, VW Polo, Ford T6, Renault Logan (Nissan plant), and Mercedes Benz C-Class.

domestic customer demands increase as the public is exposed to international product offerings. Both scenarios require that local firms upgrade their skills base.

Apart from the traditional skills requirements of the automotive industry, which have remained largely unchanged, the growth of imports and exports of both CBUs and components is placing additional emphasis on logistics related issues, with this becoming a key skills demand in its own right. The changing face of industrial relations²² has also emerged as a critical factor impacting on skills demands in South Africa. The South African labour relations situation leans more towards a pluralist model, wherein workplace conflicts are mediated between management and trade unions. This, too, has increasingly mandated that individual firm's source well qualified Human Resources personnel. Finally, in recent years, firms have increasingly begun to comply with internationally regulated occupational health and safety standards, such as OHS1800, the structural changes of which have also influenced local skills demands.

2.2. Labour force composition: Status quo

NAAMSA figures show that despite some employment losses experienced by individual sub-sectors, there have nevertheless been steady overall increases in recent years. Table 10 outlines average employment levels within the automotive industry for the 2001-2005 period. As highlighted, in respect of the automotive components industry, the widely accepted aggregated employment level, as supplied by the National Association of Automotive Component and Allied Manufacturers (NAACAM), was 78,000 in 2005.

Table 10: Industry Employment Levels – Average Monthly Figures (1999-2005)

	2001	2002	2003	2004	2005
Vehicle Manufacturing Industry	32 700	32 370	31 700	31 800	33 825
Automotive Components	72, 100	74 100	75 000	74 500	78 000
Tyre Industry	6 300	6 000	6 000	6 000	6 000
Motor Trade, Distribution and Servicing	182 000	185 000	191 000	194 000	195 000
Total	293 100	297 470	303 700	306 300	312 825

Source: NAAMSA Annual Report 2005

SAABC firm-level data echoes NAACAM's findings regarding increases in sector employment. As highlighted in Section 1, SAABC members' employment figures have risen from 18,947 in 2001 to 23,549 in 2006 – despite a 0.2% decline from 2005-6 (B&M Analysts, SAABC database). From 2001-2006, the average SAABC employment growth was therefore 4.4% per annum, although this has varied significantly from year to year. For example, the highest rates of employment growth occurred in 2001-2002 (7.9%) and 2004-2005 (6.5%), respectively.

²² The field of Industrial Relations examines relationships between management and workers, particularly groups of workers represented by a union.

2.3. Labour force composition projections: 2010 and 2015

Knowing the recent employment growth rate of the South African automotive components industry is obviously important, but it fails to indicate the likely growth rate in employment to 2010 and 2015, nor the likely composition of that employment, nor the particular skills categories required in this regard. And these are of course the key issues that need to be unpacked if a detailed understanding of the automotive component industry's future skills demands are to be adequately understood.

In this sub-section we therefore endeavour to calculate the composition of the South African automotive components industry's labour force for 2010 and 2015, the likely composition of the labour force, and then finally the skills profile within each critical labour force category (i.e. management, professionals, supervisors and artisans).

In order to undertake this task, the following four methodological steps were completed:

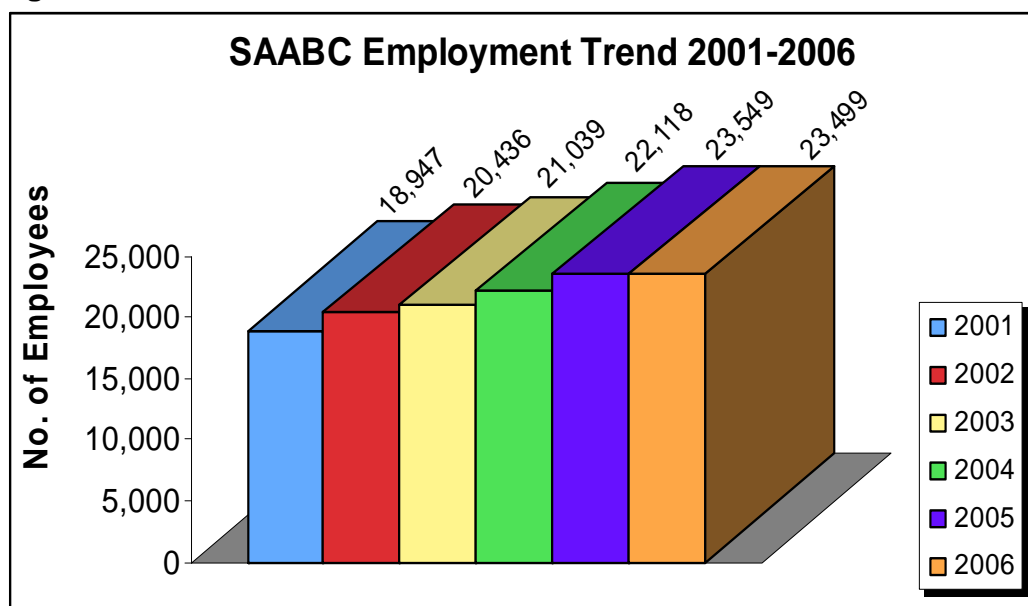
1. Based on SAABC employment growth rates over the period 2001 to 2006, as well as an analysis of domestic and international factors impacting on the industry's future performance, overall employment within the South African automotive components industry was extrapolated to 2010 and 2015.
2. Based on the average breakdown of employment at each individual component manufacturer in the SAABC, an aggregated employment profile was created for the South African automotive components industry. The employment categories encompass management, professional staff, supervisors, artisans, production workers, apprentices/learners and other (mainly administration and clerical) staff. Holding the employee breakdown of the industry steady, employment levels were then calculated for each category for the periods 2006 to 2010 and 2006 to 2015.
3. Based on the difference between employment levels in 2006 and 2010/2015, and factoring in average employee turnover rates at component manufacturers on an annualised basis, the aggregated growth in demand for particular employment categories (and for the industry in total) could then be calculated.
4. Finally, using interview data from the 12 firm-level interviews completed in each of the 12 manufacturing sub-sectors of the South African automotive components industry, a 'typical' qualifications profile was created for the 'skilled' employee categories of management, professional staff and artisans. This was then juxtaposed against the aggregated growth in demand for each employee category, thus providing an indication of the likely skills demands of the South African automotive components industry to 2010 and 2015.

As highlighted below, the findings generated are highly suggestive, revealing that the automotive components industry requires the ongoing infusion of high level skills - skills that the industry is unfortunately increasingly struggling to source, as will be highlighted in Section 3.

2.3.1. Growth Trends: 2001 to 2006

Using the SAABC database (n=75), the rate of employment growth within member firms was first established as a building block for further extrapolation. As revealed in Figure 6, which depicts the SAABC employment growth trend from 2001 through 2006; off a base of 18,947 employees in 2001, aggregated employment amongst the 75 members of the SAABC increased to 23,499 in 2006, a total growth of 4,552 jobs, or just over 24%.

Figure 6

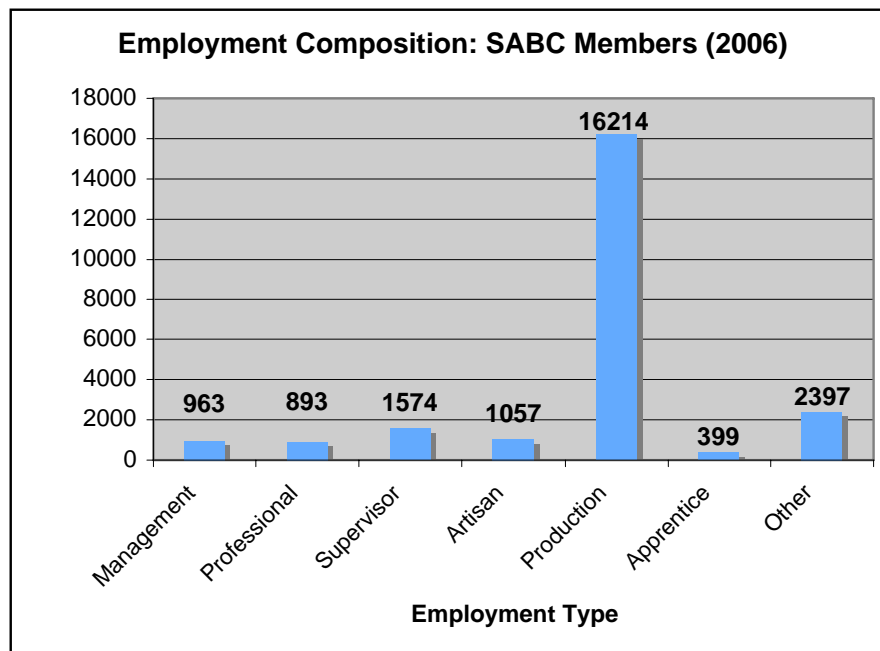


Source: B&M Analysts, SAABC database, 2007

2.3.2. Extrapolated growth trend to 2010 and 2015

Having established the employment growth trajectory of SAABC members to 2006, the next step was to factor in the SAABC's data on the employment breakdown of member firms, thus indicating the disaggregated employment composition of SAABC member firms – in terms of management, professional staff and artisans (which we have categorised as high skills employment categories), as well as supervisors, trainees/apprentices, operators and 'other' (primarily administrators and clerks). Figure 7 and Figure 8 demonstrate the findings from this exercise, with Figure 7 detailing the aggregated numbers for each category of employment at SAABC members and Figure 8, the proportional breakdown for each employment category.

Figure 7



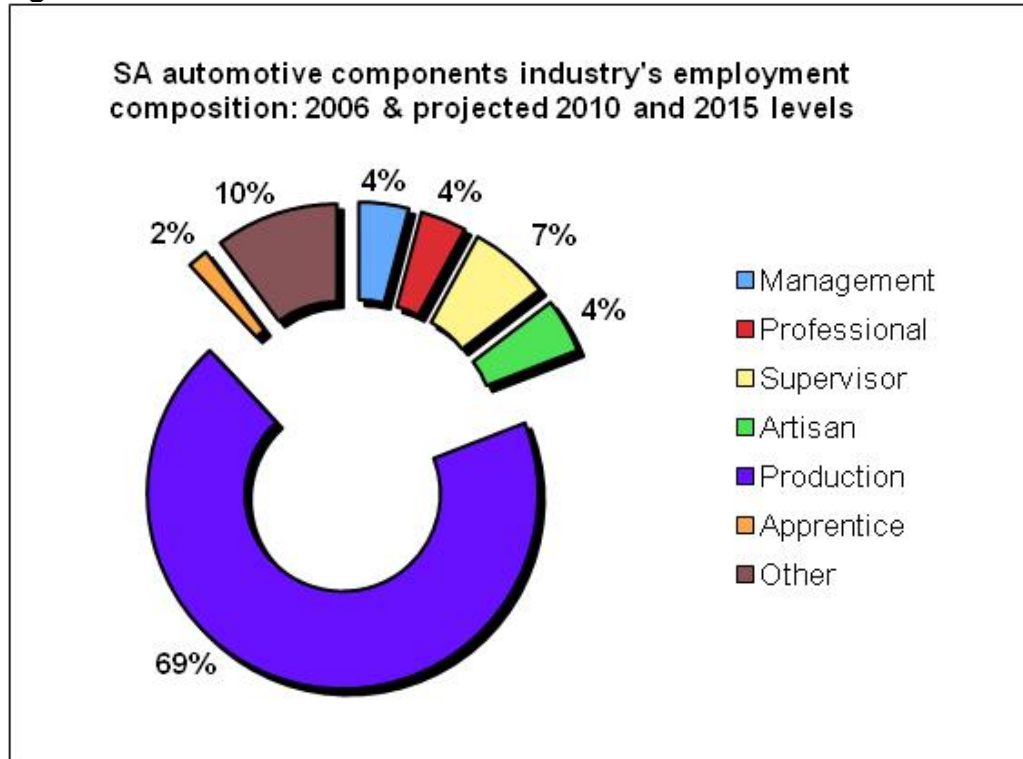
Source: B&M Analysts, SAABC database, 2007

Given the objective of extrapolating the SAABC's findings to a national level, Figure 8 is particularly important. This is because we have assumed that total employment in the South African automotive components industry, as calculated by NAACAM, can be disaggregated in the same proportions as the SAABC, namely:

- Management: 4%
- Professional staff: 4%
- Supervisors: 7%
- Artisans: 4%
- Operators: 69%
- Trainees/Apprentices: 2%
- Other: 10%

Similarly, by holding the disaggregated employment profile steady to 2010 and 2015, which is a reasonable assumption to make, we then have a basis upon which we can project forward the composition of employment within the South Africa automotive components industry – provided, of course, that a reasonable projection of employment growth over the periods 2006-2010 and 2006-2015 can be made.

Figure 8



Source: B&M Analysts, SAABC database, 2007

2.3.3. Calculating the employment growth rate to 2010 and 2015

Although the average employment growth rate has been 4.4% for the period 2001 to 2006, this growth rate was adjusted to an annualised rate of 2.4% for the period 2006 to 2015. This 'educated assumption' was based on an analysis of a number of counteracting factors presently influencing the industry's trajectory. On balance, the analysis suggested continued employment growth, but at a reduced level relative to the last five years.

Factors likely to positively influence employment demand in the South African automotive industry were identified as:

- Vibrant domestic market demand. Despite the moderation in demand evident over the first six months of 2007, the prognosis is that demand will continue to expand from 2008 into the foreseeable future.
- Recent capital investments by a number of OEMs, most notably by Toyota, the world's leading assembler; but also investments by General Motors (Hummer) and Daimler (Mercedes C-Class). Given model life spans of up to eight years, these investments signal long term production certainty at a number of South African assembly operations.
- Existing MIDP benefits until the end of 2009 or 2012, and then the likelihood of similar, but fully WTO-compliant, MIDP benefits for the period 2010 to 2020.

- South Africa's Free Trade Agreement with the European Union, which provides South African assemblers and component manufacturers with a distinct advantage over their Asian counterparts when exporting into the EU. For example, this is one of the principal reasons for Toyota's export programme into the European Union.
- Finally, the successful production track record that South Africa has forged over the last decade must be viewed as a positive factor in any future projections of its performance.

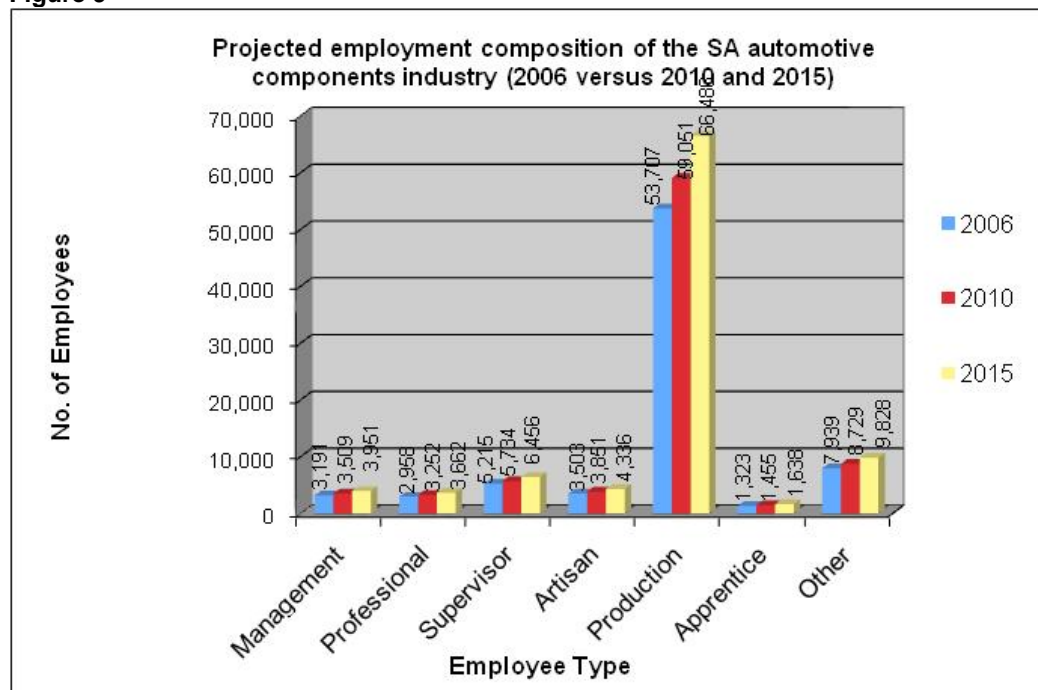
Despite these positive factors, there are unfortunately even more negative elements that must be factored in to any analysis of likely employment growth within the industry:

- Growing international competition from the East – in respect of both vehicle assembly and automotive component manufacture.
- Ongoing Rand strength, which many exporters believe will hamper their ability to secure future orders with their parent companies.
- Cost of raw materials in South Africa, which make the cost of domestic manufacture higher than in competitor economies. This is due to the continued presence of import parity pricing models at raw material beneficiaries in South Africa. In a sector where materials costs typically make up 50-60% of the selling price of products, this is obviously a major constraint to growth.
- There is a great deal of uncertainty relating to the MIDP in the South African vehicle assembly and components industry. The MIDP is currently under review and the expectation is that a positive policy framework will remain in place for the industry. However, some damage has already been done to the industry as a result of the delay in the announcement of the extension of the MIDP to 2010. Vehicle export contracts that have already been lost partly as a result of uncertainty relating to the MIDP include the next generation Ford Focus and Volkswagen Golf.
- The growing import surge into the domestic economy has also been highly problematic from a production perspective. Whilst South African consumers have benefited from more choice when purchasing vehicles, production volumes for the domestic market have failed to substantially increase, resulting in continued diseconomies of scale. Unfortunately, industry analysts project this to continue into the future.
- An additional major concern for the outlook of the industries is the vast skills shortages, which have gained increasing attention from government, labour, and stakeholders in business. Coupled with the much higher cost base of labour in South Africa relative to international competitors, this is in itself a major constraint to the growth of the industry over the next few years.

In combination, an analysis of these positive and negative factors, in conjunction with recent growth trends, led to an adjustment in the industry's projected employment growth rate to 2.4% over the next few years.

Based on NAACAM's aggregated employment level for the South African automotive components industry of 78,000 in 2005, and based on the SAABC's recorded decline in employment of 0.2% in 2006, total industry employment was calculated at 77,836 individuals in 2006. Using the anticipated growth rate of 2.4%, this is projected to increase to 85,582 in 2010 and 96,357 in 2015, translating into a total increase of 18,520 jobs from 2006-2015. The disaggregation of this employment (based on Figure 8) is presented in Figure 9 below. As revealed, the major growth of employment will be in the semi-skilled categories of production workers, other and supervisors, although there will also be sizable increases in management, professional staff and artisans. For the period 2006 to 2015, total employment growth in these three categories will equate to 760, 704 and 833 new positions being created respectively, or a total of 2,297 high-skilled positions.

Figure 9



Source: B&M Analysts, SAABC database 2007; NAACAM, 2005

2.4. Extrapolated skills demands: 2010 and 2015

In this section, aggregated and category specific employee demands are extrapolated through to 2010 and 2015. This is based on two variables: The creation of new jobs and employee turnover rates. In the final section, the anticipated skills demand per employment category is then presented.

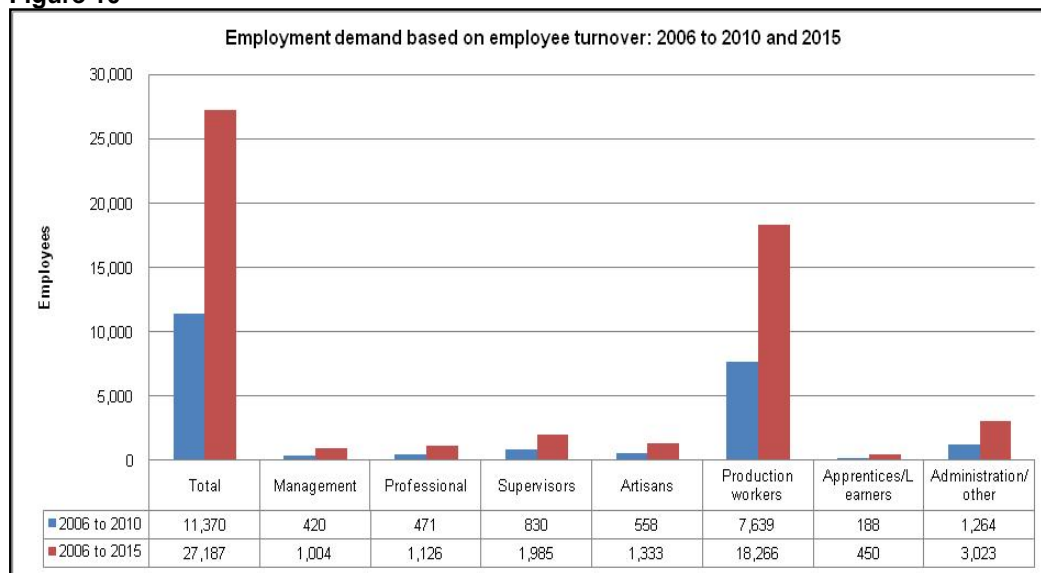
2.4.1. Anticipated skills demands based on employment creation and employee turnover rates

To calculate the demand for new employees within the South African automotive components industry per employee category for the periods 2006-2010 and 2006-2015, an additional calculation to that presented in Figure 9 was required - an estimation of the number of employees to be lost in the South African components industry due to natural turnover. This is because employment demand is dependent on both variables – growth or contraction in actual numbers and employee replacement as individuals leave their places of employment and thus effectively creating new demand.

Based on average turnover rates for the period 2003-2006, which we have for the South African automotive components industry (B&M Analysts, SAABC database), and holding this steady through to 2015, this was calculated at an annualised rate of 6.7% for labour, 7.5% for staff, and 6.2% for management. Assuming that 50% of this firm-level turnover remains in the industry and hence the skills are not lost to the industry as a whole, we then halved the turnover rates for the purposes of calculating industry-wide employee losses²³.

The findings generated in this regard are illuminating, as presented in Figure 10, which summarises expected aggregated employee turnover for the periods 2006 to 2010 and 2015. As revealed, total employee turnover from 2007-2015 is estimated at 27,187, with the majority of this turnover (18,266) in the semi-skilled production worker category. However, for the three high skilled employee categories of management, professional staff and artisans, anticipated turnover for the period 2006 to 2015 stands at a more modest 1,004, 1,126 and 1,333, or a total of 3,463 positions.

Figure 10



²³ For example, the figure we used for annualized management turnover was 3.1%, or 50% of the average management turnover rate of the industry for 2003-6. This is because approximately 50% of firm-level turnover is lost to other firms in the sector (and hence not lost to the industry) and 50% to firms in other sectors, emigration, retirement or mortality.

Having calculated both new and replacement employment demand for the South African automotive components industry for the periods 2006 to 2010 and 2006 to 2015, we can finally calculate the aggregated demand for employees in each of the industry's employment categories for these two periods.

Dealing with the 2006 to 2010 period first, total replacement demand of 11,370 and new growth related demand of 7,746 is projected to lead to aggregated demand of 19,116 new persons needing to enter the industry over the four year period. As unpacked in Table 11, In respect of the management total, aggregated demand equates to 738 persons, whilst for professionals the figure is 765 persons and for artisans 906 persons.

Table 11: Employment demand for the period 2006 to 2010

	Replacement demand	New demand	Aggregated demand
Total	11,370	7,746	19,116
Management	420	318	738
Professional	471	294	765
Supervisors	830	519	1,349
Artisans	558	349	906
Production workers	7,639	5,344	12,983
Apprentices/Learners	188	132	320
Administration/other	1,264	790	2,054

Whilst the figures for 2006 to 2010 suggest some growth in demand across all three high skill employment categories, as revealed in Table 12, aggregated demand increases significantly after 2011, with total demand for the 2006 to 2015 period revealing the need for the industry to recruit a total of 1,764 managers, 1,830 professionals and 2,167 artisans.

Table 12: Employment demand for the period 2006 to 2015

	Replacement demand	New demand	Aggregated demand
Total	27,187	18,520	45,708
Management	1,004	759	1,764
Professional	1,126	704	1,830
Supervisors	1,985	1,241	3,226
Artisans	1,333	833	2,167
Production workers	18,266	12,779	31,045
Apprentices/Learners	450	315	765
Administration/other	3,023	1,889	4,912

Having calculated aggregated new employment demand by employee category to 2010 and 2015, the next step is to identify the skills demands inherent to each category. To do this, we calculated a 'typical' skills profile for each 'high skills' employee category in the South African automotive components industry, using firm-level data from 12 manufacturers representing each of the manufacturing sub-sectors of the South African automotive components industry: Discrete components, electronics,

foundries, harnesses, injection moulding, glass, rubber and tyre, just in time assembly, metal fabrication, metal forming, precision machining and trim components. The particular qualification of each manager, professionally employed staff member and artisan was requested from each firm, with a skills profile then created for 2006. Using the baseline employment growth calculations presented earlier in this section, the qualifications comprising each high skills employment category were then projected forward to 2010 and 2015, and then finally, based on growth and replacement demand, the total demand for new qualified employees was calculated.

Table 13 below represents the findings from this exercise for management and professionals²⁴ employed in the South African automotive components industry. As revealed:

- Of the 6,149 managers and professionals employed in the automotive components industry in 2006, 2,023 (or 32.3%) had engineering related qualifications (engineering degrees or diplomas), 1,051 (or 17.1%) business related degrees (business administration, business science, economics, etc.), and 1,050 (or 17.1%) trade certificates of some kind.
- Given the concentration of these qualifications amongst managers and professional staff, of the 3,594 management and professional positions that will need to be filled over the nine year period from 2006 to 2015, 1,183 related to engineering linked qualifications, 618 business related degrees and 614 trade certificates of various kinds.

The broad based skills demands of the automotive components industry are also made explicit in Table 13, with a large number of 'other' diplomas, degrees and in-house qualifications (14.1%) evident amongst managers and professional staff.

Table 13: Management and professional skills profile for 2006, 2010 and 2015, as well as total demand calculations for 2006-10 and 2006-15

	2006	2010	2015	Total demand: 2006-10	Total demand: 2006-15
Total	6,149	6,761	7,613	1,503	3,594
Engineering-related qualifications (degrees, BTechs, Diplomas)	2,023	2,225	2,505	495	1,183
Financial-related degrees	260	286	322	64	152
Business-related degrees	1,057	1,162	1,308	258	618
Social science/ Humanities degrees	462	508	571	113	270
Management diplomas	260	286	322	64	152
Production diplomas	173	190	214	42	101
Trade certificates	1,050	1,154	1,300	257	614
Other diplomas and degrees	865	951	1,070	211	505

Source: Own calculations, based on firm-level interviews

²⁴ The skills breakdown of management and professionals was aggregated for the purposes of this exercise as the two categories have very similar skills demands and the separation was thus deemed artificial for the purposes of unpacking the industry's existing qualification base, and future demand.

The skills profile for artisans is presented in Table 14, and as revealed, whilst the largest categories of skills relate to fitters and turners (25.5%) and electricians (20.9%), a broad set of artisanal skills are generally required by automotive component manufacturers. This is reflected in the broad range of artisan skills required by the industry to 2010 and 2015²⁵.

Table 14: Artisan skills profile for 2006, 2010 and 2015, as well as total demand calculations for 2006-10 and 2006-15

	2006	2010	2015	Total demand: 2006-10	Total demand: 2006-15
Total	3,503	3,851	4,336	906	2,167
Electricians	733	806	907	190	453
Fitters and turners	895	984	1,108	231	554
Tool, jig and die	286	314	354	74	177
Millwrights	310	341	384	80	192
Tool setters	99	109	123	26	61
Electronics	124	136	153	32	77
Unspecified	1,056	1,161	1,307	273	653

Based on this breakdown of qualifications within the skilled employment categories of the industry, we can then calculate the actual skills demands for 2010 and 2015, and not only the growth in demand for particular employee categories. As revealed, the five greatest skills demands will relate to:

- Management and professional staff with engineering qualifications (aggregated demand of 1,183 new positions to 2015)
- Management and professional staff with business-related degrees (618 positions)
- Management and professional staff with trade qualifications (614 positions)
- Artisans qualified as electricians (554 positions)
- Artisans qualified as fitters and turners (453 positions)

²⁵ Unfortunately, a number of firms were unable to specify the qualifications of their artisans, hence the large proportion of 'unspecified' artisans in our calculations.

3. Skills supply into the South African automotive industry

This Section aims to accomplish several tasks. First, it outlines the aggregated number of graduates in engineering/science/technology and business management from South Africa's Tertiary Education Institutions (TEIs). Second, it uses primary and secondary research to identify those universities and other institutions of learning, which classify themselves as 'skills feeders' into the South African automotive industry. In the third section, firm-level primary research is utilised to distinguish which institutions industry representatives hold in high regard. In the fourth section, we then discuss the automotive components industry's skills status quo, by unpacking current skills deficiencies as identified through firm-level research, as well as the average lead times associated with filling skilled positions. In the fifth section, interview material is further analysed to generate an assessment of the industry's general skills outlook. Finally, we refer back to the skills demands issues identified in Section 2, and evaluate the implications of growing skills demands and constraints in the supply thereof for South African based automotive component manufacturers.

3.1. TEI and FET Graduates

The number of TEI graduates in public TEIs in 2004 was 115,801 (DOE 2005). This figure is inclusive of all major fields of study, with only 31,328 science, engineering and technology graduates and a further 29,002 business and management graduates²⁶. Calculating the number of these graduates that emerge from credible institutions with credible qualifications is, if course a highly subjective exercise likely to be painted as highly discriminatory to particular institutions. Nevertheless, the automotive components industry only perceives certain institutions as capable of producing employable graduates, and as such the DOE figures immediately over-state the number of graduates available to the industry. It is therefore necessary to discount the total DOE figure by 20%.

Using the DOE's adjusted aggregated figures, and then extrapolating these across the full spectrum of the South African economy, the following projections can be made:

- Based on manufacturing comprising 17% of the South African economy, and assuming equal demand for graduates across all sectors of the economy, 4,261 science/technology/engineering and 3,944 business management graduates would have entered the manufacturing sector in 2005.

²⁶ Unfortunately, the DOE does not disaggregate these two very broad fields of study any further. As such, medical professionals are classified in the same field as engineering, making the aggregated picture potentially very misleading.

- Based on the automotive industry comprising 25% of the total manufacturing sector in South Africa, 1,065 science/technology/engineering and 986 business management graduates would have entered the automotive industry in 2005.
- Based on the automotive components industry comprising 65% of the total automotive industry's value addition, 692 science/technology/engineering and 641 business management graduates would have entered the automotive components industry in 2005 – a total of 1,333 graduates.

The problem with the data generated here is that it remains too broad. If all 692 science/technology/engineering graduates available to the automotive components industry were engineering specific qualifications then there would be no existing or future skills problems confronting the industry, but this is clearly not the case, as outlined below.

A similar problem emerges when considering the number of graduates from FET institutions²⁷. Whilst there may be a large number of graduates from South Africa's various FET institutions, the majority of the qualifications are (a) entirely irrelevant to manufacturers, focusing primarily on the automotive services industry, or (b) of an insufficiently high technical standard to meet the exacting technical standards of the South African automotive components industry. For example, whilst 9,726 graduates emerged from the South African FET institutions in automotive related fields in 2005, this qualification field is comprised almost exclusively of automotive service qualifications. Moreover, the vast majority of these graduates are at an extremely low technical level (Level 1 or 2). To illustrate the magnitude of the challenge: Of the 9,726 graduates in 2005, 7,104 comprised 'Motor Trade Theory' – an exclusively automotive services qualification; and of this total only 4 graduates were at a Level 4 (Motor Vehicle Science), with 4,186 at Level 1 and 2,083 at Level 2. Graduation levels from FET institutions are therefore highly misleading in respect of the infusion of technical skills into the South African automotive components industry, as also outlined below.

3.2. Key Support Institutions

Given the strong growth of the South African automotive industry, there are a wide range of universities, technical colleges and other institutions of learning that have identified themselves as automotive 'skills feeders', particularly within technical fields such as Engineering. Listing these institutions is of no real value, and as such we apply both primary and secondary research to broadly reflect on only the capabilities of the leading universities, as well as the independent industry support bodies that work with them.

Because of the central importance of the automotive industry in South Africa — namely the positive multipliers it engenders — the sector has received assistance from governmental, as well as external organisations, which have initiated a range of programmes to support the national skills development

²⁷ Data supplied by the HSRC, as per the Department of Education, 2007.

agenda. For example, the Automotive Industry Development Centre (AIDC) has a mandate to further the skills development and training delivery for the local automotive industry. It does this by communicating the skills development agenda to industry stakeholders, as well as identifying opportunities and implementing training programmes. In short, the AIDC serves as an agency of action, using the government's skills development objectives to create practical programmes to assist industry, training institutions and learners alike (Goldwyer, 2007).

3.2.1. Nelson Mandela Metropolitan University

Currently, the AIDC has a strong partnership with the Nelson Mandela Metropolitan University (NMMU), a public 'comprehensive'²⁸ university based in Port Elizabeth that has a strong automotive orientation in its various offerings. The NMMU website cites Engineering Technology as a primary area of expertise, with faculties in Electrical, Mechanical and Mechatronic Engineering. NMMU boasts a number of industry-supporting research centres, which have the stated aims of promoting technology transfer and innovation institutions, including the Institute for Advanced Manufacturing and Engineering Research (IAMER), the Automotive Components Technology Station (ACTS), the Manufacturing Technology Research Centre (MRTC), and the Advanced Mechatronics Technology Centre (AMTC) (NMMU website).

Because of the increasing demand for mechatronics skills within the industry, the NMMU mechatronics laboratory has also received funding and other support from a range of organisations and companies over the last three years²⁹ (Golwyer, 2007). Before this development, the field of mechatronics had been devoid of any local avenues for formal qualifications, and lacked local competencies for teaching.

Another key development within NMMU was the 2005 launch of the Automotive Experiential Career Development Programme (AECDP), an initiative between NMMU, the AIDC, local businesses and the Nelson Mandela Bay Municipality, which sponsors young learners who have taken an interest in automotive industry careers. The AECDP sponsors regular workshops, including an annual two-week winter school for Grade 12 learners at NMMU's Summerstrand North campus. The ultimate goal of these programmes is to increase the number of black engineers and technologists in the automotive industry.

3.2.2. Tshwane University of Technology

The Tshwane University of Technology (TUT) also hosts programmes and resources, including mechatronics facilities, which have proven useful to the

²⁸ Comprehensive universities are a product of the new tertiary landscape, combining academic and vocationally oriented education, as well as engagement with government, business, civil society, as well as the surrounding community. These institutions are aimed at enhancing student access, while expanding research opportunities and market responsiveness.

²⁹ This includes the AIDC, General Motors, BMW, Festo, and Shatterprufe (Goldwyer, 2007).

local automotive industry. Within the TUT Faculty of Engineering and the Built Environment, there are a number of industry-relevant departments³⁰.

Qualifications offered include:

- Diploma in Technology (D Tech)
- Bachelors in Technology (B Tech)
- Masters in Technology (M Tech)
- National Diplomas (N Dip)
- National Certifications (N Cert)
- National Higher Certifications (NH Cert)
- National Diplomas (N Dip)
- National Higher Diplomas (NH Dip)

In 2005, the above qualifications were awarded to 11,427 graduates. The duration of study in the Engineering faculty is three years, involving, typically, four semesters of academic training and two semesters of experiential training. TUT staff members appear to be well-qualified, and have published a number research articles in mainstream, peer-reviewed journals, such as: Research and Development Journal, Elektron, Quantum SA, Journal of Applied Polymer Science, and the International Journal of Modern Physics.

3.2.3. University of Pretoria

The University of Pretoria clearly takes pride in its Faculty of Economic and Management Sciences, which the university website claims to be the leading national institution in the field. The Faculty of Economic and Management Sciences is the university's largest faculty, with approximately 9,000 students in 2006 (University of Pretoria, 2007).

According to the university website, the Engineering Faculty is also a national leader in supplying "locally relevant and internationally competitive" programmes in Engineering, the Built Environment and Information Technology (EBIT). The Faculty is apparently well-resourced in terms of research facilities, and houses several research centres.

The UoP School of Engineering offers undergraduate and postgraduate qualifications in a range of relevant disciplines, all of which are accredited by the Engineering Council of South Africa. These include:

- B Eng Electrical Engineering
- B Eng Electronic Engineering
- B Eng Industrial Engineering
- B Eng Mechanical and Aeronautical Engineering, and
- Engineering and Technology Management (postgraduate only)

³⁰These include (but are not limited to): Automotive Engineering; Electrical Engineering; Industrial Engineering; Manufacturing Engineering; Polymer Technology; and Mechatronics.

According to the DoE (2005), the University of Pretoria produced 3,262 Science, Engineering, and Technology (SET) graduates in 2004, which represents 19% of the total number of UoP students enrolled in SET programmes that year.

3.2.4. Rhodes Investec Business School

In February 2007, Rhodes Investec Business School (RIBS) introduced its certificate in automotive industry management. In this regard, RIBS was awarded a contract from the AIDC to design and implement a development programme for entry-level managers in the Eastern Cape's automotive assembly and components sector. According to the website, "the purpose of the qualification is to prepare Diploma and Bachelor Degree graduates for management positions in the automotive industry"³¹. The programme further targets individuals already working within the industry who might seek to improve their 'holistic perspective' of the industry, including varying levels of management, potential managers, team leaders and supervisors, and shop stewards.

The programme is aimed at Level 6 on the current NQF, and Level 7 on the proposed new NQF standard. The course is comprised of six modules, which extends over a 12-month period. These include:

- Personal Mastery
- The Automotive Industry and the Macro-Economic Environment
- Marketing Practices
- Manufacturing and Supply Chain Management
- Leadership and Management, and
- Project Management

The programme is fully accredited with ECSA, and according to the website, has enjoyed substantial support from the regional industry.

3.2.5. University of KwaZulu-Natal

The University of KwaZulu-Natal (UKZN) Faculty of Engineering promises to train engineering professionals with advanced, industry-relevant and internationally recognised technical qualifications. According to the Faculty website, UKZN engineering graduates easily find job placement with reputable firms (website). As of 2005, Bachelor of Sciences in Engineering were offered at the Howard College, Pietermaritzburg and Westville campuses.

Industry-relevant degrees falling under UKZN's Bachelor of Science in Engineering include:

- Electrical Engineering
- Electronic Engineering
- Mechanical Engineering

³¹ <http://www.ribs.ru.ac.za/automotive/who.php>

The Faculty offers both 3 and 4-year degrees. For all Engineering degrees, however, the first year provides foundational knowledge and skills required for basic engineering³². Furthermore, there is an experiential training component required of all UKZN engineering students, which they must complete during their study holidays.

According to the DoE (2005), UKZN produced 1,920 SET graduates in 2004, with this figure reflecting 13.26% of the institution's SET enrolments in that year.

3.2.6. Durban University of Technology

The Durban University of Technology (DUT) claims to produce qualifications that are highly valued in the industry, fostering a pool of graduates who are immediately productive upon job placement. This competence is said to be achieved through the dual experiential and theoretical components garnered in DUT qualifications.

The Faculty of Engineering, Science and the Built Environment is one of DUT's largest faculties, and produces approximately 80% of the total research output of the institution.

DUT's offered engineering qualifications range from a 3-year National Diploma, postgraduate Bachelor (Honours), to Masters and Doctoral degrees in Technology. All courses offered at DUT are ECSA-accredited.

In 2004, DUT produced 1,678 SET graduates, which translates into 15.47% of total DUT SET-enrolled students in that year (DoE, 2005). In this year, 49.5% of DUT students were enrolled in SET areas of study.

3.3. Evaluation of Institutions

3.3.1. Institutions favoured by firms when recruiting key technical skills

In this section we review those academic institutions highlighted as valuable resources to the automotive components industry, as indicated in the firm-level interviews completed by B&M Analysts in July 2007. Respondents were asked to candidly describe their relationship with so-called automotive 'skills feeder' institutions. Table 1 below summarises the key findings with regards to preferred institutions for sourcing key technical positions. As revealed, the TEIs cited most frequently are the NMMU, VW ETI, University of Pretoria, University of Cape Town and the University of the Witwatersrand.

³² Including Applied Mathematics, Chemistry, Introduction to Engineering Materials, Drawing and Design, and Physics.

Table 15: Institutions Utilised for Sourcing of Key Technical Positions

Institution	Key Skills Sourced	Score ³³
Nelson Mandela Metropolitan University (NMMU)	Middle Management; Professional Staff	33.3%
Volkswagen Education and Training Institute (VW ETI)	Artisans; training for artisans	33.3%
University of Pretoria	Top Management; Professional Staff	25.0%
University of Cape Town (UCT)	Professional Staff	16.7%
University of Witwatersrand (WITS)	Professional Staff	16.7%

Perhaps surprisingly, the University of KwaZulu-Natal (UKZN) and Northwest University were each cited only once as key institutions for sourcing Top Management in key technical positions. The University of Stellenbosch was likewise cited only once for its ability to produce quality Professional Staff for the automotive industry.

Whilst the majority of respondents were primarily disposed towards employing only from the well-established, traditional Universities, several interview respondents revealed that University of Technology (previously Technikon) graduates were considered equally (if not more) professionally competent than their university-trained counterparts. These interviewees described a significant difference between the two types of graduates, with university graduates deemed more theoretically competent, although in an operating environment where this was not always required. Conversely, University of Technology graduates were identified as being more practically oriented and thus typically performing better in terms of workplace problem-solving – a key industry requirement.

3.3.2. Institutions avoided by firms when recruiting for key technical positions

At the opposite end of the credibility spectrum, most interviewed firms stated that they would not source key technical staff from unaccredited institutions, whilst also preferring not to source from most technical training colleges. The institutions with the least amount of credibility when recruiting for key technical positions in management or professional employment categories appear to be Damelin (25%), Intec (16.7%), Boston (8.3%), Mangosuthu Technikon (8.3%) and Walter Sisulu University (8.3%)³⁴.

Interestingly, the institutions avoided by firms include both historically black institutions (Walter Sisulu University [comprehensive] and Mangosuthu University of Technology), as well as private education institutions (Boston, Damelin, and Intec). Although interviewees did not cite specific indicators relating to their reluctance to source from these institutions, there are a number of possible explanations for this.

³³The percentage score indicates the number of interviewees (out of a total of 12), which favourably mentioned the institution – without any prompting on the part of the interviewer – when asked the question as to which universities or tertiary institutions they rated highly when recruiting management and professional staff.

³⁴ The percentage score indicates the number of interviewees (out of a total of 12), which mentioned the institution negatively – without any prompting on the part of the interviewer – when asked which universities or tertiary institutions they would not source from when recruiting management and professional staff.

In terms of the historically black institutions, the shortcomings of these can be traced back to apartheid-era inequities, which in some cases have carried on into the new tertiary landscape of the democratic era. These historical inequities translate into sometimes vast disparities in terms of facilities and capabilities for research and teaching. The DoE reports that a decline in enrolments, growing student debt, as well as governance and management failures have resulted in instability and rapid erosion of historically black universities, despite the Department's efforts for recapitalisation.

Where many of the technikons from the previous dispensation has enjoyed the benefits of merging with historically white ('privileged') institutions, this was not the case for Mangosuthu University of Technology, which was scheduled for incorporation into the new DUT, before the Minister of Education put these plans on hold in 2003.

Furthermore, Mangosuthu University of Technology appears to be struggling with student throughput. In 2004, Mangosuthu produced 416 SET graduates, in comparison with the 5,293 students enrolled in SET fields of study in that year. A total of 53.6% of Mangosuthu students were enrolled in SET fields in 2004.

With regards to the private education institutions cited negatively in the firm-level interviews, this avoidance was primarily attributed to the institutions' lack of accreditation status. Damelin, for example, is registered with the DoE as a private education provider, but is currently awaiting approval of its application for full accreditation³⁵. As such, the institution offers dozens of Short Programmes and "Damelin Certificates", which have no credit-bearing status and cannot be transferred to other institutions of learning.

Intec, by contrast is a FET distance learning programme, which is a member of the National Association of Distance Learning Organisations (NADEOSA) and the Association of Private Providers of Education, Training and Development (APPETD), and has received accreditation, according to the Intec website³⁶. Through its Technical School for Mechanical Engineering, Intec offers a Motor Vehicle Technology Certificate and a Petrol Motor Vehicle Repair Diploma, however these programmes appear to be very superficial in nature and have limited formal course assessment.

3.4. Skills deficiencies noted in firm-level interviews

In this section, we unpack the key skills deficiencies at automotive component manufacturers, as identified through the firm level research, and also endeavour to quantify the severity of skills shortages by considering the lead times required to fill particular positions, and whether these have improved or deteriorated in recent years.

³⁵ <http://www.damelin.co.za/>

³⁶ <http://www.intec.edu.za>

3.4.1. Current skills deficiencies

The industry interviews revealed that there are at least three critical shortages with regards to artisan/trade skills, as well as several less severe shortages in specific management and professional skills areas. Table 3 categorises these shortages by employment type, specific professional skills, and finally, the frequency with which firms identified the skills deficiency. As revealed, the three most frequently cited skills deficiencies related to artisanal employment – in respect of electricians, fitters and turners and millwrights. These were cited more frequently than management and professional skills deficiencies, the most severe of which relate to supervisors, industrial engineers, mechanical engineers and production management.

Table 16: Current skills gaps as identified during firm-level interviews (n=12)

Type	Profession	Score ³⁷
Artisan	Electricians	75%
Artisan	Fitters and Turners	66.7%
Artisan	Millwrights	50%
Management	Supervisors	33.3%
Management, Professional Staff	Industrial Engineers	33.3%
Management, Professional Staff	Mechanical Engineers	33.3%
Management	Production Management	33.3%
Artisan	Electronics	25%

In addition to these more frequently cited skills shortages, two firms also made reference to skills gaps in respect of Electrical Engineers (Professional Staff), whilst another two firms emphasised the need to recruit artisans with tool jig and die expertise.

The skills deficiencies identified in the firm-level research emphasise the importance of joint industry-government programmes like the:

- National Tooling Initiative (NTI), which was initiated in the early 2000s, and which has focused on re-energising the development of tooling skills within the automotive and broader engineering industry. Through this initiative, apprentice training facilities are being upgraded at a number of institutions.
- Department of Science and Technology's Advanced Manufacturing Technology Strategy's (AMTS) graduate placement programme for the automotive industry, which is being coordinated through the AIDC, as well as the SAABC. This programme places recent technically qualified graduates at automotive component manufacturers for specified short-term projects, so as to support the development of the graduates, and to provide the firms with free resources for the implementation of priority projects deemed important to their competitiveness development.
- Automotive Industry Development Centre's various human resource development programmes targeted at developing technical skills through the provision of high-level, specialised engineering and production course

³⁷ Again, the 'percentage score' indicates the number of references made to the particular skill shortage by interviewees (out of a total of 12).

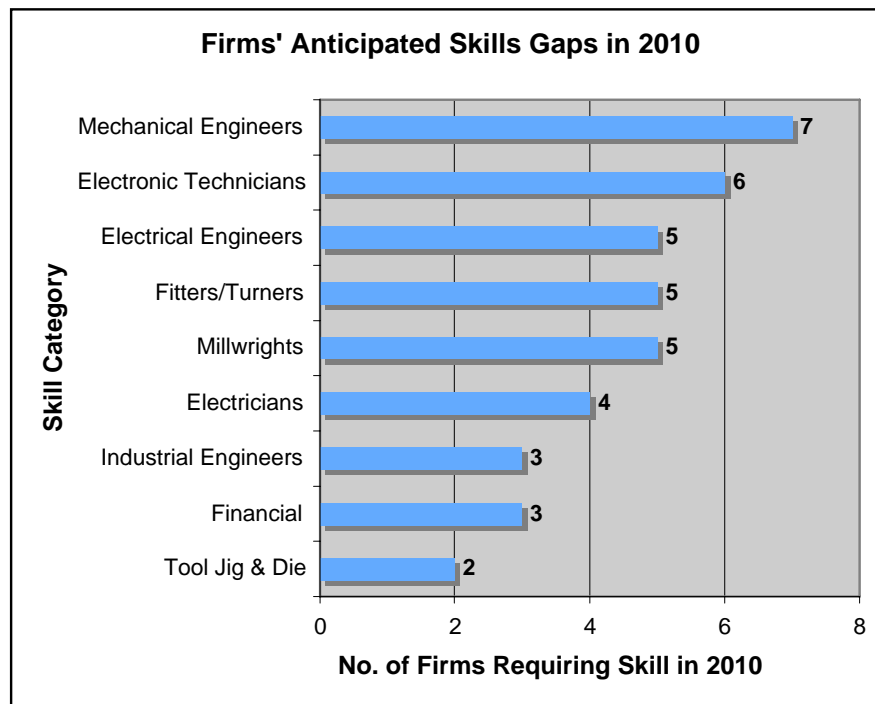
offerings at a number of tertiary institutions in the Gauteng and Eastern Cape.

- Durban Automotive Cluster's (DAC) human resources development programme, which is focused on advancing the skills profile of senior and middle management at automotive component manufacturers in the province of KwaZulu-Natal.

3.4.2. Anticipated Skills Demands to 2010

In this section, we make a comparison between the current skills shortages, as identified in the firm-level research, and the shortages anticipated by firms in respect of 2010. As revealed in Figure 11, it is clear that industry respondents anticipate that the current skills shortages will persist into the next three years.

Figure 11



Source: Firm-level interviews

In addition to these particular skills gaps, a number of firms cited a range of generic³⁸ and more specific anticipated skills shortfalls, which obviously relate to their specific sub-sector of operation. These shortages are not however illustrated in Figure 11, as one firm only referred to each of the skills gaps³⁹. It is important to emphasise that the specific skills identified do not receive a

³⁸ These include Senior Managers, Engineering Managers, Production Managers, Project Managers, Supervisors, Lean Manufacturing Engineers, IT Specialists and Production Designers.

³⁹ These include Tyre Managers, Tyre Designer Engineers, Rubber Compound Engineers, Tyre Manufacturing Engineers, Plastician Engineers, Electric Plating Technicians, and Plastic Spray Painting Technicians, amongst others.

high severity score precisely because of their sub-sector specificity, with this alluding to the specialised needs of individual sub-sectors of the South African automotive components industry.

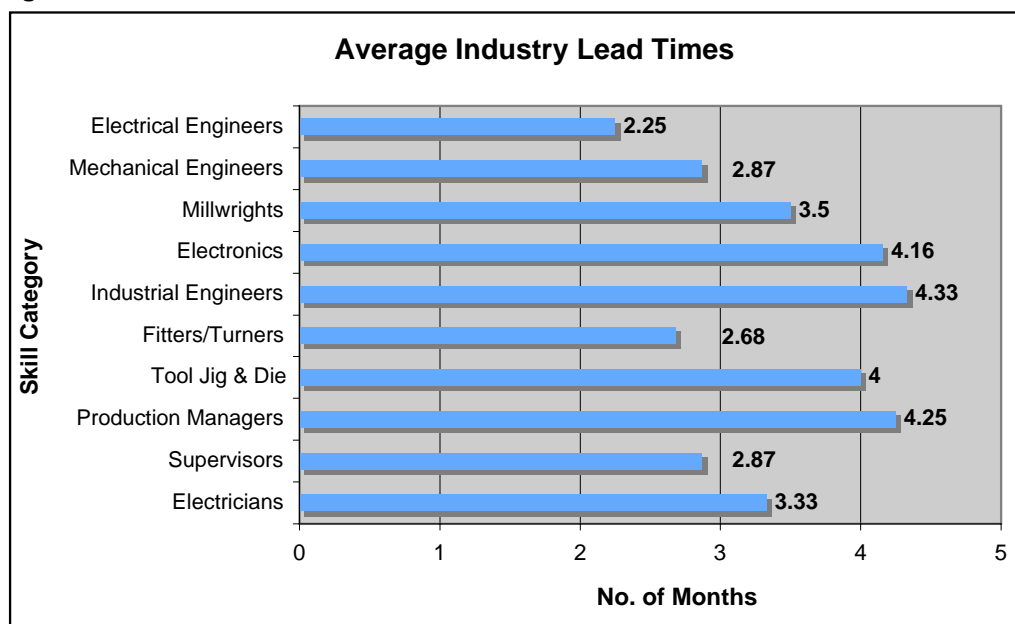
3.4.3. Average recruitment lead times

To gauge the extent of the skills deficiencies confronting the interviewed firms in each sub-sector of the automotive components industry, each firm was asked to indicate the average lead time required to recruit individuals for key technical positions (management, professional staff, or artisans). Figure 12 illustrates the findings generated from the interviews. As revealed, the average lead time required to fill the firms' current skills gaps is frequently in excess of four months. In this regard, the most severe lead times relate to the recruitment of:

- Industrial engineers (4.3 months),
- Production managers (4.3 months),
- Electronics personnel (4.2 months), and
- Tool jig and die artisans (4.0 months).

The average recruitment lead time for the 10 skills categories deemed most important by respondents was therefore an excessively long 3.4 months.

Figure 12



Source: Firm-level interviews

In addition to the long recruitment lead times, according to interviewees, many skilled positions also require lengthy on-the-job training — sometimes as much as 12 months — effectively meaning a further extension of the lead time before an incumbent's position is adequately filled by a competent recruit. This would appear to be particularly true for artisans and trade workers, where interviewees expressed the most dissatisfaction with their own recruitment processes.

Of particular concern, given the industry's growth outlook, 11 of the 12 interviewed firms reported that lead times for recruiting key technical staff had deteriorated over the last two years. Only one firm reported that lead times had remained the same, whilst none reported any improvement in the lead times associated with recruiting priority skills. This finding, whilst very concerning, is consistent with broader industry research completed by B&M Analysts through the activities of the SAABC. Firm-level interviews that focus on human resource development issues are completed annually at every SAABC member, as part of the benchmarking activities of the SAABC, and these have suggested a substantial deterioration in recruitment lead times across a range of priority management, professional and artisanal skills categories.

3.5. Reflections on future skills deficiencies in the components industry

In this section, we reflect on the firm-level interviews to ascertain the general tone of the industry's expectations for the future. Of the 12 firms considered, most expressed cautious optimism about the state of the components industry in South Africa, while a minority were decidedly more negative. This assessment was firstly based upon a comparison the firms' current skills needs against their projections for 2010, as well as changes that they expected in respected of present versus anticipated lead times. This assessment was secondly based on the tone of the interview and the interviewees' own candid estimations. Here we separate the trends by theme.

3.5.1. Absolute and Relative Scarcities

Interview respondents described frustration with both the absolute and relative scarcities experienced in the recruitment of skilled personnel. Three firms (or 25% of respondents) reported that the majority of applicants were not qualified for the positions they applied for — and that in many cases, applicants could not successfully answer the questions posed during the course of their job interviews. Another two firms emphasised that their need to recruit Previously Disadvantaged Individuals (PDIs) had been a further hindrance in their filling of job vacancies.

Interestingly, and consistent with South Africa's integration into a global operating environment, a number of firm-level respondents indicated that the aging professional skills base within their firms was falling behind the technology 'frontier' and that replacing, or at least supplementing, these aging workers with younger staff was becoming a competitiveness priority.

3.5.2. Employee Retention

Four (33.3%) of the 12 interviewed firms explicitly expressed concerns relating to employee retention. Three of these respondents complained that their employees were being 'poached', most notably by the vehicle assemblers, but also by large scale projects, such as the Gautrain, as well as other 2010 related projects. It was emphasised that automotive component

manufacturers could not match the salaries of these competitors; hence rising attrition rates in the most vulnerable skills areas of their business.

Strikingly, four firms (33.3%) also indicated that artisan turnover rates were far more severe than management and professional staff losses; whilst no firms indicated the converse. This suggests that particular challenges relate to the maintenance of artisanal skills at firms – despite very few firms having sufficient apprenticeships in place to ensure the gaps left by departing artisans are readily filled⁴⁰. Also of concern, only two firms indicated that they maintain an employee development/replacement programme for all key positions in preparation for the event that skilled personnel retire or leave the company.

3.5.3. Salary Issues

Because the industry is coping with both severe skills shortages, in conjunction with an increasingly high demand for skills, firm-level respondents emphasised that salaries are being distorted in certain key areas of expertise (namely artisans). Both employees and employers are therefore fundamentally shifting their expectations regarding wages, with ‘good’ artisans able to demand substantial salary increases over the last couple of years – well in advance of increases given to other categories of employee.

As a result of these changing expectations, two firms cited issues regarding the motivation and competence of employees. Given the rising cost of artisans – in an environment demanding cost reductions on year to year basis, certain firms are apparently compromising on the experience and/or quality of artisans employed. Whilst this allowed firms to operate within their defined operating budgets, it was noted that this led to frustrations with new recruits unable to adequately problem-solve, or take responsibility for activities that should ordinarily fall within their scope of work.

3.5.4. Training of Personnel

With regards to training concerns, several types of issues were reported. One respondent indicated that the recruitment lead time for artisans was extensively lengthened when factoring in the need for substantial on-the-job training after they are hired. It was noted that the need for on-the-job training was becoming more pronounced as the standard of external training provided to the artisans deteriorated. The challenge of securing technical personnel in specialised sub-sectors, such as tyres or injection moulding, appears particularly acute. Compounding high employee attrition rates, these sub-sectors only have a small number of firms operating in South Africa, making the recruitment of experienced managers, professional staff and artisans extremely difficult. As an example, there are only four tyre manufacturers in South Africa and as such there are only a few experienced managers, professional staff and artisans with tyre-specific manufacturing expertise.

⁴⁰ For example, the average South African automotive component manufacturer in December 2005 employed 16 artisans (out of a total employment complement of 296), whilst only having seven learners and/or apprentices.

For these reasons, intra-firm training had been implemented by nearly all of the firms interviewed. It was emphasized that this was necessary to help cope with the growing skills issues confronting the firms. At least four (33.3%) of the firms therefore had some form of training for supervisors, whilst four firms provide training for artisans (33.3%), seven (58.7%) run apprenticeship programmes, and six (50%) in-service or learnership programmes. Six of the 12 firms indicated that they provide study assistance for employees, or provide bursaries for students. Finally, it is important to note that some firms provide highly specific training pertinent to the skills demands of their sub-sector (e.g. glass manufacturing or plastics skills), whilst also actively engaging with Tertiary Education Institutions to build specific skills sets within their workforce.

3.6. Summarising skills supply issues in the South African automotive components industry

As revealed in this Section, the South African automotive components industry is fortunate to have a large number of well established, highly credible tertiary institutions providing it with both technically and professionally skilled personnel. Less positively, a number of the tertiary institutions that profess to be providers of skilled personnel into the industry are seen in a rather dubious light by automotive component manufacturers, with certain institutions having even been 'embargoed' as potential sources of new recruits. The key skills issue confronting the domestic industry does not therefore appear to be the ability of good institutions to provide skilled graduates, but rather the growing gap between the absolute number of good graduates produced and the industry's growing skills demands – due to high attrition rates, industry growth and the advancing technological complexity of vehicle manufacture, particularly as South Africa fully integrates into the global automotive operating environment. Whilst the TEI graduate numbers at a broad level of aggregation do not support this conclusion, suggesting the continued infusion of a sufficient number of university and technikon graduates the firm-level research findings were unequivocal in this regard.

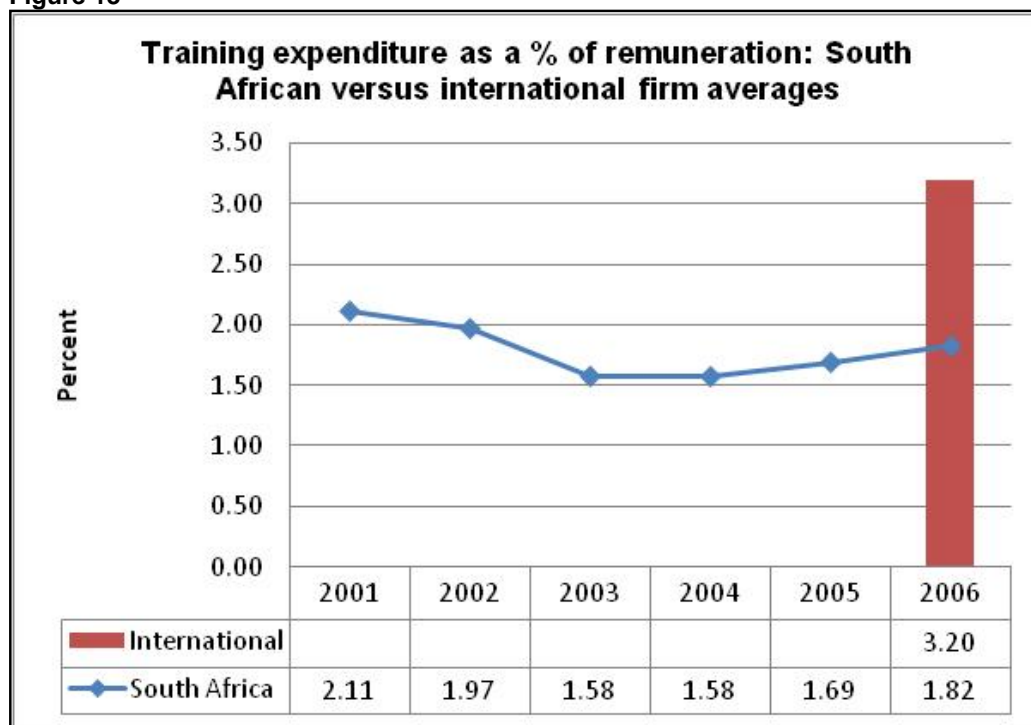
Unfortunately for the local industry, these skills challenges do not appear marginal to the future success of the industry, but rather absolutely central to its present and future competitiveness. The levels of frustration evident in the 12 firm-level interviews emphasised a mounting skills crisis in the industry, with the recruitment lead time data generated and the concerns relating to the absolute skills levels of artisans in the industry, particularly concerning. Based on the firm-level interviews completed, it is clear that recruiting suitably skilled personnel for technical positions is extremely difficult and becoming more so – as salary expectations rise to levels outside of the affordability of the firms, and as experienced artisans are recruited into new large-scale projects such as Gautrain and the many infrastructural projects associated with the 2010 World Cup.

Firms consequently appear to be compromising in respect of their employment of technical personnel, recruiting either less qualified or less

experienced staff than they would have preferred, with this in itself leading to frustrations as the recruits struggle to perform the task expected of them.

Whilst a number of firms are proactively responding to the skills crisis by spending more of their own resources on training and development, as revealed in the following two graphs, the overall firm-level response in South Africa remains lethargic in comparison to international competitors based in Central and Western Europe, Latin America and India. In respect of training expenditure as a proportion of remuneration (see Figure 13), a proxy measure for how seriously South African automotive component manufacturers are taking the development of their employees, the South African average over the last five years has only been 1.79%, or 56% of the international average – despite assertions that skills deficiencies are crippling many firms. Even more strikingly, training expenditure as a proportion of remuneration has actually declined since 2001. As skills supply issues have been noted as a major industry challenge, so firm-level expenditure has declined, rather than the inverse, as would be expected in a skills deficient environment.

Figure 13

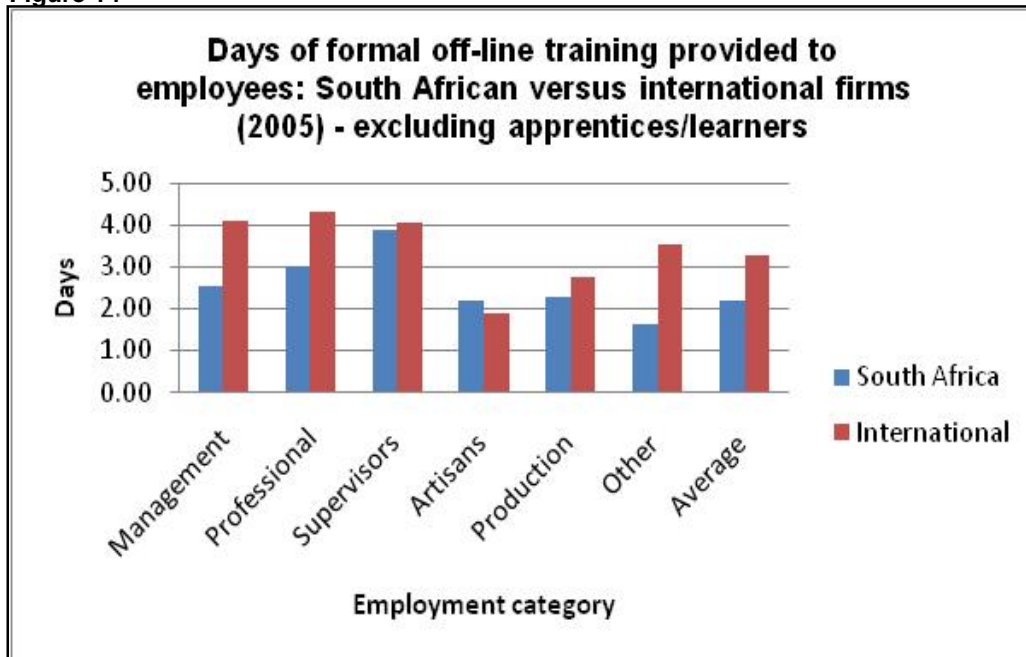


Source: B&M Analysts, SAABC database

Similarly, as revealed in Figure 14, South African firms generally provided their employees with less formal off-line training in 2005 than their international counterparts. In respect of the findings presented in this Section, the limited amount of formal off-line training being provided for management, professional staff and artisans (of between two and three days) is particularly concerning. For two of these three employee categories, namely management and professional staff, South African automotive component manufacturers provide substantially less formal off-line training than their international

counterparts. For certain categories of employment, such as artisans, training appears moreover to be universally deficient, with both South African and international automotive component manufacturers providing very limited off-line training for their employees (approximately two days).

Figure 14



Source: B&M Analysts, SAABC database

What do these firm-level, institutional and broader environmental findings therefore tell us about skills supply in the South African environment? Well, unfortunately not too much that can be construed as positive.

Institutionally, the Tertiary Education Institutions appear to be failing the sector, either in respect of not providing sufficient numbers of graduates in specific engineering and related fields (from well respected institutions), or graduates that are not sufficiently skilled to be employed in the industry. Whilst commendable work is being undertaken by organisations such as the AIDC and DAC to identify and remedy skills shortages in particular areas of the industry, by engaging with a range of academic institutions, there is a clear perception amongst firms that skills supply into the industry has deteriorated, rather than improved over the last few years.

Despite the criticisms made by the firms, evidence generated through the SAABC suggests that automotive component manufacturers have not responded adequately to growing skills deficiencies, with insufficient funds being allocated to skills development. Whilst firms may argue that their decreasing financial margins (in the face of growing international competition and increasing price pressures from OEM customers) limit the opportunities to spend significant amounts of money on training and development, absolute levels are poor in comparison to international competitors and hence

insufficient. At least part of the skills problems in the industry consequently lie with the firms themselves.

Finally, the broader South African economic environment is having a deleterious impact on the skills base of automotive component manufacturers. As skills leave the country as a result of emigration, and as the government suddenly focuses on large-scale infrastructure projects after years of underinvestment, the labour market for skilled personnel has been massively distorted. Keeping and recruiting scarce skills has therefore become an incredibly difficult and expensive process for firms – forcing sub-optimal firm-level responses, which often have negative competitiveness implications for the South African automotive components industry.

These issues, moreover, appear to impact both small and large firms, multinationals and domestically owned firms alike, with no noticeable differences in the three small firm interviews completed, or in the interviews completed at multinational and South African owned firms. Whilst this may be surprising at face value, it is consistent with SAABC data comparisons of multinational versus South African performance, and small versus medium and large firm performance levels that have been completed over the last two years⁴¹.

⁴¹ For a comparison of small versus medium and large firm performance, see SAABC Newsletter, Vol. 9, No. 4 (July/August 2007); and for a comparison of South African and MNC owned performance, see SAABC Newsletter, Vol. 9, No. 2 (March/April 2007).

4. Scarce and Critical Skills Identification

This section endeavours to complete a number of tasks. First, it attempts to provide some clarification on the prevailing terminology used in relation to understandings of South African skills shortages. Second, it compares and contrasts the scarce and critical skills lists published by the Department of Labour (DoL) and the Metals Engineering and Related Services Education and Training Authority (MERSETA). Third, the skills shortages identified and unpacked in Section 3 of the report are compared with the scarce and critical skills identified by the DoL and MERSETA.

4.1. Defining ‘scarce’ and ‘critical’ skills

The various levels of national and sectoral dialogue regarding skills acquisition has led to confusing and sometimes contradictory use of terminology, such as that of ‘scarce’ and ‘critical’ skills. This is perhaps because there is no common understanding of the precise meaning of these terms, or how the two concepts significantly differ.

Furthermore, the problem commonly referred to as a ‘skills shortage’ in South Africa is itself a nebulous concept, which encapsulates several specific issues — *shortages* in some cases (e.g. engineering and other technical skills), but skills *surpluses* in other areas (such as the social sciences) (Blaine, 2007). In other words, there is currently a significant ‘mismatch’ between the skill sets being acquired in local higher education institutions and the skills required by business (Robinson et al, 2007). However, what is centrally important is the agreement that the demand for certain skills required to develop the South African economy is far in excess of current supply.

For the purposes of this report, we will adhere to the terminology and usages provided by the South African Department of Labour. The DoL differentiates between ‘scarce’ and ‘critical’ skills, with ‘scarce skills’ describing those occupations⁴² which experience (or will soon experience) a shortage of qualified or experienced individuals to form an adequate workforce. Such scarcity is typically due to an absence of appropriately qualified individuals, or to employment criteria that prohibits firms from hiring the qualified or experienced personnel available (DoL, 2006).

‘Critical skills’, however, describe fundamental ‘top up’ skills required within an occupation. The DoL identifies two types of critical skills:

- *Key or generic skills.* This includes cognitive functions such as problem-solving, language proficiency and literacy, mathematical skills, and ICT skills, etc.

⁴² The specific use of the term ‘occupation’ (as opposed to ‘job’) must be clarified here. While a ‘job’ is seen as a set of functions to be executed by an employee for an employer in exchange for remuneration, “occupation” is seen as a set of ‘jobs’ or specialisations, the main tasks of which are characterised by such a high degree of similarity that they can be grouped together for the purposes of the classification (ISETT SETA, 2006).

- *Occupationally specific 'top up' skills.* These skills are required for performance within that occupation to fill a 'skills gap' that may have occurred due to changing technology or evolving forms of work organisation.

To be precise, both 'scarce' and 'critical' skills are determined by profession, however 'scarce' skills are considered in terms of the profession itself, while 'critical' skills are regarded as the specific skill sets required of a profession in particular (DoL, 2006).

4.2. Identifying Scarce and Critical Skills in the South African Automotive and Components Industry

Given the context outlined above, what are the scarce and critical skills shortages besetting the South African automotive components industry – as identified by the DoL, MERSETA and the firm-level research? Moreover, are the findings consistent, or do they indicate varying perspectives on the extent of the challenge confronting the industry.

4.2.1. Scarce and Critical Skills : The firm-level findings

Here we disaggregate the scarce and critical skills findings, as revealed in the firm-level interviews. As described in Section 3, there are a number of very real skills deficiencies within SAABC member firms. These are primarily related to artisanal⁴³ and professional staff⁴⁴ categories of employment, but also include some core management functions, particularly those relating to technical line-function areas. Based on the recruitment lead times and skills shortages identified by the interviewed firms, as well as the skills demand profile of the industry, the following five skills categories appear most concerning:

- All engineering qualifications, but most notably industrial and mechanical engineering
- Electricians
- Production management
- Fitting and turning
- Millwrights
- Business related degrees

As stated in Section 3, firms indicated both absolute and relative skill *scarcities*. While firms reported that there are generally too few qualified job applicants for advertised skilled positions, this has also been compounded by the aging profile of the current workforce. Whilst a number of experienced industry workers retire or are promoted to higher positions, many others are becoming increasingly redundant, due to the introduction of new technologies, which have shifted emphasis from mechanical to electronic skills, and effectively increased the premium placed on computer and technology literacy (MERSETA SSP Review, 2006). Whilst, many automotive component

⁴³ For example, electricians, fitters and turners, and millwrights, etc.

⁴⁴ For example, production supervisors and production management.

manufacturers are increasingly seeking to replace experienced workers with a younger generation of more technology-competent and computer literate graduates, they apparently face a major quandary – recent graduates may be more computer literate, but they do not have the core mechanical skills that are still required at firms. As such, by filling one skills gap, another is immediately exposed.

Firms did not specify many *critical* skills shortages, although several respondents alluded to or specified employee deficiencies in generic areas such as ‘people skills’, problem solving and the inability of many professionals to complete broader tasks not specifically within their ambit of responsibility. With regards to relative scarcities of skills, several firms also conveyed the view that needing to source qualified previously disadvantaged individuals was further undermining their ability to acquire sufficient skills.

4.2.2. MERSETA Sector Skills Plan

In 2002, the MERSETA commissioned a study to identify and review scarce skills facing the automotive sector, with the aim of generating ideas for a practical suite of interventions (Umhlaba, 2006). This *Snapshot Survey* found that troubling shortages exist in various professional and technical engineering disciplines, repair and maintenance, and manufacturing trades (ibid.). In 2005, the MERSETA shifted its focus to scarce skills identification in particular trade occupations. This study identified four broad occupations in which scarce and/or critical skills require immediate attention.

The first of these was ‘management’ occupations. The study identified a scarcity of Engineering and Operations middle managers/supervisors at the NQF 5 and 6 levels. ‘Critical’ skills identified in these areas included industry knowledge and understanding, financial management and understanding, and generic skills such as communication and problem-solving. According to the study, ‘Professional’ occupations showed scarce skills in electrical, mechanical, industrial and metallurgical engineering, again at NQF levels 5 and 6. Critical skills included maintenance orientation and knowledge (with this applying to engineering professionals and technicians specifically).

In respect of ‘Trade Worker’ occupations, the MERSETA study showed a scarcity of skilled artisan training for NQF levels 3 through 5, with this particularly evident for generic trades such as mechanical⁴⁵, fabrication⁴⁶, electrical⁴⁷ and automation. Finally, ‘operator’ occupations showed two levels of scarce skills, the first of which relates to manufacturing and engineering production operators⁴⁸.

⁴⁵ Mechanical trades include fitter, fitter and turner, machine setter, roll turner, milling machinist, instrument technician (Umhlaba, 2006: 4).

⁴⁶ Fabrication trades include metal moulder, sheetmetal trades workers, welders (ibid.).

⁴⁷ Electrical trades include electrician, amateur winders, HT electrician, lift mechanics, air conditioning and refrigerator mechanics (ibid.)

⁴⁸ Including arc welders, brake press operators, CNC machine operators, furnace operators, metal rolling mill operators, sheet metal workers, and tool setters

In 2006, the MERSETA published its *Sector Skills Plan Review*, which identified several crosscutting themes occurring both nationally and across the MERSETA sectors, namely the persistence of skills deficiencies relating to information communication technology (ICT) and customer management. However, the SSP Review found that for the manufacturing sectors specifically, core technical skills continue to be urgently needed, particularly at the level of technician and artisan — skills which the MERSETA identified as both *scarce* and *critical*. The study added that there is an increasing demand for high-level, combined skills, such as those required for advanced project management, in which industry knowledge, experience, information technologies and other technical skills coalesce (MERSETA Sector Skills Plan Review, 2006: 51).

4.2.3. DoL National Scarce Skills List

In addition to the work completed by the MERSETA, the national government's Department of Labour issued its National Scarce Skills List in 2006, a significant proportion of which relates directly to skills priorities in the automotive industry. Table 17 below lists the scarce skills (occupations and specialisations) identified by the DoL, which pertain to the automotive and components industries.

Table 17: Scarce skills in the automotive manufacturing industry (as extrapolated from the DoL's National Scarce Skills List (2006))

Generic Occupation	Specialisation
Engineering Technicians	<ul style="list-style-type: none"> • Electrical Engineering Technicians • Mechanical Engineering Technicians • Mechatronics Technicians • Robotics Technicians • Tool Design Technicians
Electricians	<ul style="list-style-type: none"> • Electricians (special class)
Electronics and Telecommunications Trades Workers	<ul style="list-style-type: none"> • Electronics Trades Workers • Electronics Instrument Trades Workers • Electronic Equipment Trades Workers
Engineering Professionals	<ul style="list-style-type: none"> • Product Design Engineers⁴⁹ • Industrial Engineers • Mechanical Engineers (especially mechatronics) • Industrial/Product Development Technologists
Fabrication Engineering Trades Workers	<ul style="list-style-type: none"> • Sheet metal Trades workers⁵⁰ • Structural steel and welding trades workers⁵¹ • Metal fabricators (including boilermakers)
Manufacturing and Process Technicians	<ul style="list-style-type: none"> • Polymer Technologists
Mechanical Engineering Trades Workers	<ul style="list-style-type: none"> • Metal Fitters and Machinists • Fitter and Turners • Machine Tool Setters • Millwrights • Mechatronics Technician/Trades Workers
Other	<ul style="list-style-type: none"> • Vehicle body builders and trimmers • Vehicle painters

⁴⁹ Includes automotive design engineers, blow and injection moulding, and industrial/product development technologists.

⁵⁰ Including metal pressing.

⁵¹ Includes ASME coded welders and nuclear qualified welders.

4.3. Comparisons between the findings of the DoL, MERSETA and firm-level research

A comparison of the scarce and critical skills findings identified in the firm-level primary research and the MERSETA Scarce Skills List show a high level of alignment, suggesting largely consistent findings. The similarities are moreover encouraging, insofar as they reflect a broad-based understanding of critical and scarce skills issues impacting on the industry. While a number of the scarce skills identified in the DoL's *National Scarce Skills List* are not substantiated by the primary (firm-level) or secondary (MERSETA) findings, these, too, show a significant degree of alignment, revealing that industry bodies are 'in-touch' with the skills issues plaguing the automotive components industry – obviously a positive finding. This is revealed in the following table, which summarises the key skills shortfalls identified in all three studies.

Table 18: Comparative identification of scarce skills

This study (2007)	Department of Labour (2006)	MERSETA (2006)
<ul style="list-style-type: none"> • Artisan/trade skills: electricians, fitters and turners, millwrights, electronics, tool jig and die • Professional: industrial engineers, mechanical engineers, electrical engineers • Management: supervisors, production management 	<ul style="list-style-type: none"> • Engineering technicians: electrical, mechanical, mechatronics, robotics, tool design • Electricians • Electronics Trades Workers: electronics, electronic equipment • Engineering Professionals: product design, industrial, mechanical (especially mechatronics), industrial/product development technologists • Fabrication Engineering Trades Workers: sheet metal, structural steel and welding, metal fabricators • Mechanical Engineering Trades Workers: metal fitters/machinists, fitter and turners, machine tool setters, millwrights, mechatronics • Vehicle body builders and trimmers • Vehicle painters 	<ul style="list-style-type: none"> • Management: engineering and operations middle management. • Professional: electrical, mechanical, industrial and metallurgical engineers • Trade Workers: mechanical, fabrication, electrical and automation • Operator: manufacturing and engineering production operators, stationary plant operators

A key unanswered question that emerges from the findings is far less positive however; namely, why has the scarce and critical skills situation confronting the South African automotive components industry deteriorated, when critical shortfalls were identified very clearly as far back as 2002 by the MERSETA? The firm-level research completed by B&M Analysts was unequivocal in this regard, with 11 of the 12 surveyed firms indicating that recruitment lead times had lengthened and that their skills deficiencies had become more, rather than less acute over the last couple of years. Whilst an awareness of the skills problems confronting the industry may be in place, this is simply the starting point for any positive set of interventions. To **effectively improve** the situation, far more still clearly needs to be done to ensure the industry has the requisite skills to compete against increasingly aggressive and capable international competitors.

5. Conclusions

The research findings generated are illuminating (for the authors at least!). As highlighted in Section 1, the South African automotive industry has done extremely well since the birth of South Africa's democracy in 1994. Sound growth rates, burgeoning exports, growing productivity, and significantly more capital investment than evident in other domestic manufacturing sectors, has ensured its status as a 'stand out' performer. As also highlighted in Section 1, there are a number of significant challenges confronting the industry. The South African automotive industry is competing against the 'big league' of manufacturing economies, with a mix of well-established developed economies and rapidly growing developing economies targeting the industry as a key economic growth enabler. As the MIDP's benefits reduce, increased pressures are therefore confronting local automotive assembly and component operations. This is evident in respect of the import surge presently being experienced in the domestic market, the loss of recent export contracts (e.g. the Ford Focus to Australia), and in the case of the automotive components industry more specifically, the demand by customers that they reduce their pricing – in line with ever cheaper Asian competitors.

Underpinning these concerns is a widely held perception that South African automotive component manufacturers are simply not competitive at the firm-level, with this relating to exorbitant logistics and materials costs and low levels of productivity. Whilst the former set of issues (logistics and materials costs) can partly be addressed through increased skills acquisitions in key management line function areas responsible for procurement and logistics management, there are a broader set of structural reasons for South Africa's lack of competitiveness in these areas; and these will therefore need to be addressed at a policy and broader government level. The latter issue lies at the core of this research report, however, with the lack of firm-level productivity, at least in part, directly related to skills deficiencies in critical line function areas of operation.

These skills issues were then focused upon in-depth in Sections 2 and 3 of the report; with Section 2 looking at the skills issue from a demand perspective and Section 3 from a supply perspective. Section 2 considered the existing employment profile of South African automotive component manufacturers, and then using an employment forecast based on employment growth over the period 2001 to 2006 (which averaged 4.4% per annum), as well as the mix of present challenges and opportunities facing the industry, projected annualized employment growth at 2.4% to both 2010 and 2015. Holding, the proportionate breakdown of employees equal to 2006 levels, aggregated employment for the South African automotive components industry, and its various categories of employment, was projected at 85,582 for 2010 and 96,357 for 2015. As highlighted in Section 2, the majority of this employment is projected to remain at a semi-skilled level, although there will also be significant demand for skilled employees at a management, as well as professional and artisanal levels.

Based on 2006 industry employment levels, future employment demand and 2003 to 2006 average rates of employee attrition at a management, professional staff and artisanal level, the research completed suggested substantial skills demands to 2010 and 2015. In total 738 new managers, 765 new professional staff and 906 new artisans were calculated as needing to join the industry by 2010, with the comparative figures for 2015 sitting at 1,764, 1,830 and 2,167 respectively.

Whilst these high levels of demand for skills suggest an extremely healthy future operating environment for automotive component manufacturers, Section 3 provides a rather harsh reality check for industry stakeholders. As revealed in this section, skills demand may be high, but there is no indication that South Africa is positioned to provide the industry with its requisite skills needs. Despite a sufficient number of graduates apparently emerging from South African TEIs and FETs at a very broad level, the firm-level findings suggested very significant graduate deficiencies from particular educational institutions, and insufficient numbers of graduates emerging from credible institutions. The three most striking skills findings generated, relate to:

- Extended recruitment lead times, which are as high as 4.3 months for industrial engineers and production managers, and 4.2 months for skilled electronics staff.
- The aging profile of professionals at South African automotive component manufacturers, and the implications of this for the absorption of cutting-edge technology, most of which is electronics based.
- The failure of firms to invest in skills development as a means to compensate for deficiencies at Tertiary Educational Institutions, FET institutions and the labour market more broadly. For example, in comparison to their international competitors (as gauged through the activities of the SAABC), South African automotive component manufacturers spend less money on training employees, whilst also providing less formal off-line training to artisans, professional staff and management.

The existing skills demands indicated in Section 2 and the deficiencies, or supply constraints, highlighted in Section 3, are fortunately well understood by the two principal institutions mandated to support skills development within the automotive components industry, namely the DoL and the MERSETA. As unpacked in Section 4, the two institutions highlighted similar skills constraints (to that identified in this report) in their previous reviews of the manufacturers that fall within their ambit of responsibility. The key question that emerges from this research then, is why are skills shortages in the industry becoming more severe, when they are apparently well understood and have been extensively documented since 2002?

Interestingly, this is the exact question posed by Professor David Kaplan in a recent Financial Mail article (24th of August 2007). Kaplan argues that skills declines in the broader productive sectors of the economy are well

understood and that the limited remedial action taken by firms and government in the face of these declines represents institutional failure. Most notably, Kaplan argues for the need to dissolve the SETAs and institute a training incentive for firms that more aggressively encourages skills upgrading without SETA mediation of any kind. Whilst the ambit of the research presented in this report does not allow for an informed perspective on the merits of such an approach to skills upgrading, Kaplan's analysis of the skills status quo in South Africa appears to be entirely consistent with the findings generated.

In conclusion, then, is the industry on the brink of a major skills crisis? Or is the very real danger for the automotive components industry that skills shortages no longer remain skills shortages because South African based operations cease to be sufficiently competitive in the face of growing international competition (a very real threat as MIDP benefits reduce over the next few years) – resulting in their closure, as business is lost to competitors, or relocated to sister plants operating in more competitive national economies?

Strong demand for skills in the automotive components industry is incredibly healthy for the South African economy, but the lead times quoted by firms, as well as other evidence generated from the firm-level and broader secondary research, does not auger well for the future of the industry. In fact, a great irony may very well be sitting in the research completed. Our projections of skills demand to 2010 and 2015 may be completely wrong, precisely because skills supply constraints grow to the point where firms can no longer grow their businesses in South Africa, nor effectively compete with international competitors. If this occurs it is entirely conceivable that demand will drop sharply and supply will no longer be an issue. Unfortunately, this would sound the industry's death knell, thus supporting the view of those analysts who do not believe South Africa has the ability to manufacture high value added products for the domestic and international markets.

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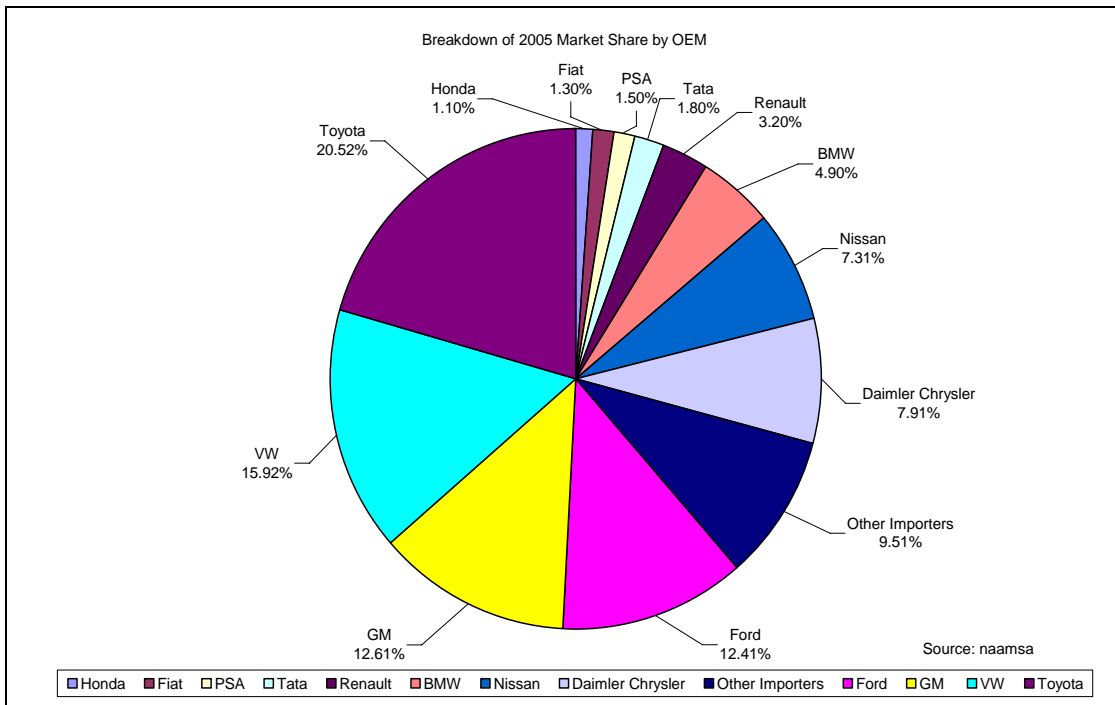
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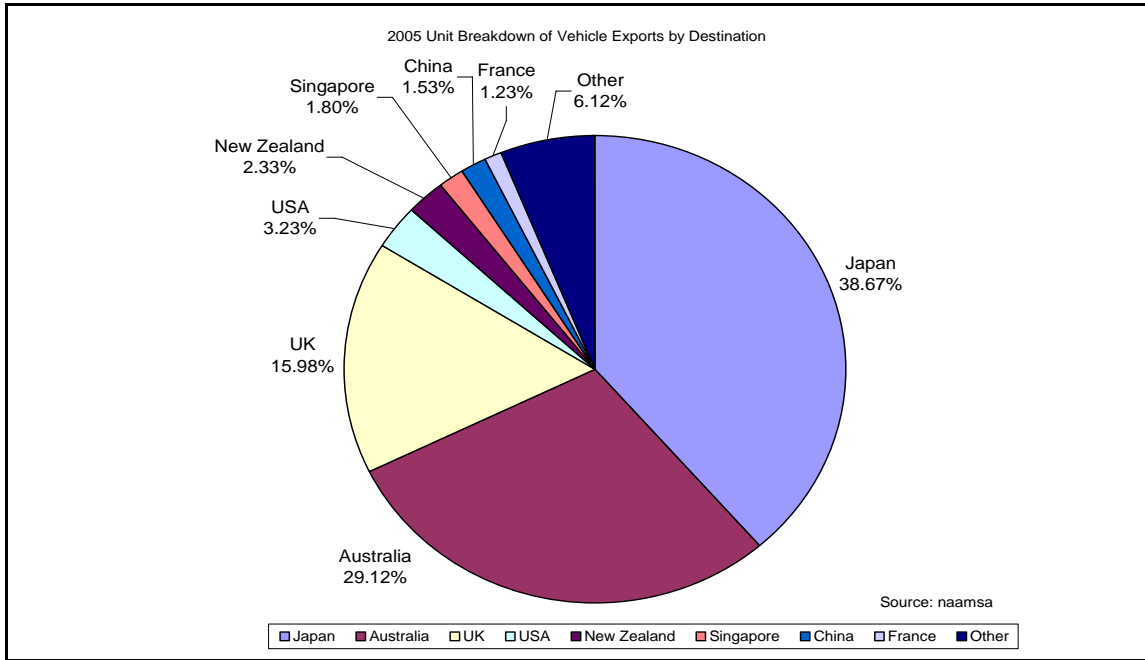
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Appendix A: Market Share by OEM (2005)



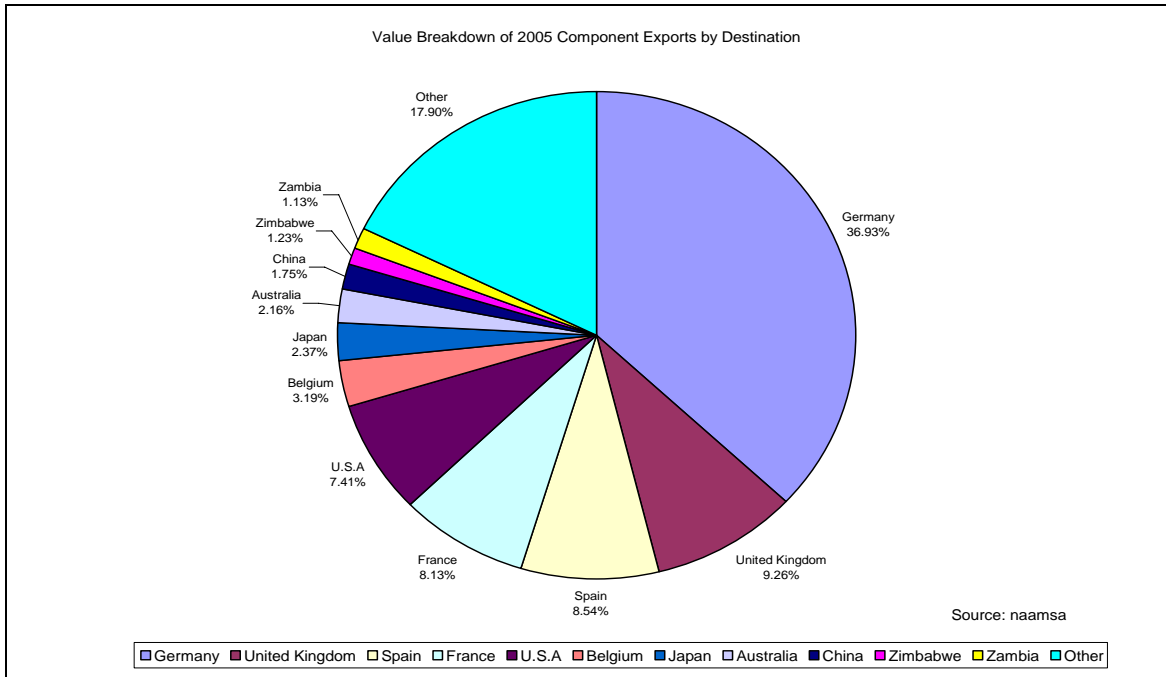
(Source: Barnes and Comrie, 2007: 16)

Appendix B: Breakdown of Vehicle Exports by Destination (2005)



(Source: Barnes and Comrie, 2007: 14)

Appendix C: Breakdown of Component Exports by Destination (2005)



(Source: Barnes and Comrie, 2007: 15)

Appendix D: Top 11 Parts and Components Imported (in R millions)

Parts Category	2003	2004	2005
Engine parts	1 416	1 395	1 536
Automotive tooling	1 002	1 728	1 229
Tyres	899	1 005	1 225
Stitched leather components	631	630	828
Gauges/Instrument parts	483	549	666
Brake parts	429	513	599
Catalytic converters	365	337	256
Transmission shafts	307	300	311
Car radios	298	327	320
Lighting equipment/parts	238	265	399
Axles	211	200	315
Other	7 645	7 239	9 310
Total	13 502	14 488	16 994

Source: the dti/TISA

Appendix E: Key Academic Support Institutions to the SA Auto Industry

According to research compiled by the Institute for Higher Education at Shanghai Jiao Tong University, there are only a handful of world renowned academic institutions in Africa. Of these, one is the University of Cairo in Egypt, and the remaining four in South Africa. The study ranked the world's 500 top-performing universities, based on a weighted rubric involving the following key indicators:

- The number of university staff and alumni who have been awarded either a Nobel Prize or Fields medal in their respective field,
- The number of highly cited researchers at the institution,
- The number of articles written by university staff, which are published in Nature and Science, and
- The number of articles written by university staff and indexed in Science Citation and Social Science Citation indices⁵².

Table 15 below highlights the critical indicators described in the study, and compares South African universities with the University of Cairo, and two top-performing U.S. universities.

Table 16: Critical Measurements of South African Universities

	No. of Alumni Awards	No. of Staff Awards	No. of Highly Cited Researchers	Nature and Science Publications	SCI/SSC Index	Size
Univ. of Cape Town	24,2	0	11	12,5	30,4	17,6
Univ. of Witswatersrand	24,2	0	0	8,7	25,7	14,6
Univ. of KwaZulu-Natal	0	0	7,7	9,8	22,9	11,9
Univ. of Pretoria	0	0	0	9,1	26,7	12,9
University of Cairo	25	0	0	0	22,5	13
University of Cambridge	96,3	91,5	53,8	59,5	67,1	66,5
MIT	72,9	80,6	66,6	66,4	62,2	53,6

⁵² The weighted scores of the above indicators were then divided by the number of full-time academic staff. For each indicator, the highest scoring institution was assigned a score of 100, and the others were calculated as a percentage of this top score.

Appendix F: Schedule of Interview Questions

- a. Please unpack the specific qualifications/skills breakdown of your existing management, professional staff, artisans and 'other' employment categories.
- b. What critical skills gaps presently exist in respect of each of these employment categories? Please prioritise these in order of importance.
- c. For each of the critical skills gaps, what is the average lead-time required to fill individual positions?
- d. Has this lead-time improved or deteriorated over the last 24 months?
- e. What are the specific qualifications/skills likely to be required by the company in 2010?
- f. What strategies does your firm have in place to overcome existing skills deficiencies? How far have these strategies advanced and have they been successful to date?
- g. Which institutions are best to source from for key technical positions? Please differentiate for specific skills sets
- h. Which institutions do you avoid in respect of technical skills recruitment, and why?