COMMODITISATION'S IMPACT ON THE ECONOMIC SUSTAINABILITY OF PRIMARY AUTOMOTIVE SUPPLIERS IN SOUTH AFRICA: THE CASE OF THE AUTOMOTIVE CHEMICALS INDUSTRY

by

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I declare that this dissertation, entitled *"Commoditisation's impact on the economic sustainability of primary automotive suppliers in South Africa: the case of the automotive chemicals industry,"* is my own work and that all sources I have used or quoted have been indicated and acknowledged using complete references. I declare that I have not submitted this work, or part of it, for examination to the University of South Africa, or to any other higher education institution, for another qualification. I further declare that I have submitted the dissertation for originality checking and that it falls within the accepted requirements for originality.

25th October 2022.

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"Vos autem non est senex discere"
(You are never too old to learn)

ABSTRACT

The re-integration of the domestic automotive industry into the global operating environment has led to increased levels of competition, increased supply chain complexity, escalating input costs, and declining product prices within the automotive industry. Consequently, domestic manufacturers of specialty chemical products for the automotive industry in South Africa face numerous challenges that threaten their profitability and long-term economic sustainability. This study is directed at the concern of the phenomenon of commoditisation and its impact on the future economic sustainability of domestic automotive chemicals businesses supplying specialty process chemicals to the South African automotive industry. The aim of this dissertation was to explore and identify the major challenges facing the South African automotive chemical industry and specifically examine the impact of the cost and price dimensions of commoditisation on business profitability and the economic sustainability of this industry in South Africa. An exploratory qualitative research design using a thematic data analysis approach was adopted for this study. Viewpoints of six key participants, selected by the researcher based on their industry expertise, were collected using one-on-one, in-depth semi-structured interviews to empirically establish the factors present in the industry that could lead to commoditisation. The study established that the results could be categorised according to five themes representing key factors present in the industry that are linked to the price and cost dimensions of commoditisation, namely “competitive environment,” “industry factors,” “operational factors,” “commoditisation,” and “business relationships and power.” The study concluded that the continued presence of the factors identified would progressively lead to diminishing profit margins and adversely impact the long-term economic sustainability of domestic automotive chemical supplier businesses. Focused actions such as improving business relationships with automotive customers, striving to achieve supply chain excellence, and regular scanning of the business environment for signals of encroaching commoditisation were recommended to enable automotive chemical supplier businesses to strategically manage commoditisation and improve profitability.

Keywords:

Automotive chemical industry, automotive original equipment manufacturers, profitability, economic sustainability, globalisation, commoditisation, hyper-competition, value chain, supply chains, buyer-supplier relationships.

OPSOMMING

Die herintegrasie van die binnelandse motorbedryf na die globale bedryfsomgewing het gelei tot ’n toename in mededingingsvlakke, verhoogde voorsieningskettingskompleksiteit, eskalerende insetkoste en dalende kommoditeits produkpryse in die motorbedryf. As gevolg hiervan kom binnelandse vervaardigers van spesialiteits- chemiese produkte vir die motorbedryf in Suid-Afrika voor verskeie uitdagings te staan wat hulle winsgewendheid en langtermyn- ekonomiese volhoubaarheid bedreig. Hierdie studie is gerig op die kommoditering en die invloed daarvan op die toekomstige ekonomiese volhoubaarheid van binnelandse motorchemiese-ondernemings wat spesialiteits- verwerkingschemiesestowwe aan die Suid-Afrikaanse motorbedryf lewer. Die doel was om die grootste uitdagings van die Suid-Afrikaanse motor- chemiese bedryf te verken en te identifiseer en om in die besonder die invloed van die koste- en prysdimensies van kommoditering op sakewinsgewendheid en die ekonomiese volhoubaarheid van hierdie bedryf te ondersoek. ’n Verkennende kwalitatiewe navorsingsontwerp wat ’n tematiese dataontledingsbenadering gebruik, is vir hierdie studie aangepas. Die standpunte van ses sleuteldeelnemers, gebaseer op hulle bedryfskundigheid, is met behulp van aangesig-tot-aangesig-, omvattende, semigestruktureerde onderhoude ingesamel om die faktore teenwoordig in die bedryf wat tot kommoditering kan lei, empiries vas te stel. Die studie het vyf temas bepaal wat die sleutelfaktore tans in die bedryf verteenwoordig en met die prys- en kostedimensies van kommoditering verbind kan word, naamlik “mededingende omgewing”, “bedryfsfaktore”, “operasionele faktore”, “kommoditering” en “sakeverhoudings en mag”. Die studie het tot die gevolgtrekking gekom dat die voortgesette teenwoordigheid van die geïdentifiseerde faktore progressief tot dalende winsgrense sal lei en ongunstig sal inwerk op die langtermyn- ekonomiese volhoubaarheid van binnelandse motor-chemieseverskafferondernemings. Gefokusde optrede soos die verbetering van sakeverhoudings met motorkliënte, ’n strewe om voorsieningskettinguitnemendheid te bereik, en die gereelde bestudering van die sake-omgewing vir tekens van dreigende kommoditering word aanbeveel om motor- chemieseverskafferondernemings in staat te stel om kommoditering strategies te bestuur en winsgewendheid te verbeter.

Sleutelwoorde:

Motor- chemiesebedryf, oorsponklike motortoerustingvervaardigers, winsgewendheid, ekonomiese volhoubaarheid, globalisering, kommoditering, hipermededinging, waardeketting, voorsieningskettings, koper-verskafferverhoudings.

ISISFNQO

Ukuhlanganiswa kabusha kwemboni yezimoto yasekhaya endaweni yokusebenza emhlabeni wonke kuholele ekwenyukeni kwamazinga okuncintisana, ukwanda kwenkimbinkimbi yochungechunge lokuhlinzeka, ukukhuphuka kwezindleko zokufakwayo, kanye nokwehla kwamanani entengo yemikhiqizo ngaphakathi kwemboni yezimoto. Ngakho-ke, abakhiqizi basekhaya bemikhiqizo yamakhemikhali akhethekile embonini yezimoto eNingizimu Afrika babhekene nezinselelo eziningi ezibeka engcupheni inzuzo yabo kanye nokusimama komnotho wesikhathi eside. Lolu cwaningo luqondiswe kwezohwebo kanye nomthelela walo ekusimameni komnotho wangomuso kumabhizinisi asekhaya amakhemikhali ezimoto ahlinzeka ngamakhemikhali akhethekile embonini yezimoto yaseNingizimu Afrika. Inhloso bekuwukuhlola kanye nokuhlonza izinselelo ezinkulu ezibhekene nemboni yamakhemikhali ezimoto eNingizimu Afrika kanye nokuhlola ngqo umthelela wezindleko namanani entengo yempahla etholakalayo enzuzweni yebhizinisi kanye nokusimama komnotho wale mboni. "Umklamo wocwaningo lwesimo noma lwekhwalithi yokuhlola usebenzisa indlela yokuhlaziya imininingwane yendikimba yamukelwe kulolu cwaningo. Imibono yabahlanganyeli abayisithupha ababalulekile, ngokusekelwe kulwazi lwabo lwemboni, yaqoqwa kusetshenziswa izingxoxiswano ezijulile zomuntu ngamunye ezihlelwe kancane ukuze kutholakale ubufakazi obunamandla obukhona embonini obungaholela ekuthengisweni kwempahla. Ucwaningo lusungule izindikimba ezinhlanu ezimele izinto ezibalulekile ezikhona embonini ezixhunyaniswe nenani nezindleko zobukhulu bempahla, okungukuthi "indawo yokuncintisana," "izici zemboni," "izici zokusebenza," "impahla," kanye "nobudlelwano bebhizinisi namandla." Ucwaningo luphethe ngokuthi ukuqhubeka nokuba khona kwezinto ezikhonjiwe kuzoholela kancane kancane ekuncipheni kwezilinganiso zenzuzo futhi kube nomthelela omubi ekusimameni komnotho wesikhathi eside wamabhizinisi asekhaya ahlinzeka ngamakhemikhali ezimoto. Izenzo ezigxilile ezinjengokuthuthukisa ubudlelwano bebhizinisi namakhasimende ezimoto, ukulwela ukuzuza impumelelo kuyichungechunge lokuhlinzekwa, kanye nokuskena okuvamile kwendawo yebhizinisi ukuze kutholakale izimpawu zokungena kwempahla ethengiswayo kwatuswa ukuze amabhizinisi abahlinzeki ngamakhemikhali ezimoto akwazi ukuphatha ngobuchule ukuthengiswa kanye nokuthuthuka ekwenzeni inzuzo.

Amagama balulekile:

Imboni yamakhemikhali ezimoto, abakhiqizi bemishini yoqobo yezimoto, inzuzo, ukusimama komnotho, ukuhwebelana umhlaba wonke, ukuthengiswa kwempahla, ukuncintisana okweqile, uchungechunge lwenani, uchungechunge lokuhlinzeka, ubudlelwano bomthengi nomhlinzeki.

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LIST OF ABBREVIATIONS AND ACRONYMS

The following acronyms and abbreviations are used throughout the dissertation.

ACIS	-	Automotive Chemical Industry Supplier
ACM	-	Automotive Component Manufacturer
ACS	-	Automotive Component Supplier
AIEC	-	Automotive Industry Export Council
APDP	-	Automotive Production and Development Programme
B2B	-	Business-to-Business
BAIC	-	Beijing Automotive Group Company Ltd
B-BBEE	-	Broad-Based Black Economic Empowerment
BOM	-	Bill of Materials
CAQDAS	-	Computer-Assisted Qualitative Data Analysis Software
CBU	-	Completely Built-Up
CKD	-	Completely Knocked-Down
COVID-19	-	Coronavirus Disease
DTI	-	Department of Trade and Industry
EOS	-	Economies of Scale
FDI	-	Foreign Direct Investment
GDP	-	Gross Domestic Product
GVC	-	Global Value Chain
ISO	-	International Standards Organisation
MIDP	-	Motor Industries Development Programme
MNC	-	Multinational Company
NAACAM	-	National Association of Automotive Component and Allied Manufacturers
NAAMSA	-	National Association of Automobile Manufactures of South Africa
OEM	-	Original Equipment Manufacturer
PwC	-	PricewaterhouseCoopers
R&D	-	Research and Development
RBV	-	Resource-Based View

ROIC	-	Return on Invested Capital
RP	-	Research Participant
SAAM	-	South African Automotive Master Plan
SCM	-	Supply Chain Management
TSR	-	Total Shareholder Return
UNISA	-	University of South Africa
USA	-	United States of America
VAA	-	Vehicle Assembly Allowance
WTO	-	World Trade Organisation

CHAPTER 1:
INTRODUCTION AND BACKGROUND TO THE STUDY

1.1. INTRODUCTION

Changing business conditions in the global automotive industry in the 21st century, as a result of globalisation and liberalisation, have created a new set of challenges for the global automotive industry. Automotive original equipment manufacturers (OEMs) and their supply base are facing issues such as modern technologies, escalating consumer demands, and economic uncertainty. Shifts in global sourcing and automotive supply chain strategies have created more complexity, challenging the profitability of automotive OEMs and automotive suppliers. This has resulted in a highly competitive manufacturing environment with growing competition between vehicle manufacturers (Ambe & Badenhorst-Weiss, 2019).

While the challenges of South African OEMs in this competitive environment have been well researched in early studies by Black (2001), Black (2009), Black (2011), Naude (2009), Naude and O’Neill (2011), and Ambe and Badenhorst-Weiss (2013), the implications for the primary automotive supplier base from an economic sustainability perspective are potentially more concerning. In an early publication by the Kotler Marketing Group (2009), they concluded that automotive suppliers continue to be called upon by the OEMs to share in their challenges by providing price reductions for them to achieve their cost-down objectives. As a result of this pressure, most automotive supplier businesses continue to be exposed to increased pressure on their profit margins.

The current study was centred around the impact of changing automotive value chain requirements on the economic sustainability of automotive chemical industry supplier (ACIS) businesses. Although numerous studies have been directed at the competitive pressures being exerted on the South African automotive component supplier (ACS) base, no specific research pertaining to the impact of these automotive industry pressures on the domestic ACIS businesses could be found in the literature. Because automotive process chemicals in the form of adhesives, sealants, and surface treatment products play a significant role in the automotive value chain, it can be argued that domestic ACIS businesses are strategically important to both automotive component and original equipment manufacturing customers as the products and services provided by ACIS businesses form an integral part of the automotive manufacturing process.

The challenges facing the domestic ACIS businesses in the context of achieving long-term economic sustainability in the globalised South African automotive industry were of specific interest to this study. The aim of this research study was therefore directed at identifying the underlying issues contributing to the encroaching commoditisation of specialty process chemical products supplied to the automotive industry. Of particular interest was the contribution of the phenomenon of commoditisation, which refers to the erosion of profit margins of domestic ACIS businesses with a negative impact on long-term business relationships with automotive customers and, ultimately, the economic sustainability of domestic ACIS businesses.

The purpose of this chapter is to provide a background to the study, an understanding of the theory and motivation for conducting the research study, and an insight into the significance of the study. The chapter commences with a background to the study, from which the motivation, problem statement, research questions, and research objective were derived. The selected research design and methodology are briefly explained in this chapter, together with the ethical considerations pertaining to this study. To conclude, a layout of the study chapters to follow is provided, together with a schematic representation outlining the intended major exploratory discussion topics relating to the automotive and automotive chemical industry business environments.

1.2. BACKGROUND TO THE STUDY

According to Ikome, Laseinde and Katumba (2022), intensified competition amongst global automotive manufacturers has forced automotive companies to search for alternative growth and cost-reduction opportunities to ensure that their companies remain competitive and profitable. As a result, many of these global automotive companies have shifted their production base from developed countries to developing countries to take advantage of lower manufacturing costs. This shift has brought about significant transformation in the automotive industries of developing countries such as South Africa. Crampton (2017) pointed out that most challenges South Africa's automotive industry face can be attributed to automotive OEMs hastening to become more competitive by improving production outputs with a simultaneous reduction in manufacturing costs to reduce their vehicle prices. This view was supported in an early study by Naude (2009), who concurred that two of the main challenges confronting the South African automotive manufacturing industry are the need to produce vehicles at a competitive cost and the ability to respond quickly and reliably to first-world market demands.

The various sectors and subsectors of the South African chemical industry have not escaped the myriad of challenges brought about by globalisation and trade liberalisation. The South African chemical industry prior to democracy, having been founded under a policy of isolationism and protectionism, was shielded from global competition. In the twenty years since democracy in South Africa, the chemical industry has adapted well to global pressures (Majozi & Veldhuizen, 2015). Notwithstanding these adaptations, and as a result of the years of isolation from international competition, numerous challenges remain in the various sectors and subsectors of the South African chemical industry.

The domestic automotive chemical manufacturing industry,[1] a subsector of the South African speciality chemicals industry that produces customised formulated chemical performance products for the automotive manufacturing industry, is one such subsector that is experiencing specific challenges brought on by global pressures from the automotive industry in which it operates, namely, the automotive industry. According to Budde, Ezekoye, Hundertmark, Prieto and Simons (2017), the specialty chemical industry sector in South Africa has been able to increase its productivity and retain profit gains over a long period, outperforming the overall market. This picture is changing as the specialty chemical industry sector is expected to come under an increasing profitability threat going forward. This is underpinned by the fact that since 2012 the financial performance has been less than favourable in some chemical subsectors. This can be ascribed to slowing growth in demand and significant increase

[1] Specialty chemicals are formulated chemical products that are supplied to the automotive industry on the basis of their function and influence on the processing and ultimately the performance of the customers' products. The specialty chemicals industry can be subdivided based on end-user-driven segments such as the automotive industry. Automotive chemical industry supplier (ACIS) businesses support vehicle manufacturers in developing chemical solutions to address automotive industry challenges such as developing light-weight vehicle designs. Bonding, sealing, and surface treatment technologies play a significant role in structural design and corrosion protection in modern multi-mix vehicle construction materials used in light-weight design.

in competitiveness (Budde et al., 2017). Segment profitability, according to Budde et al. (2017), is now more dependent on specific industry structures (such as the automotive industry) than the specific technical content of business offerings. In the context of the high levels of competitiveness in the automotive industry brought about by the globalisation of the industry, it is expected that domestic specialty chemicals segments such as the automotive chemicals industry will continue to come under profitability threat.

The automotive specialty process chemicals market can be characterised as being a quasi-monopoly, in other words there is more than one supplier of automotive chemical products. However, the nature of the competition is such that a similar kind of servicing and pricing is offered to the OEMs and ACS customers.

According to Mankiw (2007), some of the characteristics of a quasi-monopolistic market are:

- less than four very large suppliers;
- market requirements dictate high barriers to entry;
- the type of product and service provided to the market demonstrates little differentiation; and
- pricing is a factor of limited competition as opposed to that of supply and demand.

It should be noted that these multinational specialty chemical companies have stringent anti-collusion compliance requirements in their home countries which are rolled out to their South African affiliates. An in-depth background on the automotive chemical industry is provided in Chapter 4 of this dissertation.

There are two major domestic automotive chemical suppliers with domestic manufacturing capability servicing the seven automotive OEMs as well as a few smaller chemical suppliers servicing numerous automotive component manufacturers (ACMs) in South Africa. The two major domestic automotive chemical suppliers are local affiliates of multinational companies (MNCs). Despite there being some minor domestic companies that provide imported non-production chemical products to the OEMs, these two major MNCs hold the majority share of the automotive specialty process chemical market in South Africa, specifically because of their multinational links.

A significant contemporary challenge faced by the automotive chemicals industry, globally and in South Africa, was that of the coronavirus (COVID-19) pandemic. The chemical industry is still experiencing the effects of the outbreak of the COVID-19 virus in key regions, primarily in the form of supply chain disruptions (even though governments have lifted restrictions on movement globally) and falling demand due to uncertainty in the global economy. The COVID-19 pandemic has caused extensive economic distress for many businesses, both internationally and in South Africa. The 2020 COVID-19 pandemic lockdown and second and third waves of infections in 2021 and 2022 have had a continued negative impact on South African automotive manufacturer production volumes due to reduced domestic and export demand. It could therefore be argued that this will have a continued negative impact on the supply of specialty automotive process chemicals to the domestic automotive industry.

1.3. MOTIVATION FOR THIS STUDY

1.3.1. Motivation

This study was directed at the concern of commoditisation and its effect on the future economic sustainability of domestic automotive specialty chemicals businesses supplying specialty process chemicals to South African-based global automotive OEMs and ACSs. This area of focus is important to the South African automotive industry since automotive specialty process chemicals play a crucial role in the automotive manufacturing process. This role does, however, need to be contextualised within the general automotive industry trend towards fewer domestic and more multinational suppliers entering the domestic market and the comparatively low profile of ACIS businesses in the automotive value chain.

1.3.2. Significance

This study has significant relevance in terms of the South African domestic ACIS businesses, their role in the South African automotive value chain, their strategic importance in the vehicle manufacturing process, their current level of competitiveness, and prospects of economic sustainability in the future. This study was expected to expose some of the key challenges facing the automotive chemical industry, to gain an understanding of the impact of these challenges on the economic sustainability of the automotive chemical industry. In doing so, it was anticipated that the study will provide a useful analysis of the dynamics of the domestic automotive chemical industry and provide a unique perspective on the factors that can negatively impact the economic sustainability of domestic automotive chemical industry businesses.

1.4. PROBLEM STATEMENT

The domestic automotive industry has gone, and continues to go, through a significant transformation process which is having a significant impact on South African ACIS businesses that operate in an increasingly challenging automotive business environment. The contemporary automotive business environment is characterised by increasing complexity, supply chain changes, and competitive pressures. To remain competitive, ACIS businesses must address these challenges by managing costs, quality, and risks holistically. With car manufacturers shifting their operations to emerging markets, the production footprint of the automotive supplier industry continues to globalise. Supply chain complexity is increasing and ACIS businesses are having to cope with increasing flexibility demands as a result of industry volatility and fluctuation in global demand. As the bargaining power of automotive OEMs strengthens, ACIS business performance must improve year on year just to offset OEM-imposed price reductions (Oliver Wyman, 2016). This competition and cost pressure makes it increasingly challenging for domestic ACIS businesses to bridge the gap between industry demands for higher quality and lower cost. It can thus be argued that the challenges confronting domestic automotive chemical businesses are reflected in their competitiveness and ability to compete with imported products in a globalised domestic automotive industry.

Independent of the competitive pressures emanating from the automotive industry, domestic ACIS businesses face additional chemical industry challenges such as the high cost of large volumes of imported input base chemical raw materials that are used in the manufacture of specialty formulated products for the automotive industry. These raw material costs are further exacerbated by import tariffs, rate of exchange volatility, and delays at ports, amongst others. These costs, which need to be absorbed by automotive chemical manufacturers to maintain competitive market pricing, result in diminishing profit margins for chemical manufacturers (Oliveira, 2014). Low supplier profitability levels typically lead to less investment into business operations, resulting in compromised quality and efficiency (Comrie, Terreblanche, Johnson & Snyman, 2013).

The research problem was indicative of the dearth of specific research and knowledge relating to the automotive chemical industry in terms of the role and importance of this industry to the South African automotive manufacturing industry, the unique challenges they face, and the long-term economic sustainability of these domestic automotive chemical businesses. Domestic automotive chemical industry businesses are experiencing increased profit-margin pressure as a result of rising input costs and price-reduction pressure from automotive OEMs. The inability of automotive industry businesses to maintain a profitable position in the industry going forward due to OEM downward price pressure and escalating input costs could bring their long-term economic sustainability and domestic existence into question. This would in turn suggest that domestic manufacturing of specialty process automotive products could be terminated in favour of importing products which would create an alternative costly set of challenges for domestic automotive OEMs. The impact on domestic OEMs for example would be; exposure to limitations in terms of length of supply chain, supply chain flexibility, domestic product development, product customisation and technical service to name but a few. The significance of solving this automotive chemical industry dilemma would ensure continued fair profitability for automotive chemical industry businesses enabling them to provide the continued advantages of a domestic product manufacturing presence. The strategic importance of the domestic automotive chemical industry to the OEMs are discussed in detail in chapter 3 & 4 of this study. The aim of this research study was therefore to explore the challenges facing this industry and examine the consequences of commoditisation on the long-term economic sustainability of domestic automotive chemical manufacturers as it is unclear whether domestic automotive chemical manufacturers have a sustainable economic future in the globalised South African automotive value chain.

1.5. RESEARCH QUESTIONS

The ability of domestic ACIS businesses to comply with the competitive demands emanating from the domestic automotive industry, in addition to specific chemical industry challenges, and still maintain profitability in an economically sustainable manner into the future is uncertain. This questions whether domestic automotive chemical manufacturing businesses can be economically sustainable in the face of encroaching commoditisation, rising input costs, and pressurised product price-reduction requirements of domestic automotive OEMs. Consideration therefor needs to be given to the strategies ACIS businesses need to select to address these challenges and improve their competitive position in the globalised South African automotive value chain.

The following specific research questions were formulated to assist in addressing the research problem.

1.5.1. Primary research question

The primary research question formulated to guide the study was:

What impact does commoditisation have on the long-term economic sustainability of the South African automotive chemical industry?

1.5.2. Secondary research questions

The following secondary questions were formulated to assist in answering the primary research question:

- *What are the underlying environmental, market and industry challenges faced by automotive chemical industry that negatively impact industry profitability and long-term economic sustainability?*

- *What are the sources of these underlying environmental, market and industry challenges?*

- *Which of these underlying environmental, market and industry attributes present as significant drivers of commoditisation in the automotive chemical industry?*

- *To what extent has the automotive chemical industry been commoditised?*

- *How can the profitability and long-term economic sustainability of domestic automotive chemical industry be enhanced?*

1.6. RESEARCH OBJECTIVES

One primary research objective and five secondary research objectives were developed to assist in answering the research question. These objectives are indicated below.

1.6.1. Primary research objective

To explore the impact of commoditisation on the long-term economic sustainability of the South African automotive chemical industry.

1.6.2. Secondary research objectives

In support of the overall objective of the study, a set of secondary objectives were formulated which contribute to the primary research objectives:

- *To explore and outline the contemporary environmental challenges in the automotive chemical industry that can potentially negatively impact industry profitability and long- term economic sustainability.*

- *To empirically explore the opinions and insights of selected automotive chemical industry experts with respect to the sources of key underlying environmental challenges that could engender commoditisation and negatively impact profitability and economic sustainability of the industry.*

- *To establish the key underlying environmental attributes that are manifested in the phenomenon of commoditisation in the automotive chemical industry.*

- *To explore the level of commoditisation that exists in the automotive chemical industry by reviewing the South African automotive and automotive chemical industries in the context of the impact of globalisation and exposure to international competition.*

- *To recommend strategies that would enhance the profitability and long-term economic sustainability of the automotive chemical industry in South Africa.*

1.7. THEORETICAL BACKGROUND

The focus of this study was directed at domestic ACIS businesses and their ability to maintain economically sustainable businesses in a globalised automotive value chain.

The theoretical basis for this research was grounded in the academic fields of international business, strategic management, and competitiveness theories. The contribution of theoretical concepts such as globalisation and internationalisation of markets, global competition, competitive advantage, value chains, supply chains, and relationship management were of utmost importance to the research as it provided the theoretical underpinning required for this dissertation. These concepts are discussed below.

1.7.1. Globalisation and internationalisation

The theory of globalisation and internationalisation of products was the point of departure, followed by a discussion on the impact of globalisation on the global and domestic automotive industry in South Africa and, more specifically, ACIS businesses.

Globalisation theory is a complex and multifaceted topic and is described in the literature as consisting of three dimensions, namely economic, political, and cultural (Peng & Meyer, 2019). Globalisation, in simple terms, is the process whereby goods and people move easily across international borders. This is principally an economic concept and can be formally described as the mobility of goods, services, capital, technology, and people in the world economy, given the country's integration into the world economy. Internationalisation, on the other hand, can be defined as the effort of companies to conduct business in one or more foreign countries. According to Ishaq (2012), internationalisation is about the increasing linkage of national economies, using international trade. The global environment is characterised by unpredictability, volatility, and intense competition among multinational businesses (Benito, Peterson & Welch, 2019). The challenges and opportunities presented by these phenomena imply that multinational and domestic businesses impacted by international businesses, such as the automotive industry, will have to review how they conduct business to remain globally competitive (Lee & Gereffi, 2015).

The strong drive towards globalisation by the automotive industry since the 1980s has created complex issues with far-reaching consequences in terms of the challenges facing automotive industry players. Global production overcapacity, market fragmentation, entry into new (developing) markets, and volatile material prices have emphasised the need to understand the dynamics of globalisation of the automotive industry and how stakeholder businesses can position themselves in the global market to achieve and maintain a competitive advantage (Bechmann & Scherk, 2010). Original equipment manufacturers (OEMs) are therefore under increasing pressure to improve the competitive position of their products to increase sales and improve profitability. According to Deloitte (2017), issues of competitiveness in manufacturing are paramount to both OEMs and ACMs. This observation can also be applied to ACIS businesses. This implies that, unless domestic automotive supplier businesses in South Africa (such as ACIS businesses) have world-class manufacturing capabilities and global links, they have limited future opportunities in a globalised automotive value chain (Barnes & White, 2018).

1.7.2. The role of strategy

According to Hill (2021), strategy focuses on businesses and the actions that can be taken to compete more effectively as an international business. One of the aims is to explore how businesses can increase their profitability by expanding their operations into foreign markets and selecting a suitable internationally-competitive strategy. To be profitable, businesses must lower their costs of value creation and sufficiently differentiate their products to encourage consumers to value their products and pay more than what it costs to produce. Strategic choice is governed by both internal (strategic orientation and thought processes) and external (cost pressure and the need for local responsiveness) factors (Hill, 2021). Competitive strategies for international businesses are discussed in the following section.

1.7.2.1. International competitive strategies

To succeed in the dynamic and competitive global business environment, a business needs to have viable strategies. These strategies must be based on clear strategic intent, mission, and long-term objectives that align to the business's intended international involvement. Another influential internal factor that also plays a role in strategy selection is the business's strategic orientation. External factors, such as cost pressure and the need for local responsiveness, are equally important in strategy selection (Aregbeshola, Luiz, Ojah, Oosthuizen, Palmer & Venter, 2011:256). Businesses make use of four basic strategies to enter and compete in an international environment, namely international strategy, multi-domestic strategy, global strategy, and transnational strategy (Aregbeshola et al., 2011:258; Hill, 2021).

Assessing the position of South African domestic ACIS businesses, it is clear that they are experiencing intense competitive conditions due to changes brought about by globalisation and trade liberalisation. The global competitiveness of domestic automotive chemical manufacturers in this globalised automotive value chain, where pressures for cost reduction and local responsiveness are high, has been significantly challenged.

According to Aregbeshola et al. (2011:256), a transnational strategy makes sense for businesses facing these types of pressures. Multinational company (MNC) ACIS businesses in South Africa have established domestic production facilities in geographically favourable locations within South Africa to deal with product customisation and responsiveness while at the same time pursuing low costs by using universal products where possible. These businesses are characterised by both centralised and decentralised decision-making within complex global business matrix organisation structures. The challenge of businesses following transnational strategies is that the businesses try to lower cost and increase value simultaneously, which creates conflicting demands on the businesses (Hill, 2021).

1.7.3. Competitiveness and competitive advantage

The concept of competitive advantage is central to the study of strategic management and refers to the position of superiority that a business has developed within an industry in comparison to its competitors. According to Ismail, Rose, Uli and Abdullah (2012), the main objective of business is to strive to attain a competitive advantage position relative to competitors, both domestically and globally. The competitiveness of businesses operating in the South African automotive industry, in the context of globalised markets, is therefore dependent on their competitive position or competitive advantage relative to global competitors and can be explained by the theory of competitive advantage.

The term 'competitive advantage' is attributed to the seminal work of Michael Porter. Competitive advantage is a construct that describes the organisational assets and competencies that are difficult for competitors to imitate. Porter (1990) assumed that the competitiveness of businesses is related to the performance of other businesses and is tied together in a value-added chain in a long-distance, regional, and domestic context. Porter's theories on competitive advantage, and specifically his Five Forces framework, are frequently used as a guideline for evaluating the competitive forces that influence a variety of business sectors. Porter's Five Forces framework is comprised of five elements, namely competition in the industry, potential of new entrants into the industry, power of suppliers, power of customers, and threat of substitute products (Scott & Williams, 2022). Since their inception, Porter's theories of competitive advantage and his Five Forces framework have not been without criticism in the literature. Grundy (2006) critiqued, *"Porter's work tends to overstress macro analysis…"* while Srivastava and Verma (2012) critiqued, *"Porter's assumption that five forces framework involves a zero-sum game…"*. A major critique was that Porter's theories do not keep pace with technology changes and their influence on the development of competitive advantage. According to Ural (2014) and Isabelle, Horak, McKinnon and Palumbo (2020*),* Porter's Five Forces framework needs to be adjusted in order to assess today's industry structure*.* Porter's theories do, however, still have merit in the 21st-century business world since industry structure can still be explained by the Five Forces framework as all businesses can relate to these forces.

In the current global automotive business environment, competitiveness is the key to achieving superior performance. It is therefore crucial that businesses establish and maintain a competitive advantage over competitors in order to survive and be profitable. Determining a business's competitiveness and competitive position is an integral function of strategic management. From a strategic management theory perspective, numerous theoretical approaches have been proposed and addressed in the literature.

Analysis of business-level competitive advantage has been dominated by the value chain framework developed by Michael Porter (1985). His approach was that competitive advantage cannot be determined by focusing on the business as a whole and it is important to take into consideration the multitude of activities carried out by a business in the process of creating value for its customers. According to Salvi and Pahurkar (2018), the value chain framework developed by Porter not only represents the value-adding activities of the business but also includes a conceptual distinction between primary and support activities. A key concept of Porter's value chain framework is the idea of drivers of activity cost and differentiation produced by the business activities which integrate into his competitive strategy proposition). The value chain logic therefore shaped his framework for competitive analysis at industry level.

In conclusion, Porter's Five Forces analysis is used to determine the attractiveness of an industry while value analysis focuses on formulating how a business can achieve a position of sustainable competitive advantage (Salvi et al., 2018).

1.7.3.1. Competitiveness of businesses: theory, models, and frameworks

Two major streams of theory provide the basis for the analysis of a business's competitiveness, namely the resource-based view (RBV) (focus on internal business attributes) and the market-based view (MBV) (focus on industry characteristics). The industrial-organisation (IO) view focuses on external factors, such as the industry structure and the business's ability to exploit market power to gain superior performance, while the resource-based theory attempts to explain the diversity of performance amongst businesses, based on business-specific factors, and focuses primarily on the internal attributes of the business to describe its position in the competitive environment (Pervan, Curak & Kramaric, 2017).

As an extension of the RBV, Pervan et al. (2017) highlighted a third approach: the dynamic capabilities approach. This approach asserts that the sustainability of a business's performance and competitive advantage is dependent on the ability of the business to renew its resources in line with external environmental changes. The dynamic capabilities approach highlights the importance of sensing opportunities and threats and taking advantage of opportunities that can contribute to the business's profitability and long-term success.

An alternative model proposed in an earlier study by Ozdemir and Denizel (2007) draws on the central tenets of the RBV and industrial-organisation (IO) models, namely the Resource-Base and Context-Dependent Model. The addition of context variables (industry-related and country-related factors) to the RBV implies that context variables will determine the circumstances under which specific resources can contribute to competitiveness. Ozdemir et al. (2007) submitted that there are five requirements for sustainable business competitiveness, namely appropriate industrial and country context supporting resources of the business, the rarity of the resources, inimitability of these resources, non-substitutability of these resources, and continuing favourable effects of the context variables. Ozdemir et al. (2007) concluded that addressing the environmental and resource-based characteristics of competitive advantage in the same model provides for a more comprehensive and explanatory competitive analysis.

1.7.3.2. The concept of economic sustainability

Relentless price-reduction pressures on ACIS businesses by OEMs place ACIS businesses under extreme pressure to achieve the required price-reduction targets mainly through productivity and quality initiatives. As a result, ACIS businesses have been exposed to increased margin pressure, which has placed a question mark on the preservation of existing business, the viability of continued business in the South African automotive value chain, and the ACIS businesses' future economic sustainability. Due to the perceived volatility of the automotive market with limited future potential, these ACIS businesses are reluctant to invest (Harding, 2010). It is therefore important for domestic MNC subsidiaries to be competitive, both domestically and globally, to protect domestic operations in South Africa.

This leads to the question and concept of economic sustainability. According to Found, Beale, Hines, Naim, Rich, Sarmiento and Thomas (2014), economic sustainability is the ability to extract revenues that outweigh the costs of operating a business to secure the future of a business. As economic sustainability is linked to the central tenets of systems theory, it follows that economic sustainability is based on an input-process-output cycle and the flow of revenues and absorption of costs within a business (Found et al., 2014).

Pitelis (2013) offered a more strategic perspective of economic sustainability as he linked it to value creation. He believed value capture can become a constraint to economic sustainability.

1.7.3.3. Commoditisation of automotive chemical industry suppliers

Commoditisation is an important phenomenon in evolving market competition as the forces of globalisation and commoditisation in modern business are here to stay (Consultancy.in, 2020). The phenomenon of commoditisation has created a challenge for businesses, and specifically in the case of ACIS businesses operating in the automotive industry in South Africa. The challenge is how to cut costs and grow simultaneously. Matthyssens and Vandenbempt (2008) defined commoditisation as *"a dynamic process that erodes competitive differentiation potential and consequently deteriorates the financial position of any organisation"*. The commoditisation framework proposed by Matthyssens et al. (2008) explained the drivers and effects of the multifaceted commoditisation process that brings businesses to a state of deteriorating financial performance, namely profit squeeze. The phenomenon of commoditisation is used as a tactic by OEM buyers aimed at increasing their bargaining power by either eliminating or downplaying points of difference between competing offerings. Competitive rivalry and customer bargaining power drive prices down while business input costs increase. Matthyssens et al. (2008) pointed out that businesses deal with the resultant profit squeeze in different ways. They highlighted three generic value propositions that businesses can follow that may lead to competitive differentiation, namely differentiation based on product innovation, differentiation based on service, and differentiation based on cost leadership (operational excellence and fair value solutions). They also referred to four strategies that can be used: value-added strategy, process-innovation strategy, market-focus strategy, and service-innovation strategy. It is important to mention that, according to Matthyssens et al. (2008), the literature on this phenomenon has neglected to address the difficulties businesses face in trying to implement these strategies. In an early study by Schrage (2007), commoditisation was found to be a key challenge in business markets.

According to Sumanchem (2021), slowing growth rates, falling gross margins, high feedstock prices, reduced research and development (R&D) budgets, and volatile end-markets are just a few of the challenges characterising specialty chemical businesses such as ACIS businesses, especially in the face of growing competition from more cost-effective imported substitutes sourced directly from internationally-based competitor companies. In addition to these cost pressures, automotive industry buyers apply further pressure on the profitability of ACIS businesses by driving value to the lowest common denominator, which is the price to achieve OEM operating-cost-reduction goals. (Glaschke, Moder & Schmitz, 2017).

In a study conducted by Roland Berger and Rothschild (2008:3), it was concluded that automotive suppliers globally are facing one of the most competitive environments ever experienced in the automotive industry, with increasing raw material prices and low-cost competition, and this pressure is predicted to continue to increase. Suppliers are therefore sandwiched on one side by OEM consumers and OEMs and on the other side by raw material and financial markets. Figure 1.1 depicts this sandwich position.

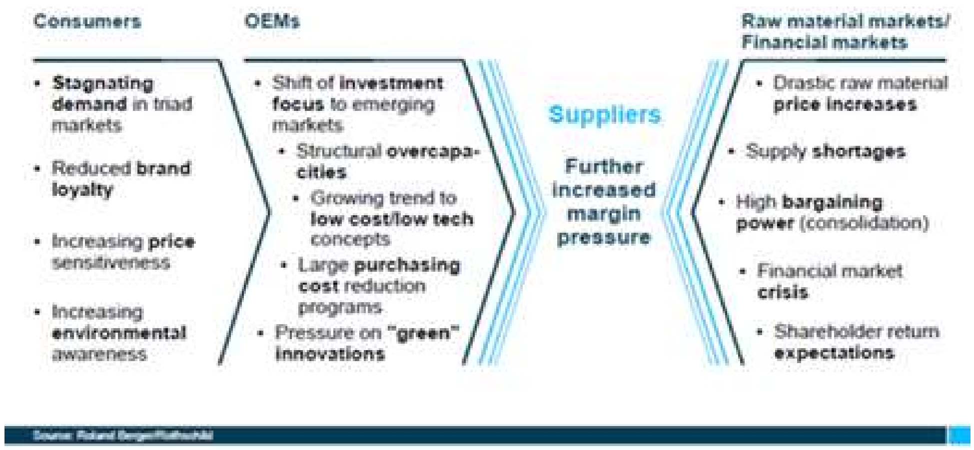

Figure 1.1: The automotive power play

Source: Roland Berger and Rothschild (2008:5)

The bargaining power of the South African OEMs compared to suppliers (more specifically lower-tier suppliers), especially when it comes to pricing, price negotiation, and cost-down requests to suppliers, leads to a commoditised business environment that has a direct impact on the profitability and future economic sustainability of ACIS. This was central to this study.

1.7.4. Supply chain and supply chain management

Supply chain and supply chain management (SCM), which is the management of supply chains, are interrelated concepts. According to du Toit and Vlok (2014), supply chain includes all activities associated with the flow of products and services from raw materials to finished goods. In an early study by Singh, Smith and Sohal (2007), they stated, *"SCM is a philosophy of management that involves the management and integration of a set of key businesses processes from end-user through to original suppliers, that provides products, services and information that adds value for customers and other stakeholders through the collaborative efforts of supply chain members".* Therefore, SCM encompasses the planning and management of all activities of the supply chain.

1.7.4.1. Influence of power and integration of supply chains

One of the challenges of SCM is integrating supply chain processes. Worldwide trends and forces such as increased cost competitiveness, shorter product lifecycles, faster product development cycles, globalisation and customisation of product offerings, and higher overall quality are driving supply chains to increased integration. An integrated supply chain can be defined as customers and suppliers working together, using management techniques to optimise their collective performance in the creation, distribution, and support of an end product. Although supply chains, and specifically automotive industry supply chains, are integrated to some extent, they are still characterised by adversarial relationships between OEMs and suppliers, little regard for sharing benefits and risks, short-term focus, focus on cost and delivery, little concern for added value, limited communications, and little interaction with suppliers outside of Tier 1 suppliers (in other words, direct suppliers of final products to automotive OEMs). According to Aulia, Erna and Margo (2018), in the explanation provided by the Committee on Supply Chain Integration by The National Research Council (Commission on Engineering and Technical System, 2000) in their published book titled *Surviving Chain Integration: Strategies for Small Manufacturers*, an important aspect of an integrated supply chain is that of relationships between OEMs and suppliers. Relationship management is of particular importance to the supply of automotive chemicals to the South African automotive OEMs and leads to the economic sustainability of ACIS businesses to the OEMs.

Power is a central element in supply chain relationships and Reimann and Ketchen (2017) highlighted the complexities surrounding power relationships within supply chains. The balance of power has a major impact on the distribution of value. Reimann et al. (2017) asserted that the resource dependence theory is often used to explain supply chain relationships. The basis of this theory is that, to compete successfully, businesses need to have access to businesses not directly under their control. In other words, if one business controls the resources that another requires, it possesses the power. Reimann et al. (2017) further pointed out that the use of power can damage the relationship between businesses. This leads to the question of the influence of power on supply chain integration. In an early study by Schmeetz (2010), he concluded that, if power does influence supply chain integration, this will have consequences for the competitive advantage of the supply chain. Schmeetz (2010) further pointed out that there are five different power types: reward, coercive, expert, referent, and legitimate. He highlighted the influence of power on the following supply chain variables: information sharing, process co-ordination, relationship commitment, and the interaction between trust and power. It is therefore important for OEMs and OEM suppliers like the ACIS businesses to be aware of the different power types and their potential influence on the supply chain and supply chain integration.

1.7.4.2. Chemical manufacturing supply chains

Because of the complexities associated with the chemical manufacturing industry (which makes use of formulations, manufacturing recipes, and batch production), optimisation of chemical industry supply chains is extremely difficult.

The chemical industry faces rising competition and increasing cost of input raw materials, and customers are demanding higher service levels from chemical suppliers. Specialty chemical products are under pressure of commoditisation from industries such as the automotive industry. These industry shifts place stress on specialty chemical manufacturers, and especially on their supply chains. In the face of price-reduction pressure, automotive chemical businesses need to find new ways to make their supply chains more effective (Kotlik, Friese & Dudek, 2017). According to Kotlik et al. (2017), chemical companies have considerable room for improvement in their supply chain as a result of legacy infrastructure and its growing market and product complexity. This has resulted in chemical businesses having high inventory and logistics costs and a generally weak performance in areas that directly affect the customer, such as lead times and delivery service. In summary, the challenge of the chemical industry supply chain is to become more agile, sustainable, cost-effective, efficient, and responsive to automotive OEM demands to improve their competitive position in the globalised South African automotive value chain and their economic sustainability.

The research design and methodology used in this research study is discussed in Section 1.8.

1.8. RESEARCH DESIGN AND METHODOLOGY

This research study followed a sequential process, commencing with an investigation and analysis of pertinent literature sources to develop the theoretical perspective. This was followed by an overview of the specific research methodology to be used to investigate the impact of commoditisation on the economic sustainability of domestic ACIS businesses. The business environment of the South African light-vehicle automotive manufacturing industry was central to the research study as it is the environment in which automotive suppliers operate. The literature and data in existence on the global and domestic automotive industry value chains is significant in understanding the industry and its challenges from the automotive supplier perspective. Over and above reviewing academic articles and research studies, numerous current automotive industry-related data were consulted. These data were widely available from sources such as automotive publications and reports from automotive trade associations such as the National Association of Automobile Manufacturers of South Africa (NAAMSA), the National Association of Automotive Component and Allied Manufacturers (NAACAM), and the Automotive Industry Export Council (AIEC). Government automotive policy development information from departments such as the Department of Trade and Industry (DTI) was also consulted.

1.8.1. Research design and philosophy

The research design refers to the general plan of how the research questions will be answered (Saunders, Lewis & Thornhill, 2016). According to Cooper and Schindler (2018), there are several definitions of research design. However, no single definition captures the full range of important aspects. By combining some of these important aspects, one can refine the definition of research design as ‘constituting the blueprint for the collection, measurement, and analysis of data to obtain answers to research questions.

Saunders et al. (2016) introduced the research onion as a means of depicting the components of the research design, namely philosophies, approaches, strategies, research choices, research time horizons, data collection, and data analysis procedures (refer to Figure 1.2 below).

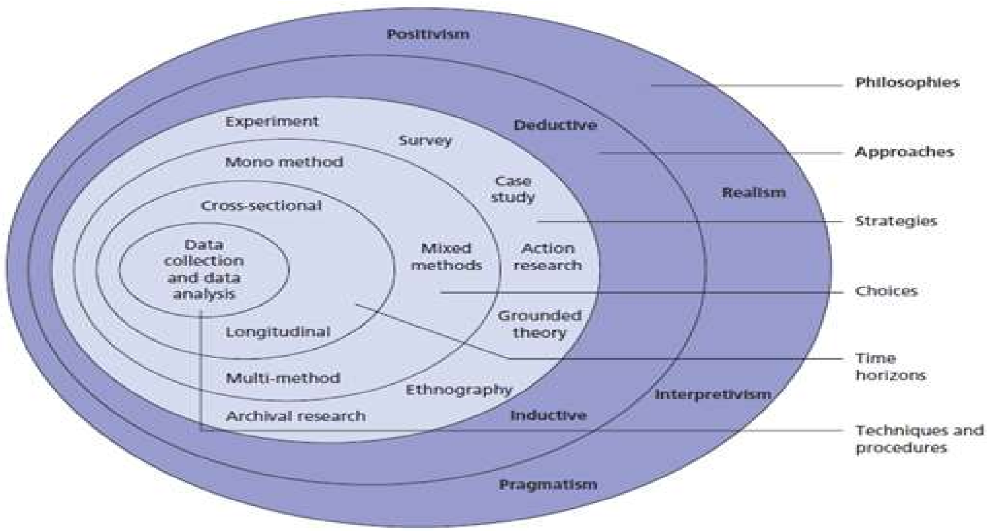

Figure 1.2: The research onion

Source: Saunders, Lewis, and Thornhill (2016)

As illustrated in Figure 1.2 above, the identification of research philosophy is characterised by the outer layer of the research onion and is the first topic of discussion in the research design process. Research philosophy considers the source, nature, and development of knowledge. This implies that a research philosophy is a belief about ways in which data and phenomena should be collected, analysed, and used (Saunders et al., 2016).

The philosophy selected for this research study was one of pragmatism as this research philosophy positions the research question as being of primary importance as it is positioned to answer the research question. Studies selecting a pragmatic, or pragmatism, research philosophy can integrate the use of multiple research methods, such as qualitative and quantitative methods. Pragmatists select research methods (single or multi) that are suitable for advancing the specific research most effectively.

Research approaches can be divided into two main categories, namely deductive and inductive. The relevance of hypotheses to a research study is the main distinction between these two approaches. The deductive approach assesses the validity of theories or hypotheses whereas the inductive approach contributes to the emergence of new theories and generalisations (Saunders et al., 2016). An inductive approach does not require the formulation of hypotheses and addresses the research questions, aims, and objectives that need to be attained during the research process.

An inductive approach was followed in this research study, which implies the development of a theoretical perspective to provide direction for the research, followed by a collection of data and subsequent development of a theory as a result of data analysis (Saunders et al., 2016).

1.8.2. Primary research

Yin (2018) pointed out that the most important condition for deciding which strategy to select is to identify the type of research question being asked. 'What' questions are exploratory by nature. The structure of the research question of this study *("What impact does commoditisation have on the long-term economic sustainability of the South African automotive chemical industry?")* was a justifiable rationale for selecting an exploratory approach. According to Saunders et al. (2016), an exploratory study is valuable in terms of seeking out new insights by asking questions and assessing phenomena in a new light. Exploratory studies are also useful in clarifying the understanding of problems when unsure of the exact nature of the problem. Saunders et al. (2016) pointed out that the advantages of exploratory research are that it is flexible enough to explore the complexity of a topic and it is adaptable to change. Flexibility does not, however, imply an absence of direction. It simply means that the focus is broad initially and narrows as the research progresses. The primary research process took the form of an exploratory study to gain an in-depth understanding of the effect of commoditisation on the economic sustainability of ACIS businesses.

The decision to use an exploratory qualitative research approach was grounded in the flexibility of a qualitative methodology as opposed to the rigidity of a quantitative methodology. Quantitative research attempts to apply quantitative measures to answer questions such as 'how much,' using predominantly survey data collection methods. A qualitative approach is predominantly based on the researcher's ability to be immersed in the phenomenon under study to gather data to provide a detailed description of situations (Cooper et al., 2018). The advantage of using a qualitative research approach is that an in-depth study can be conducted on a topic, which was required in the case of this research study. A positive feature of qualitative research is that the approach reflects the views of research participants and covers contextual conditions, such as the set of economic conditions characterising the South African automotive industry, to explain phenomena through existing or new concepts (Yin, 2016). The limited population universe in this study further led to the use of a qualitative approach. This is addressed in more detail in Section 1.8.4.

1.8.3. Research strategy

As the research study was focused on determining the impact of commoditisation on the future economic sustainability of the domestic automotive chemical industry, a case-study strategy was followed. According to Saunders et al. (2016), a case-study strategy is specifically suited to gaining an understanding of the context of the research and the processes being used. Yin (2018) asserted that the most important method for differentiating the various research strategies for selection is to identify the type of research question being asked. Saunders et al. (2016) defined a case study as a *"research strategy that involves the empirical investigation of a particular contemporary phenomenon within its real-life context, using multiple sources of evidence"*. A case-study strategy can provide answers to the question 'what' and is, therefore, compatible with an exploratory research approach (Saunders et al., 2016). The 'what' questions favour the use of exploratory research.

1.8.4. Target population

Cooper et al. (2018) defined a target population as the people and events or records that can contribute to answering the research question of the study and assist in selecting an appropriate sampling method. The primary research was conducted with participants selected from the domestic automotive chemical manufacturing industry. Comparative perspectives of both the automotive chemical industry and the automotive component industry (ACS) were required for triangulation purposes, which is the use of two or more independent sources of data or data collection within one study to validate the data (Saunders et al., 2016).

1.8.5. Sampling method

Cooper et al. (2018) pointed out that the researcher has a choice of selecting either probability or non-probability sampling techniques. A non-probability sampling technique was adopted for this study as a result of some practical considerations. The population in this research study was limited, therefore adopting a probability sampling technique in this case was not feasible. According to Cooper et al. (2018), a non-probability sample, conforming to certain criteria, is referred to as purposive sampling, of which there are two types: judgment sampling and quota sampling. The researcher, who has 30 years of experience in the automotive chemicals industry, adopted a judgment-sampling approach to select participants. The aim was to select and elicit opinions of industry experts who either have direct or indirect automotive chemical industry knowledge or experience in the automotive chemical industry. These industry experts were best placed to provide industry data that assisted in answering the research question. The interviews were conducted with selected industry experts from domestic multinational ACIS businesses currently operating businesses in South Africa, yielding a total of at least six participants. The researcher also applied the concept of saturation to the selection of sample size, which is discussed in more detail in Chapter 5.

In order to comply with the university's prevailing COVID-19 policies at the time the interviews were conducted, no face-to-face interviews were conducted. All the interviews with the participants were conducted remotely using Microsoft Teams.

1.8.6. Data collection

Although a case-study strategy supports a variety of data-collection techniques and combinations of techniques, an in-depth interview technique was used for this research study. In-depth personal interviews can be defined as face-to-face one-on-one conversations between the researcher and the participant (Saunders et al., 2016). As mentioned in Section 1.8.5. above, interviews were conducted via Microsoft Teams in accordance with the university's COVID-19 policy at the time the research interviews took place. According to Saunders et al. (2016), these are classified as non-standardised interviews, often referred to as qualitative research interviews. Primary data were collected with in-depth, face-to-face personal interviews with semi-structured questions, which were conducted with selected participants from key role-players such as domestic automotive chemical suppliers and OEMs to gain participant opinions and views regarding the research question. The researcher made use of an interview protocol as a conversational guide to the interviews. According to Yin (2016), an interview protocol contains a small subset of topics that are considered relevant to the interview and allow for each topic to be probed and supplemented with additional questions. An initial pilot semi-structured in-depth interview was conducted to evaluate the suitability of the question topics to provide adequate responses and allow for adjustments to be made to the semi-structured interview topics and questions.

1.8.7. Data processing and analysis

The data from the primary research in-depth interviews were collected using audio recording. Notes recorded by the researcher, in the form of memoranda, documented any additional contextual information to assist in the recall of the context and content of the interview and the researcher's interpretation in support of the audio-recorded interviews. After being coded (categorisation of data units), the transcribed data from the audio-recorded participant interviews was analysed using an ATLAS.ti computer programme. Cooper et al. (2018) pointed out that data analysis consists of a process that involves reducing data to a manageable size and developing summaries to generate information. More simply, data analysis can be defined as the process of deconstructing data into manageable themes, patterns, and trends.

1.8.8. Reliability, validity and trustworthiness

According to Nowell et al. (2017), assessing qualitative research is more challenging than quantitative research. Conducting the research in a precise, consistent, and exhaustive manner through recording, systematizing, and disclosing the methods of analysis with enough detail, will determine process credibility (Nowell et al., 2017).

The relevance of traditional criteria; 'Internal and External Validity,' 'Reliability' and 'Objectivity,' are deemed to be unsuitable for assessing the quality of qualitative research and four alternative corresponding criteria for judging the trustworthiness of qualitative research have been proposed by Bryman and Bell (2014). They proposed alternative corresponding criteria, **credibility** (vs. internal validity), **transferability** (vs.

external validity), **dependability** (vs reliability), and **confirmability** (vs objectivity) for assessing qualitative and quantitative trustworthiness.

According to Lincoln and Guba, (1985), **credibility** involves demonstrating that the results of qualitative research are believable from the perspective of the research participant. Credibility which is the most important criteria in establishing trustworthiness of a qualitative study can be achieved by making sure that good research practice is applied to the study and describing and understanding the phenomena of interest from the participants point of view.

Transferability corresponds to external validity (generalizing a study's results), and can be explained as the degree to which the qualitative research can be generalised or transferred from the original research situation to a similar situation. Transferability of findings can be achieved by the provision of background data to establish context of the study and a detailed description of the phenomena in question to allow comparisons to be made (Shenton, 2003).

Dependability aims to replace reliability, which requires that when replicating experiments, the same results should be achieved. Lincoln and Guba (1985) maintain that both the process and the product of the research must be consistent. Shenton (2003) believes the research design is an important factor as it allows the reader to assess the extent to which proper research practices have been followed and gain an understanding of the methods and their effectiveness.

Finally, **Confirmability** refers to the neutrality and objectivity of the research findings and is focused on ensuring that that the research findings are grounded in data and that the research findings have not been influenced by personal bias (Shenton, 2004; Bryman and Bell, 2014). Confirmability is concerned with establishing that the researcher's interpretations and findings are clearly derived from the data requiring the researcher to demonstrate how the conclusions and interpretations have been reached (Nowell et al., 2017).

There are various ways in which errors can be made in personal interviews, by both the participant and the researcher. It was therefore the objective of the researcher to minimise the chances of any biases occurring. Saunders et al. (2016) pointed out that there are four threats to be considered in terms of dependability: participant error – anything that may affect the enthusiasm of the participant; participant bias – factors influencing the participant's response; researcher error – any factor which influences the researcher's interpretation, such as ways of asking questions; and researcher bias – anything that may influence the interpretation of participant responses. Participants can introduce bias to the interview. The researcher mitigated inconsistencies by checking information with alternative sources and closely observing and monitoring the way the participant reacted to the immediate environment. The researcher also made sure that participants fully understood the questions being asked and the context in which they were asked. To avoid misunderstandings, the researcher carefully explained the objectives of the interview, the identity of the researcher, and what was required from the participant. The researcher also created a good interview environment, maintaining a professional relationship to obviate the provision of courtesy answers.

It is also possible for the researcher to introduce bias to the interview. Therefore, the researcher retained objectivity throughout the interview. Formulating probing questions from open-ended questions can introduce bias. The researcher made use of an interview protocol, with guided questions, to reduce the potential for any bias.

Credibility is defined by Saunders et al. (2016) as *"the extent to which data collection methods accurately measure what was intended to measure".* Although Maxwell (2013), in his book *Qualitative Research Design*, identified five threats to credibility (validity) that can occur in qualitative research, two broad types of threats are often raised concerning qualitative studies. These are researcher bias and reactivity. Two important validity threats regarding researcher bias are the selection of data that fits the researcher's theory or goals and the selection of data that stands out to the researcher. According to Maxwell (2013), both involve the subjectivity of the researcher. Reactivity, which means the influence of the researcher on the environment or participants, is the second broad threat to validity. This may occur because the researcher is part of the environment that is under study.

Maxwell (2013) pointed out that it is important to be aware of the potential influence and understand how what the participant is saying is being influenced and how this could affect the validity of the inferences drawn from the interview. Maxwell (2013) proposed several validity strategies, one of which was triangulation. According to Maxwell (2013), research methods are all susceptible to bias and are not infallible, therefore triangulation should be applied within the scope of identified validity threats. In the context of this study, the two validity strategies proposed were triangulation and rich data.

Triangulation refers to *"the use of multiple methods or data sources in qualitative research to develop a comprehensive understanding of phenomena"* (Carter, Bryant-Lukosius, DiCenso, Blythe, & Neville, 2014). Triangulation facilitates the validation of data through cross-verification from more than two sources and evaluates the consistency of findings obtained through different instruments to reduce the risk of bias by neutralising inherent bias risks.

The presumption of rich data implies that the qualitative data achieved through semi-structured in-depth personal interviews reveal the complexities and richness of the subject under study and provides an in-depth insight into the phenomenon of interest (Barrett & Twycross, 2018).

1.8.9. Time Horizons

According to Saunders et al. (2016), the research study can either take the form of a snapshot taken at a particular point in time or a representation of events over a given period. The former time horizon is referred to as a cross-sectional study while the latter is considered a longitudinal study. This qualitative study was based on in-depth interviews conducted over a short period and was therefore categorised as a cross-sectional study.

1.9. ETHICAL CONSIDERATIONS

According to Cooper et al. (2018:28), *"ethics are norms or standards of behaviour that guide moral choices about our behaviour and our relationships with others."* Ethical compliance, therefore, plays an important and integral role in the research process to ensure that no-one is harmed or suffers adverse consequences from research activities. Cooper et al. (2018:28) further pointed out that protecting the rights of the participant is paramount and the research must be designed in such a way as to ensure that the rights of the participant are protected. The participant must be safeguarded against physical harm, discomfort, pain, embarrassment, and/or loss of privacy. Three guidelines are proposed for the research process, namely explaining the benefits of the study, explaining participants' rights and protection, and obtaining informed consent.

Ethical compliance was extremely important for this research and, as such, required prior approval of the University of South Africa's (UNISA) Research Ethics Committee. The research process was therefore directed by the ethical standards and COVID-19 policy as set by UNISA at the time of the study and an ethical clearance certificate was obtained from the Research Ethics Committee before the data-collection process commenced. A participant information sheet was provided to each participant, explaining the purpose of the study and providing all the information that a participant needed to know before taking part in the study. Informed consent documents were provided to all the participants, disclosing the procedures of the research design, which the participants had to sign. (Van Zyl, 2014; Cooper et al. 2018). Furthermore, the researcher collected data without harming the participants, with the anonymity and confidentiality of participants being maintained (Babbie, 2016:63-65).

1.10. CHAPTER LAYOUT

The model depicted in Figure 1.3 below provides an outline of the intended major discussion topics which were deemed by the researcher to be important in providing answers to the primary research question. It also illustrates the progression of the discussion through Chapters 2, 3, and 4. The model highlights the primary constructs of commoditisation and economic sustainability which, from a theoretical perspective, were grounded in globalisation and competitiveness theories as being important discussion points. Value chain and supply chain constructs were also deemed to be important aspects of the theoretical discussion in terms of their contribution to business profitability. The model illustrates the importance of exploratory discussions relating to the automotive and chemical industry business environments that produce significant challenges for automotive chemical industry businesses in South Africa.

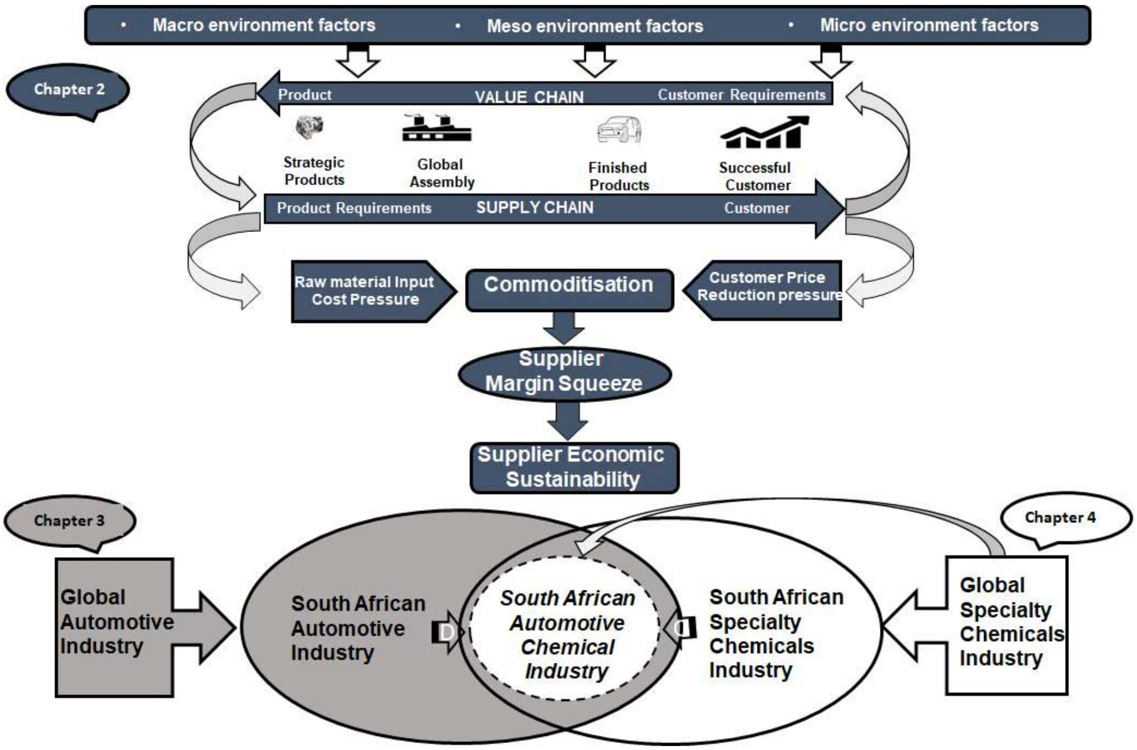

Figure 1.3: Model outlining major discussion topics in Chapters 2,3, and 4

Source: Researcher's own illustration

The discussion topics of the research study highlighted in Figure 1.3 above was structured into seven chapters as follows:

- Chapter 1 covers the introduction and background to the study, articulates the research questions and problem statement, presents the theoretical concepts that underpinned the study, and provides the research design and ethical considerations for the study.
- Chapter 2 provides an overview of the theoretical aspects which were central to the theme of this study and which contributed to providing answers to the primary research question by linking commoditisation and economic sustainability to competitiveness theories and globalisation. Central concepts and theories such as competitive theories, globalisation, value chains, value chain governance, supply chains, and collaborative relationships in SCM are discussed in the context of evolving competitive strategy in the automotive and chemical business environments.

- Chapter 3 reviews the global automotive landscape in terms of the main features and trends in the global automotive industry. The impact of globalisation on the global automotive value chain and the consequent effects on the global automotive supplier industry are explored. The South African automotive industry post-1995 is discussed, focusing on structural issues, government influences, and competitive pressures on South African-based OEMs and the automotive supplier base, with particular attention being paid to the domestic automotive chemical industry.
- Chapter 4 introduces and explores the global specialty chemical industry sector, the South African automotive chemical industry sector, and the South African automotive chemicals industry business environment. The South African automotive chemicals industry is discussed in terms of the broader context of the domestic specialty chemicals sector and its relevance and importance to the South African automotive manufacturing industry.
- Chapter 5 addresses the research process, philosophy, principles, approach, and research design and methodology used in this study.
- Chapter 6 focuses on the processing and analysis of data collected from in-depth interviews, which were deconstructed and systematically summarised to generate information that was translated into themes, patterns, and trends in support of the research objectives, followed by an in-depth discussion of the research findings of the empirical component of the study.
- Chapter 7 covers the conclusions and recommendations of the research study with regards to the impact of commoditisation on the economic sustainability South African ACIS businesses and suggests strategies that can be adopted by ACIS businesses to overcome potential commoditisation in the industry and secure future economic sustainability.

1.11. SUMMARY

The importance of domestic automotive chemical manufacturers to the automotive manufacturing industry cannot be underestimated. The long-term survival of this important industry, in terms of its economic sustainability and its ability to retain market share and a profitable position in the globalised South African automotive value chain, is integral to the continued success of South African automotive OEMs. The commoditisation of products and markets has become a reality for businesses in general and businesses need to devise strategies to assist in overcoming the increasingly pervasive effects of commoditisation. This study explored the automotive industry in which the ACIS businesses operate and evaluated the various aspects of commoditisation in terms of its impact on automotive chemical manufacturers' profitability and economic sustainability. From a managerial perspective, the study aimed to provide a practical approach for domestic automotive chemical manufacturers to understand the phenomenon and find creative ways to overcome commoditisation and secure economic sustainability in the automotive value chain.

CHAPTER 2:
THEORIES AND CONSTRUCTS INFLUENCING COMMODITISATION AND ECONOMIC SUSTAINABILITY

2.1. INTRODUCTION

The aim of this chapter is to identify, examine, and discuss theories and constructs that can assist in describing the environmental factors that give rise to the phenomenon of commoditisation and its impact on long-term business economic sustainability.

Primary constructs, definitions, and dimensions of the research objectives alluded to in chapter 1 will be summarised and presented to lay the groundwork for the theoretical discussions in this chapter. Following a brief discussion on the business environment, a cursory review of the concept of economic sustainability and the phenomenon of commoditisation will be undertaken. Theories and constructs such as globalisation, competitiveness theory, the role of strategy, value chains, supply chains, and SCM will be explored and discussed in the context of evolving competitive strategy in the automotive chemicals business environment. These theories and constructs provided the theoretical foundation required for this study and contributed to the provision of answers to the primary research question of this study.

To end this chapter, potential key influencing factors associated with the automotive chemical industry's business environment will be identified, summarised, and presented in a theoretical framework. The theoretical framework depicts the relationship between the attributes of the price and cost dimensions of commoditisation and their potential impact on ACIS business profitability and economic sustainability. The theoretical framework provided a basis for the qualitative empirical study.

2.2. PRIMARY CONSTRUCTS, DEFINITIONS, AND DIMENSIONS OF THE RESEARCH OBJECTIVES

To guide the empirical phase of the study, the key constructs underlying the research objectives were identified and defined. The primary research question was: "*What impact does commoditisation have on the long-term economic sustainability of the*

South African automotive chemical industry?" This question highlighted the two key constructs pertaining to this study, namely economic sustainability, and commoditisation. To guide this study, a summary of the definitions and dimensions of these two key constructs identified from the research question are provided in Table 2.1 below.

PRIMARY CONSTRUCTS	**DEFINITIONS**	**DIMENSIONS**
Economic Sustainability	*"The ability to extract, in some time period, revenues that outweigh the costs of operating the business and thereby securing the future of the business."* (Found, Hines, Rich, Sarmiento & Thomas, 2014).	Revenues Net Income Return on Investment Cash Flow Capital Expenditure
Commoditisation	*"A dynamic process that erodes the competitive differentiation potential and consequently deteriorates the financial position of any organisation."* (Matthyssens & Vandenbempt, 2008).	Hyper-Competition Declining Differentiation Input-Cost Escalation Price-Reduction Pressure Diminishing Margins

Table 2.1: Primary constructs, definitions, and dimensions

Source: Researcher's own depiction. Definitions: Found, Hines, Rich, Sarmiento and Thomas (2014); Matthyssens and Vandenbempt (2008)

The increasing practical importance of understanding the phenomenon of commoditisation in the automotive chemical industry suggests a need for a mutual understanding and operationalisation of the phenomenon. This will address the assumption that increased commoditisation in the automotive chemical industry leads to lower profitability of automotive chemical industry businesses and impacts business long-term economic sustainability.

With commoditisation becoming an increasingly important phenomenon in evolving market competition, it has become necessary for businesses to monitor various aspects of the changing competitive business environment (Reimann, Schilke & Thomas, 2010). Accepting the existence of commoditisation implies that the business environment must be continuously monitored at contextual and operational levels for environmental influences to counter business challenges such as commoditisation.

This means that a thorough understanding of the dynamics of today's business environment is required. This links to the theoretical discussion on the business environment, which follows in the next section.

2.3. THE BUSINESS ENVIRONMENT – A THEORETICAL PERSPECTIVE

A business environment is made up of a variety of organisations, ranging from small domestic suppliers to international or multinational corporations operating on a global scale. These businesses are generally differentiated in terms of their size, the type of products they produce, the markets they serve, and the scale of their operations. According to Worthington and Britton (2015), although these distinctions are valid, one should not lose sight of the fact that all business organisations are involved in the same basic activity of transforming inputs (resources) into outputs (goods and services), immaterial of size. While the type, amount, and combination of resources will vary according to individual business needs over time, the simple process described above is common to all types of business organisations and provides a useful basis for investigating business activity and the environment in which it takes place. It is important to recognise that most businesses strive to earn enough revenue to be able to continuously replenish their resources, allowing them to produce further outputs, as depicted in Figure 2.1 (Worthington et al., 2015).

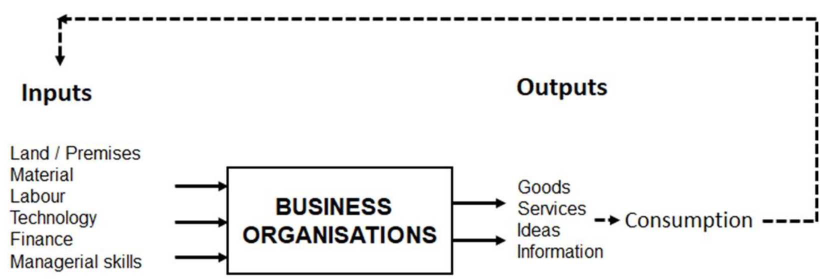

Figure 2.1: The business organisation as a transformation system

Source: Adapted from Worthington and Britton (2015)

Outputs of one organisation are inputs for another organisation. This highlights the complex interrelated nature of business activity. It also highlights the fact that the economic sustainability of business organisations is integrally linked to other organisations. Viewed as an open system, business organisations are continuously interacting with their environment. This implies that environmental changes can effect changes to inputs, the business organisation's transformation process, and its outputs (see Figure 2.2 below).

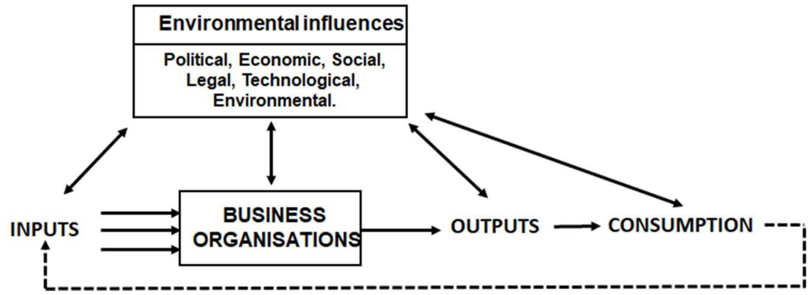

Figure 2.2: The business in its environment

Source: Adapted from Worthington and Britton (2015)

These changes to an organisation's internal process may also trigger changes to the organisation's external environment. The internal and external environments of the business organisation are interdependent and not separate entities (Worthington et al. 2015). In addition to this interaction between organisation, internal environment, and external environment, the numerous external factors influencing business organisations are also, in many cases, interrelated. As an example, changes in interest rates and governmental influences on demand levels combined can result in changes in overall economic conditions. According to Worthington et al. (2015), there is a distinction between the external factors that have an immediate effect on the day-to-day operations of a business and the external factors that have a more general impact on the business. Figure 2.3 depicts a graphic representation of this distinction.

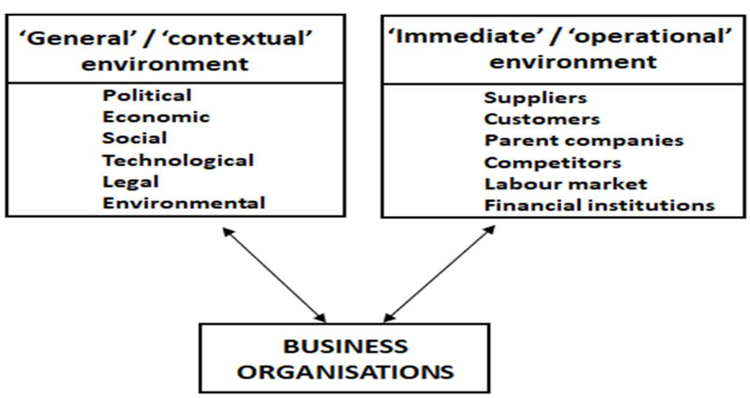

Figure 2.3: Distinction between two levels of the environment

Source: Adapted from Worthington and Britton (2015)

The operational environment of businesses consists of micro-environmental factors, which include elements such as suppliers, competitors, labour markets, financial institutions and customers, and parent companies. The contextual environment, on the other hand, is characterised by macro-environmental factors such as economic, political, socio-cultural, technological, legal and environmental influences, which can impact businesses from both a domestic and international perspective. The political environment consists of external forces driven by government and politics (e.g., tax, trade restrictions and tariffs – potential impact to costs on imported raw materials); the economic environment consists of external forces driven by the economy (e.g., interest rates, inflation, economic growth or decline – currency-Rate of Exchange fluctuations, added cost and profit margin pressure); the sociological environment consists of external forces driven by social dynamics (e.g., trends in demographics, cultural trends and consumer attitudes – attitudes towards chemical manufacturing industry which is inherently dangerous); the technological environment consists of external forces driven by technology (e.g., changes in innovation and new product development-move to 'green chemical products'); environmental driven by external forces from the environment (e.g., natural disasters, weather patterns and pollution- transportation of hazardous chemicals); and lastly the legal environment driven by external forces driven by the law (e.g., laws governing employment, health and safety, and antitrust-safety health and environmental laws for chemical industry). The impact of macro environmental factors will differ from business to business depending on the industry in which it operates, the unique position of the business together with its market and needs.

The infinite number of environmental variables that can affect organisations highlights the complexity of the environment in which businesses operate. Because of this complexity, solely describing environmental variables in terms of contextual (macro-environmental) and operational (micro-environmental) variables is inadequate. Therefore, supplementing the macro- and micro-approach with a meso-approach allows factors between the macro- and micro-approach to be explored.

To further assist in describing the business environment, the concept of governance levels has been included in the discussion. According to Nitschke (2011), governance levels augment the theoretical description of a business environment. In an early study of global production networks, Coe, Dicken and Hess (2008) pointed out that there are governance levels that distinguish between political, institutional, industrial (inter-business), and corporate (intra-business) governance. This implies that there are two layers: the system level comprising macro-, meso-, and ‘micro-economic sublevels; and the governance level comprising government, market, industry, and corporate sublevels. The inclusion of governance levels in the business environment discussion enhances the aspect of inter-business governance and a global value chain (GVC) approach and assists in providing clarity to intra-business, institutional, and political forms of governance (Nitschke, 2011).

Figure 2.4 below depicts the interaction between macro, micro, and meso aspects of the business environment as well as governance levels.

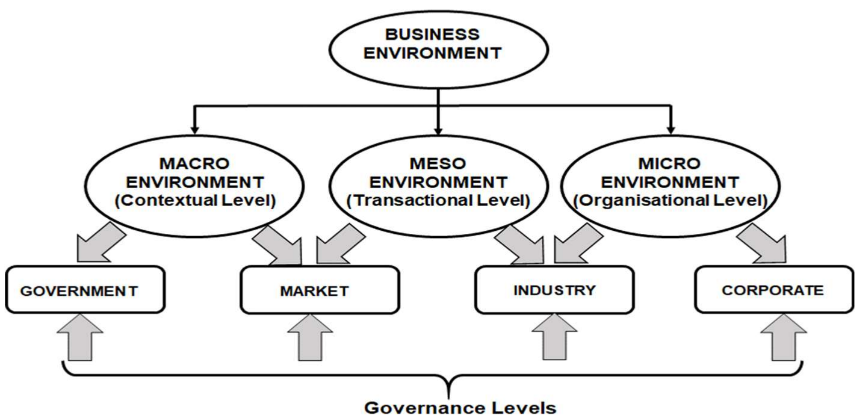

Figure 2.4: Macro, meso, micro, and governance aspects of business environments
Source: Researcher’s own depiction

‘Macro-environment’ refers to the general environment within the economy that influences the working performance, decision making, and strategies of businesses that operate simultaneously in the economy and can be characterised as dynamic. The macro-environment constitutes sub-environments such as political and legal environments, economic environments, socio-cultural and demographic environments, technological environments, and ecological environments.

‘Micro-environment’ refers to the environment that is in direct contact with business organisations. Aspects of this environment can have an immediate effect on the routine activities of businesses as it is associated with the arena in which businesses function. The micro-environment can be characterised as a collection of forces that are close to business operations and particular to individual businesses. Micro-environment forces, therefore, impact day-to-day business performance for short periods and consist of forces such as stability of demand, intensity of competition, resource (materials and labour) availability, cost escalation, and profitability that emanate from customers, competitors, employees, suppliers, and shareholders.

The meso-environment takes on an intermediate position between the macro- and micro-environmental levels. The meso-level is directed at the institutional aspects of the business environment that are not captured at the macro- and micro-levels. The meso-level is referred to as a transactional level and is characterised by market forces such as suppliers, supply and demand, distribution, competitors, and strategic alliances, to name but a few.

While there are numerous environmental-influencing factors emanating from the business environment at contextual, transactional, and organisational/operational levels, this study was particularly focused on identifying specific factors that give rise to the phenomenon of commoditisation of products and how they impact on business long-term economic sustainability.

2.4. ECONOMIC SUSTAINABILITY

This research study questioned whether domestic automotive chemical manufacturing industry that comprise several ACIS businesses can be economically sustainable in the long term, given the pressurised price-reduction requirements of the automotive industry and the unrecoverable input cost of ACIS businesses. In this section, the dynamics, and various views on the concept of sustainability is explored, with a specific focus on economic sustainability.

2.4.1. Contextualising the concept of economic sustainability

Sustainability is about long-term environmental, social, and economic survival and is widely considered in terms of a triple-bottom-line approach. According to Doane and MacGillivray (2001) as cited by Lang (2014), research into the social and environmental dimensions of sustainability are more advanced than research on the economic sustainability dimension. They concluded that as a result of the complexity of the economic dimension it cannot be understood without looking at both the internal and external business environment. As this study focused on the economic dimension only, economic sustainability was addressed as a dimension of its own as it is deemed to be important in its own right and not only in relation to the social and environmental dimensions. Any reference to the term 'sustainability' in the context of this study is therefore construed as economic sustainability.

Lang (2014) cited an early study by Doane and MacGillivray (2001), who pointed out that the simplest interpretation of economic sustainability is how companies stay in business. Jokela and Halinen (2015) believed managing businesses responsibly and making every effort to achieve business sustainability has become a critical dimension for business organisations. It therefore follows that it is important for businesses to understand what enables businesses to survive.

The second strand of economic sustainability was frequently dubbed *"the business of staying in business"* by Doane et al. (2001) in an early study cited by Lang (2014), and is concerned with viable business strategies that are linked to the concepts of efficiency and effectiveness.

Found, Hines and Rich (2014) argued that the economic sustainability rests on profit extraction and successful investments that guarantee the survival of the business. This concept of sustainable business strategy can be defined as meeting the needs of a firm's direct and indirect stakeholders.

In their study, Lang, Collie, Gocke, Moldenhauer, Zhai and Ulrich (2015) referred to a definition of economic sustainability from an early study by Found, Beale, Hines, Naim, Rich, Sarmiento and Thomas. (2006) who defined economic sustainability as: *"the ability to extract, in some time period, revenues that outweigh the costs of operating the business and thereby securing the future of the business"*. They claimed that economic sustainability is linked to the concepts of efficiency and effectiveness of business management in extracting a profit and investing it responsibly to enable continuous business improvement efforts to be implemented, both within the business and external to the business.

Jokela et al. (2015) integrated the concept of value creation into their definition by defining economic sustainability as *"a business's long-term economic viability that relies on value creation through its products and services in the pursuit of profits and economic growth"*. The inclusion of the concept of value creation into a definition of economic sustainability was supported by Pitelis (2013), who suggested that economic sustainability takes place through value creation and the business's ability to capture value while striving to achieve a competitive advantage against its rivals.

Lang et al. (2015) viewed economic sustainability as being a complex issue. They argued that, to fully comprehend the nature of economic sustainability, both the internal and external environment in which businesses operate must be considered. They pointed out that, according to an early study by Doane et al. (2001), there are two mechanisms of broaching the topic of economic sustainability. The question of how businesses remain in business must therefore lead to an internal approach while at the same time analysing the business's external economic impact on the broader society, which supports a stakeholder view.

It could therefore be argued that the economic sustainability dimension encourages businesses to consider both the internal and external implications of sustainability management. This implies that the process of managing economic sustainability must take cognisance of the financial performance of a company, the business's management of its intangible assets, its influence on the wider economy, the wider economy's influence on the business, and the management of the business's social and environmental impacts.

2.4.2. Measures of economic sustainability

It is evident that businesses would not be in business if they did not manage their economic sustainability at all. This highlights the importance of measuring a business's economic sustainability. Singh, Darwish and Potocnik (2016) referred to an early study on the measurement of business performance by Venkatraman and Ramanujam (1987:4), whose study concluded that sales growth (revenues), net income growth, and return on investment are three dimensions reflective of business economic performance. They also point out that these dimensions closely correspond to the key dimensions of performance measurement offered by the profit impact of marketing study (PIMS) of factors that influence the profitability of businesses in different industries. Notably, in an arena of reduced protection, as in the South African automotive industry, economic sustainability is also largely attributed to cost competitiveness factors such as labour, material, and logistics as well as more dynamic attributes such as productivity improvement and production volumes. From a simplistic point of view, economic sustainability is about how businesses stay in business. Taking this viewpoint, it follows that, if business economic performance is a measurement of economic sustainability, the view of sustainability changes from a mixture of external and internal implications to one of an internal view only.

Nitschke (2011) offered a slightly different view that provided a useful explanation of the economic sustainability concept in the industry and highlighted the measurement dimensions of economic sustainability. The model depicted the interaction of dependent variables emanating from what he described as the system and governance levels that impact economic sustainability. He also included the measurement dimensions of operational performance (revenues) and investment (capex) in the measures of economic sustainability (see Figure 2.5 below).

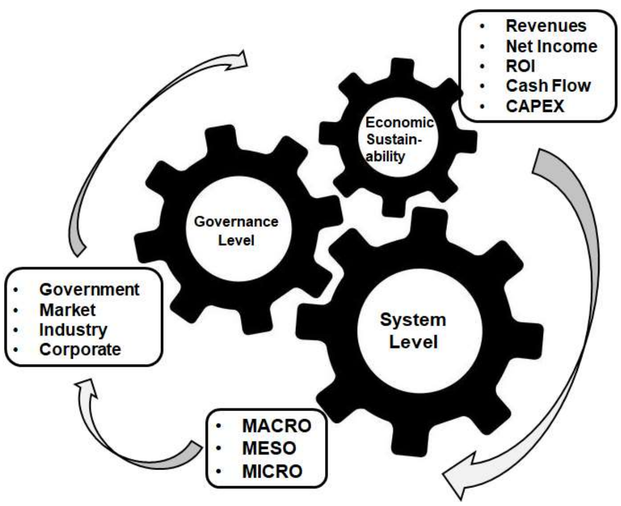

Figure 2.5: Impact on and measures of economic sustainability

Source: Adapted from Nitschke (2011)

Figure 2.5 reflects the measures of economic sustainability in terms of net income, revenues, return on investment, cash flow, and capital expenditure for automotive suppliers. These elements of economic sustainability are, in turn, influenced by independent variables at both the system and value chain governance levels. This impact is applicable to ACIS businesses in the South African automotive value chain. The flow of influences begins at the systems level, moves to the governance level, and then finally impacts the dependent variables related to economic sustainability (Nitschke, 2011). It is also important to note the secondary dependencies between system and governance levels. According to this model, macro-factors are governed at government and market levels, meso-factors are governed at market and industry levels, and micro-factors are governed at industry and corporate levels.

It can therefore be concluded that, in the process of determining factors that influence economic sustainability, one needs to take cognisance of the fact that the nature of economic sustainability is complex and cannot be fully understood without exploring influencing factors in the macro-, meso-, and micro-environments in which organisations operate.

2.5. COMMODITISATION

Commoditisation is fast gaining momentum in industries such as the automotive chemical industry as innovative products become standard products over time. Automotive chemical manufacturing businesses are finding it increasingly difficult to develop innovative products that offer significant additional value to automotive manufacturers while simultaneously differentiating their offerings from their competitors. According to Glaschke et al. (2017) of McKinsey consulting, new low-cost market entrants, such as suppliers from China, have led to many domestic automotive chemical product prices being determined based on their production and freight-to-market costs as opposed to the intrinsic market value of the products. It is therefore important for domestic ACIS businesses to be aware of the encroaching phenomenon of commoditisation and its causes and consequences in this sector. In the process of examining the consequences of commoditisation, several researchers have empirically concluded that increased commoditisation will lead to lower profitability of businesses (Matthyssens et al., 2008; Reimann et al., 2010; Boringer & Simons, 2016). Margin pressure is a function of eroding profit margins because of OEMs' continuous focus on a price-reduction strategy and rising automotive chemical industry input costs that cannot be recovered in price adjustments.

It has been argued that cutting costs and boosting efficiency may only provide temporary relief in the presence of global competition levels but may not be adequate to prevent further margin erosion and secure business economic sustainability, especially when many businesses already operate at the edge of efficiency. In today's competitive and volatile business markets with professional buyers and intense global rivalry in industries such as the automotive industry, chemical industry supplier businesses supplying this industry are increasingly confronted with the phenomenon of commoditisation (Matthyssens et al., 2008). This leads to a discussion on the process of commoditisation.

2.5.1. The process of commoditisation

Matthyssens et al. (2008) defined commoditisation as *"a dynamic process that erodes the competitive differentiation potential and consequently deteriorates the financial position of any organisation"*. This process can be further explained using Figure 2.6 below.

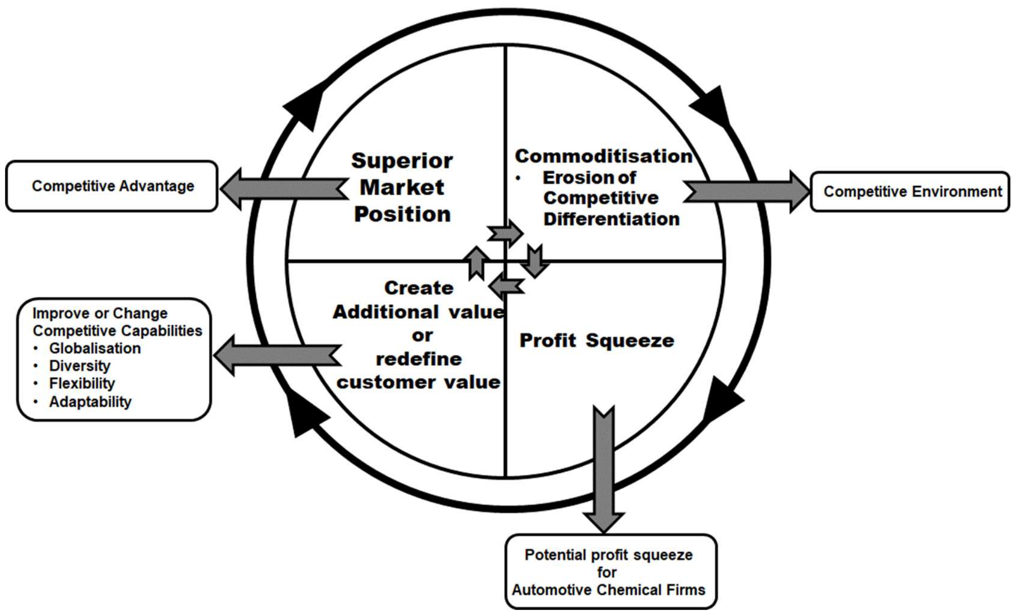

Figure 2.6: Commoditisation: drivers and effects

Source: Adapted from Matthyssens and Vandenbempt (2008)

The upper left quadrant in the diagram represents a business occupying a superior market position based on the business's differentiation strategy and holds a competitive advantage. As the business is exposed to market forces such as standardisation, growing experience with existing offerings in the market, and imitation of the business's business practices by rivals, commoditisation will transpire (upper right quadrant).

The impact, according to Matthyssens et al. (2008), is multifaceted. In other words, it decreases the differentiation of the business in the market, leading to products and services no longer being perceived as unique by customers, increasing their bargaining power. This ultimately brings the business into the lower right quadrant where supplier business profit margins are negatively impacted.

As a result, a business in this position will begin to experience a decline in financial performance with further rivalry and powerful customer-bargaining positions driving prices down. At the same time, businesses are likely to experience cost-of-sales increases amongst other cost increases, which ultimately leads to what is widely recognised as a profit squeeze.

It should, however, be noted that competitiveness and lack of differentiation are not always the primary drivers of price-reduction requests from customer buyers and are, in many instances, considered to be a tactic used by buyers to gain bargaining power by understating or excluding any points of difference between competing offers. Price-reduction pressure can therefore be a result of the general commoditisation of business products or simply an ongoing tactical initiative by buyers to gain bargaining power.

Kyoshabire and Timothy (2012) stated that, when businesses find themselves in a situation where there is little to distinguish between one business's products and services from another business, this situation is what is commonly referred to as a commodity trap. For many businesses, finding themselves in this predicament where price becomes the principal basis for allocating business, it becomes a situation where the cheapest supplier survives.

2.5.2. Commodity trap

According to Roland Berger (2014), a commodity trap describes a situation in which complex products and services are downgraded to a commodity status. This usually occurs when competition is primarily based on pricing and there is limited differentiation between competitor products and services. The commodity trap is a phenomenon found in all industries and the automotive chemical industry is not exempt. Symptoms of commoditisation are typically characterised by products that are highly standardised, face high levels of competition from substitutable products, and have high price transparency for customers. Consequently, businesses find themselves in a position of increasing costs, consequent margin pressure, and a downward spiral of purely price-based competition with limited opportunities to differentiate their offerings by traditional means.

Roland Berger (2014) believed the root causes of the commodity trap are embedded in global megatrends. The impact of these global megatrends as root causes can be explained with the assistance of Figure 2.7 below, which depicts the root causes, elements, and ways of falling into the commodity trap.

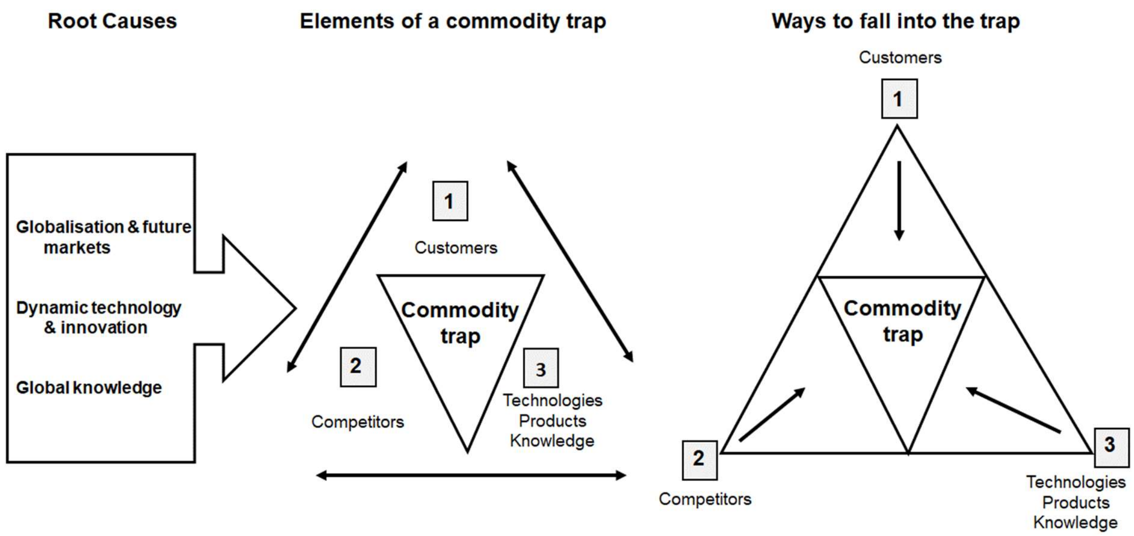

Figure 2.7: The commodity trap

Source: Adapted from Roland Berger (2014)

The box on the left shows the megatrends that contribute to the root causes of commoditisation by their impact on the global economy, which trigger the commodity trap. It is important to note that these global megatrends, which Roland Berger (2014) identified as being the root cause of commoditisation, are not only influenced by a single company. An example of some important elements of these megatrends that have manifested themselves in the South African automotive chemicals industry are the emergence of competitors from developing countries, a globally accessible supply market, changing customer perceptions of value, and a newly-established price transparency.

The second section of the diagram shows the three interlinked elements of a commodity trap. Various indicators in each of these elements may signify the existence of or an emergence of a commodity trap. From an automotive chemical industry perspective, businesses may typically be characterised by indicators such as: transparency of product features, pricing and cost, change of OEM perception of value, and price-based buying decisions. Low rates of further technological development and movement of international technology experts and know-how to emerging markets such as South Africa are a common occurrence. From a competitive point of view, the automotive chemicals market is seeing new competitors, previously unable or unwilling to compete, entering the market. For example, large multinational coating businesses have acquired automotive chemical technology and capability via international mergers and acquisitions and are challenging the traditional ACIS businesses.

The last section demonstrates the fact that the commodity trap may commence with any of the three of these elements and the interaction between these elements shows how these elements reinforce each with resultant significant price and margin pressure on the supplier business.

The discussion so far has focused on the definition of commoditisation from a business's product portfolio perspective and the resulting symptoms and consequences of this phenomenon. On a more practical level, the rapid growth of MNCs over the past three decades has created global competition in all major economic sectors, one of them being manufacturing. Diminishing opportunities for differentiation, saturated market conditions, and the growing availability of imported substitutes, especially from China, have challenged many businesses. This scenario can therefore be described as one of commoditisation.

2.5.3. Root causes of commoditisation

Based on an early seminal study on commoditisation by D'Aveni (2009) in several different industries, he concluded that there are three types of commodity traps that can prevail in industries. These can be categorised as escalation, deterioration, and proliferation. Businesses can find themselves 'trapped' in either one of them, or all of them simultaneously. Figure 2.8 below depicts these three categories and the primary root causes of each. Each of these categories, together with their root causes, will be briefly discussed.

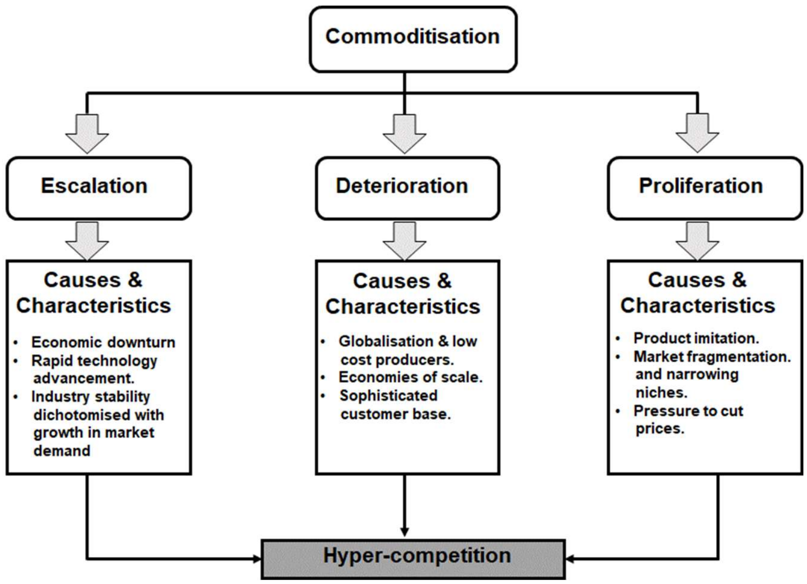

Figure 2.8: The three commodity traps framework: root causes and characteristics

Source: Adapted from D'Aveni (2009)

2.5.3.1. Escalation

According to Kyoshabire et al. (2012), escalation occurs when businesses attempt to challenge their competitors by offering more product benefits at the same price. Consequently, contemporary benefits are taken for granted by customers, resulting in these benefits becoming the norm as competitor businesses endeavour to create new benefits for the customer. This leads to customers getting more value for their money with the consequent erosion of supplier profit margins.

Businesses that find themselves in a situation where customer buyers possess excessive buying power tend to lower their prices to either maintain or increase their market share. This becomes more evident as businesses continue to augment their offerings by adding benefits to their products despite not being able to charge a premium price for these additional benefits.

In an environment where there is an economic downturn, demand will decrease, providing customer buyers with power to demand more for less. Technological advancement and industry stability are further drivers of commoditisation, according to Kyoshabire et al. (2012). Low entry barriers for new entrants and low switching costs provide opportunities for competitors to introduce new products with improved features to attack the market.

2.5.3.2. Deterioration

D'Aveni (2009) asserted that, in this scenario, businesses with a dominant low-cost, low-benefit position together with significant economies of scale (EOS) enter the market, capture a substantial portion of the market share, and disrupt the market position of other market players. With the expansion of businesses' operations into new markets and geographical regions, they face the challenge of more complex markets, hyper-competitive environments, and additional variables. The drivers of competition now emanate from both domestic and international competitors, which have resulted in hyper-competition and commoditisation on a global scale. D'Aveni (2009) argued that incumbent businesses must protect their declining market share and, in most cases, their actions will escalate industry competition and thus increase commoditisation.

2.5.3.3. Proliferation

Proliferation is the scenario that develops when the market is attacked by competitors with new value propositions, which are a combination of price and benefits. In other words, the incumbent business's products are attacked by rivals offering suitably substitutable products. D'Aveni (2009) asserted that this consequently results in fragmentation of the market into smaller niches, raising levels of competition, and commoditisation which erodes businesses' market share. According to Kotler and Armstrong (2018), when numerous businesses compete for the same business with comparable product offerings, price defines the competitive position. At the end of the day, when businesses' market share is eroded, businesses tend to reduce prices to retain customers, resulting in a scenario where customers are more likely to switch to competitors with preferable offerings.

In summary, the pressure to cut prices as a direct result of competition or tactical price-reduction pressure from customers consequently leads to diminishing supplier margins and returns, indicating the manifestation of commoditisation.

2.5.4. Features of commoditised markets

According to Kyoshabire et al. (2012), an understanding of evolving market structures can provide awareness of, and insights into, trends of an industry that is being commoditised so that businesses can determine how best to respond to the threat of commoditisation. Kyoshabire et al. (2012) highlighted a few significant features displayed by commoditised markets, namely price wars, shortened product lifecycles, value chain reconfiguration, and declining product differentiation.

A consequence of commoditisation on market structure would be the proliferation of price wars where price becomes the basis for the comparison of competing offers in the face of competitive rivalry among suppliers. It therefore follows that only businesses with the ability to translate their low-cost structures into low prices will be able to maintain a dominant role in the sector in which they operate. Businesses that are unable to recover fixed and production input costs utilising increased sales prices will be placed in a position where sales revenues will decline, resulting in diminishing business profit margins.

Shortened product life cycles, when business products reach maturity in the market, tend to accelerate the cycle of new product development. The maturity stage is a period when product sales slow down since the product has achieved acceptance by the market, competition is intense, and businesses struggle to maintain their market share (Kotler et al., 2018). Rapid obsolescence of existing products can occur in technical markets as a result of technological innovation and intense competition in the industry. As an example, the automotive industry tends to change models on a five-year cycle, with vehicle upgrades and facelifts taking place after three years. This often leads to the use of new products for new models, depending on changes in vehicle structure and construction materials.

One of the major impacts of commoditisation is on business value chains. Kyoshabire et al. (2012) were of the opinion that the value chain forms an important dimension of market strategy for businesses. As a consequence of changes in customer value requirements, changes to the continuously evolving market pressurises businesses to reconfigure their value chains to remain competitive. Although businesses continue to strive to differentiate their offerings to improve their profitability, the problem that arises is that differentiation is often imitated by competitors. In many cases, product differentiation becomes indistinct in the view of customers and they revert to negotiating based on price, which implies that product differentiation alone will not always suffice for supplier businesses. To be successful, supplier businesses will have to differentiate by changing their industry structures in such a way as to evade or extricate themselves from a commodity trap.

2.6. GLOBALISATION

According to Soosay, Nunes, Bennett, Sohal, Jabar and Winroth (2016), during a period of global economic downturn the survival and competitiveness of manufacturing businesses such as those in the automotive chemical industry are dependent on the practices they employ and their ability to adapt to external environmental changes such as changes in customer preferences, governmental regulations, technology, and competitors. Soosay et al. (2016) further asserted that, to remain competitive and survive, the strategic alignment of internal resources and external market requirements is of prime importance.

2.6.1. Globalisation theory

From a theoretical perspective, the term ‘globalisation’ refers to the integration of markets in the global economy, which leads to an increased interconnectedness of national economies, with a consequent increase in economic trade taking place beyond the borders of individual countries (Chang, Bayhaqi, & Yuhua, 2012). The numerous attempts in the literature to define the concept of globalisation and the abundance of definitions published have failed to capture an understanding of exactly what globalisation is, due to the multifaceted complexity of the concept. Marginean (2015) referred to an early study by Al-Rodhan (2006), who offered the following holistic definition of globalisation based on contemporary knowledge of the concept: “*Globalisation is a process that encompasses the causes, course, and consequences of transnational and transcultural integration of human and non-human activities.”* The academic literature commonly subdivides globalisation into three major categories, namely economic globalisation, political globalisation, and cultural globalisation. Although globalisation is most often referred to in an economic context, it also affects and is affected by politics and culture. In the context of this study, an economic definition of globalisation was considered. Marginean (2015) further referred to the study by Al-Rodhan (2006) in which he suggested that the following definitions are interpretations of economic globalisation which describe the interdependence of nations around the world fostered through free trade:

- *"Globalisation is the spread of products, technology, information and jobs across national borders and cultures."*
- *"Economic globalisation is the increasing economic interdependence of national economies across the world through a rapid increase in cross border movements of goods, services, technologies, and capital."*

According to Ristovska and Ristovska (2014), economic globalisation is a worldwide phenomenon in which economies in the world are no longer restricted to operating within their borders and can implement a wide range of business activities globally. With the relaxation of trade barriers, global trade between countries has grown at a rapid rate. Companies can no longer assume that domestic markets alone will lead to long-term profitability. The unfettered flow of money across national borders has resulted in companies and investors pursuing more favourable financing opportunities and returns on their investments. Economic globalisation has two main components, namely the globalisation of markets and globalisation of production (Ristovska et al., 2014). The globalisation of markets refers to the merging of separate national markets into one global market. The globalisation of production implies the tendency of companies to source goods and services from various locations in the world. This is to reduce overall costs, improve the quality and functionality of their product offerings, and enable them to compete more effectively.

2.6.2. The impact of globalisation on businesses

Globalisation has changed the way in which businesses conduct business. Mahmutovic, Talovic and Kurtovic (2017) believed economic globalisation provides companies with new business opportunities while simultaneously presenting them with new challenges, in other words globalisation creates direct implications for companies yielding both positive and negative impacts. Porter (2008) pointed out that the positive aspects of globalisation relate to the acquisition of inputs such as raw materials, capital, and knowledge globally, which improves the chances of building a competitive advantage and future growth. On the other hand, intense global competition also creates new risks for companies. This is especially applicable to companies in developing countries who are particularly exposed to risks because the products they produce must meet global market standards in terms of price, quality, and delivery flexibility.

There are, however, several distinct factors that encourage globalisation and stimulate companies to strive for business development and growth through international and global operations, namely political changes, development of technology, international business climate, and market development, expenses, and competition.

Globalisation has impacted the way businesses conduct business and, consequently, GVCs and supply chains have been transformed by technical progress, modern communication infrastructures, falling trade, investment barriers, and the manifestation of developing low-cost labour economies (Chang et al., 2012). One could argue that globalisation has consequently been responsible for intensified international competition (Gereffi & Lee, 2012). Companies entering the global market is an inevitable consequence of both globalisation and limitations in domestic markets that have been exposed to foreign competition. South Africa's position in the global economy and its link to global automotive industry supply chains has resulted in competition from a South African automotive chemicals industry perspective being considerably intensified.

Globalisation, therefore, links into concepts such as competitiveness theory, GVCs, supply chain, and SCM and provides an important theoretical component in support of the primary research question of the study regarding the future economic sustainability of domestic automotive chemical manufacturing businesses and whether they can sustain access to the globalised domestic automotive value chain.

2.7. COMPETITIVE THEORY

The most important theme in this study is that of competitiveness. Against a background of evolving competition in the automotive manufacturing environment where price has, to a large extent, become the basis for purchasing decisions, competitive theory is the basis for gaining an understanding of the evolving competitive environments of the automotive chemical industry as a precursor to determining the impact of commoditisation on the automotive chemical industry's economic sustainability. The globalisation of markets, which has resulted from developments in communication and transportation, changing political climates, and the reduction in trade barriers, has facilitated new international opportunities and competition for businesses.

With foreign businesses making inroads into domestic markets, domestic businesses are having to initiate continuous improvement and innovation programmes to strengthen their competitiveness and remain relevant in the markets in which they operate. Maune (2014) asserted that the success and survival of businesses in modern turbulent and dynamic environments are becoming exponentially dependent on competitiveness.

Melnyk and Yaskal (2014) viewed competition and competitiveness as basic economic phenomena. Although competition is made up of various aspects, its primary function is to render market economies more efficient. Competition can therefore be viewed as a factor of economic growth, which is the result of businesses implementing innovative development strategies to facilitate the reduction of business costs and fulfil growing customer demands. According to Maune (2014), competitiveness has been described by numerous researchers as being a multidimensional and relative concept that refers to the ability to be able to create sustainable competitive advantages that can be used at national, industry, and business levels.

According to Siudek and Zawojska (2014), competitiveness has been described by numerous researchers as a *"theoretical, multidimensional and relative concept associated with the market mechanism".* The concept may be applied at various levels such as global, national, regional, domestic, sectoral, and business level. Competitiveness could therefore be described as a set of characteristics of one object with respect to other comparable objects in the market. Siudek et al. (2014) stated that the classical approach mainly focuses on competitiveness at the macrolevel (international, regional, country) while the neoclassical approach focuses on the microlevel (business).

Competitiveness is commonly acknowledged for its impact on the sustainability of positions of advantage and, consequently, business survival. Macro-economic volatility and the proliferation of new market players from peripheral economies, together with technological advancements, have been some of the more important contributing factors to the changes in traditional business configurations and the increase in competitiveness. As business profitability and growth are deemed to be important measures of business success, the challenge for businesses in modern markets is that, to be successful, they must maximise both market share and profitability simultaneously. Consequently, according to De Brito and Brito (2014), it has become more and more difficult to sustain competitive advantage and maintain economic sustainability.

The South African automotive supplier industry in general is facing numerous challenges due to intense domestic and global competition emanating from demanding OEMs. According to Comrie et al. (2013), factors affecting the competitiveness of automotive suppliers, especially at lower and non-tier levels, include high labour costs, poor labour productivity, skills shortages, and high overhead costs. This has been considered a major contributing factor affecting the economic sustainability of automotive suppliers.

While not all-encompassing, the theory of competitiveness in many ways reconciles concepts such as globalisation, profitability, sustainable competitive advantage, commoditisation, and economic sustainability.

2.7.1. Hyper-competition

Following on from the discussion on commoditisation in Section 2.5, which is notably one of the most virulent forms of hyper-competition, it is appropriate at this juncture to introduce the concept of hyper-competition to the discussion as it is important to understand the environment in which commoditisation is prevalent. Hyper-competition is a term conceived by Richard D'Aveni (2009) and describes a dynamic competitive environment in which no action or advantage can be sustained for any length of time. D'Aveni (2009) described hyper-competition as being associated with a disruptive, uncertain, and rapidly changing environment where businesses can expect temporary and unsustainable advantages. Hyper-competition is considered to be a key aspect of the contemporary global economy. It is therefore important for businesses to understand hyper-competitiveness as it can result in an erosion of business financial performance and long-term economic sustainability. Goeltz (2014) described hyper-competition as *"an indication, result and a driver of substantial changes to the* *competitive environment caused by volatility in demand, convergence of technologies and indeterminate competitive boundaries and where change is non-linear and outcomes less predictable".* According to Goeltz (2014), the increasing rate of international trade and competition are consistent themes in business literature that are being associated with the phenomena of globalisation and hyper-competition. These phenomena are being signified as a new paradigm for business where globalisation inevitably leads to hyper-competition.

According to Sammut-Bonnica (2015), hyper-competition is *"created by the acceleration of competitive moves in an industry where businesses must react quickly to develop their competitive advantage and erode the advantages of competitors".* Hyper-competition can occur in both low- and high-technology industries, an example of the latter being the automotive industry where products, standards, and rules have shifted due to business being interrupted by competitors and external environmental factors such as globalisation, innovation, flexible manufacturing, and outsourcing. Sammut-Bonnica (2015) asserted that, in hyper-competitive environments, profits and competitive advantages are temporary and will be challenged by future disruptors in the industry at a point in time when new entrants or innovations by current industry incumbents challenge the market. Demand-pulls from hyper-competitive markets and lowered barriers to entry have consequently increased supply chain agility, which in turn has increased supply chain competition. Drivers of hyper-competition can therefore be summarised as a pull from markets, enabled by technology, resulting in lower barriers to entry and a fragmented and dispersed globally accessible value chain (Goeltz, 2014).

Di'Aveni's (2009) assertion that *"hyper-competition is being fuelled by changes in the environment, including changes in consumer demand, the increased knowledge base of businesses, the declining height of entry barriers and the increasing alliances between businesses"* points to the fact that drivers of both globalisation and hyper-competition interact to increase competition.

Goeltz (2014) concurred with Di'Aveni's assertion that there is a symbiotic relationship between globalisation and hyper-competition. He pointed out that this is accomplished via the value chain. This is demonstrated by the fact that globalisation changes the quantity and quality of the value chain by dispersing it and then reintegrating activities globally. The corollary is equally evident where intense competition for resources and markets reinforces and accelerates globalisation. It can therefore be concluded that globalisation and hyper-competition are linked by common drivers such as technology, market pull, and lowered barriers of entry.

It can be acknowledged that the challenges of hyper-competition in an industry such as the automotive industry requires a strategic approach to cope with the realities of this rapidly changing environment in the context of the underlying principle that competitive advantage is almost impossible to sustain (Di'Aveni, 2009).

2.8. STRATEGY

In simple terms, the concept of strategy can be described as an outline of how businesses intend to achieve their goals. Achieving business goals is an objective while the strategy is the route to be followed to achieve these objectives. These objectives are generally directed at the survival of the business and the achievement of growth targets. Strategy is therefore primarily associated with the selection of a product-market positioning, which relates to how a business selects its product offerings, areas in which it will compete, and the business profitability and growth objectives it seeks to achieve. Strategy can therefore be explained as being a deliberate and systematic approach by a business to clarify objectives, make strategic decisions, and follow up on progress towards achieving predetermined business goals.

2.8.1 Defining strategy

Strategy can be defined in several different ways and is more than likely to be embedded within different perspectives adopted by researchers. According to Porter (1996), (competitive) strategy is about being different. This implies that a business can achieve success by selecting a strategic position that is different from that of the competitors in its industry, which implies the selection of a set of business activities that will deliver a unique mix of value. Because businesses are confronted with a perpetually changing environment, there is a need to regularly ensure that their internal resources and capabilities can meet the needs of the external environment.

2.8.2. The role and importance of competitive strategy in business

It has been argued that in modern business things change so rapidly that a strategy can become outdated almost as soon as it is formulated (Kraaijenbrink, 2019). To give substance to this reasoning, it is imperative to examine what the concept of strategy offers to organisations and its relevance in today's volatile, uncertain, and complex world. According to Kraaijenbrink (2019), several core functions of strategy can be identified from classic scientific strategy literature. Because strategy is future-oriented it takes the focus away from short term activities, assists the organisation to focus on its unique assets in a meaningful way, provides an organisation with stability and a common frame of reference (especially in times of turbulence), and is an overarching managerial discipline which reinforces internal and external alignment by providing an integrated overview of both internal and external factors that are important to the organisation. Taking these core functions of strategy into consideration, one can confirm that they are still relevant in today's modern business environment, from the point of view that modern organisations are still required to find ways to differentiate themselves from competitors, retain organisational stability, and maintain a common frame of reference to guide their actions.

2.8.3. International competitive strategies

To be successful in the modern competitive and dynamic business environment, it is apparent that an organisation needs to have feasible international strategies which reflect the organisation's intended participation in the global business environment. The strategic orientation of an organisation is a primary internal driver of strategy choice while cost pressure and the need for organisational responsiveness to customer demands are important external drivers of strategy choice (Hill, 2021). According to Hill (2021), when competing internationally organisations commonly choose among what he calls *"four main strategic postures".* These are characterised as global-standardisation strategy, localisation strategy; transnational strategy; and international strategy. Hill (2021) pointed out that the appropriateness of each strategy depends on the extent of the pressures for cost reduction and local responsiveness experienced by businesses. Hill (2021) offered the following explanations for the abovementioned strategies:

- ❖ The focus of businesses pursuing a global-standardisation strategy is on increasing profitability and profit growth by taking advantage of factors such as cost reductions as a result of EOS, location economies, and learning effects. In other words, their strategic intent is to pursue a low-cost strategy on a global scale.
- ❖ The focal point of a localisation strategy is concentrated on increasing business profitability by customising the business's goods and services to suit the preferences of national domestic markets. This strategy is the most appropriate when there are significant differences in preferences across nations and cost pressures are not exceptionally high. By customising product offerings to meet local demands, businesses can increase the value of their product offerings in the local market.
- ❖ Competitive conditions in the modern global environment are extremely high, with businesses simultaneously having to cope with intense cost pressures and high demands for local responsiveness. Businesses in this position tend to follow a transnational strategy where they must take advantage of location economies and experience effects to enable them to leverage their products internationally while at the same time being attentive to local market responsiveness.
- ❖ Many multinational businesses are in a position where they are confronted with low-cost pressures and low local responsiveness demands. Businesses in this position tend to follow an international strategy. This implies that these businesses sell products first produced for a domestic market internationally with little or no customisation. Businesses in this position do not have any significant competition and have product portfolios that serve universal needs.

Each of the international competitive strategies listed above are characterised by both benefits and drawbacks and the suitability of a specific strategic choice will rest on the balance required between cost pressure and localisation requirement.

It is important that the selected competitive strategy links to how businesses intend to sustain a competitive market position to achieve long-term profitability. The following section explores the concepts of value chains and value chain governance which present businesses with a mechanism that can be used to translate the selected strategy into a competitive advantage by assessing how discrete activities are performed and managed along the value chain.

2.9. VALUE CHAINS AND VALUE CHAIN GOVERNANCE

A value chain can theoretically be described as an extensive set of value-added activities that are necessary to drive a product from its conception through design, raw material sourcing, production, marketing, and distribution to the end customer (Chang et al., 2012.) A value chain can span domestic economies as well as regional economies and can become global when its activities are spread across several economies. It is important to note that the complexity of value chains will vary, depending on the products manufactured, from industry to industry and business-to-business (B2B). Wen and Hou (2015) stated that value chain theory focuses on three areas, namely value chain governance, value chain upgrading, and the production and distribution of economic rent. Value chain governance refers to the organisational structure and power distribution in the value chain organisation. It also refers to the relationship among buyers and sellers and regulatory institutions that operate within the influence or range of activities required to drive a product from inception to end-use. Value chain upgrading is concerned with the mechanisms, type, and course of upgrading. The production and distribution of economic rent (money earned that exceeds what is economically necessary) is directed at providing a competitive advantage to producers. These would include aspects such as barriers to entry and business core competencies in areas of technical ability, organisational ability, marketing ability, and special skills.

2.9.1. Value chain concept

The value chain concept was popularised in 1985 by Michael Porter in his seminal work on competitive advantage (Porter, 1985). Porter conceived the value chain as a *“combination of nine generic value-added activities operating within a business”* which work in unison to provide value to customers. The Porter model focuses on the exchange of tangible assets (external, human, and structural capital) that manifests as a linear structure depicting a business’s value activities, total value, and business profit margin (Van Wijnen, 2014).

In his value chain concept, Porter linked the value chains of individual businesses to form what he termed a 'value system,' which infers that the linking of the value-creating processes of multiple businesses in the current business environment where considerably more outsourcing and collaborative activities exist has been commonly referred to as a value chain (Dubey, Singh, Singh, Mishra & Singh, 2020).

The significance of the value chain concept is that it can be used to analyse different value-add stages of the value chain to identify participants in the value chain and their fundamental business models, reveal the location of the competitive advantages in the value chain, and determine which businesses hold these competitive advantage positions (Nitschke, 2011). Analysing value chains also provides an opportunity to identify cost and value drivers within each activity of the value chain. A further illustration of the importance of the value chain concept, in the context of competition, is the role that the value chain concept and value chain governance play in the synergistic relationship between globalisation and hyper-competition. These aspects provide for a realistic framework to explore the position and role of domestic industrial clusters such as the automotive chemicals industry within a greater automotive value chain.

2.9.2. Value chain process

According to Porter (1991), the value chain can be described as a set of linked activities performed by a business that influences its competitive position. These linkages do not only connect value activities within a business but also connect value chains between businesses, implying that the value of businesses can be influenced by strategic partners, such as the businesses' suppliers. The value chain process is typically represented by Porter's simplified value chain, which depicts the primary activities of the value chain (namely inbound logistics, operations, outbound logistics, marketing and sales, and service) supported by activities such as human resources, R&D, and purchasing functions of the business (see Figure 2.9 below).

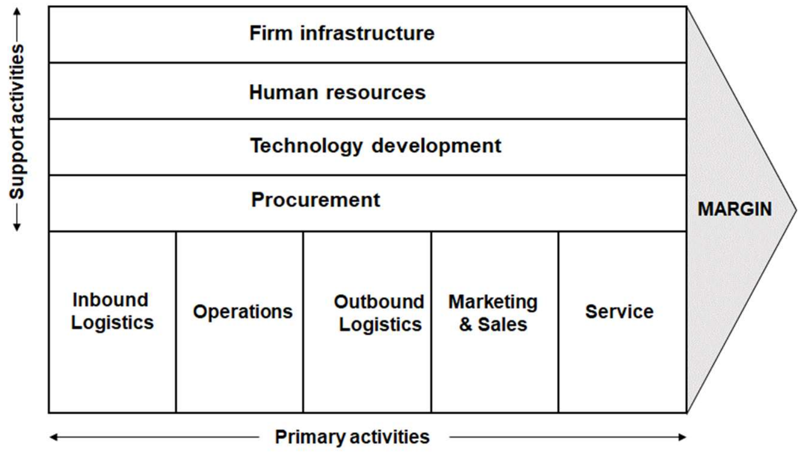

Figure 2.9: Porter's value chain

Source: Porter (1985:34)

According to Monczka, Handfield, Giunipero and Patterson (2020), when describing the value chain process, a question that often arises is that of the difference between a value chain and a supply chain. Monczka et al. (2020) asserted that one way of envisioning the difference is to conceptualise the supply chain as a *"subset of the value chain".* While all business personnel are part of the value chain, the same cannot be said about the supply chain. This is underpinned by the fact that, at an organisational level, the value chain is much broader than the supply chain as it is inclusive of all a business's support activities. While the value chain is focused primarily on internal participants, the supply chain is both internally and externally focused.

Figure 2.10 depicts contemporary thinking, where Porter's model is expanded to include suppliers and customers who are situated upstream and downstream of the core organisation.

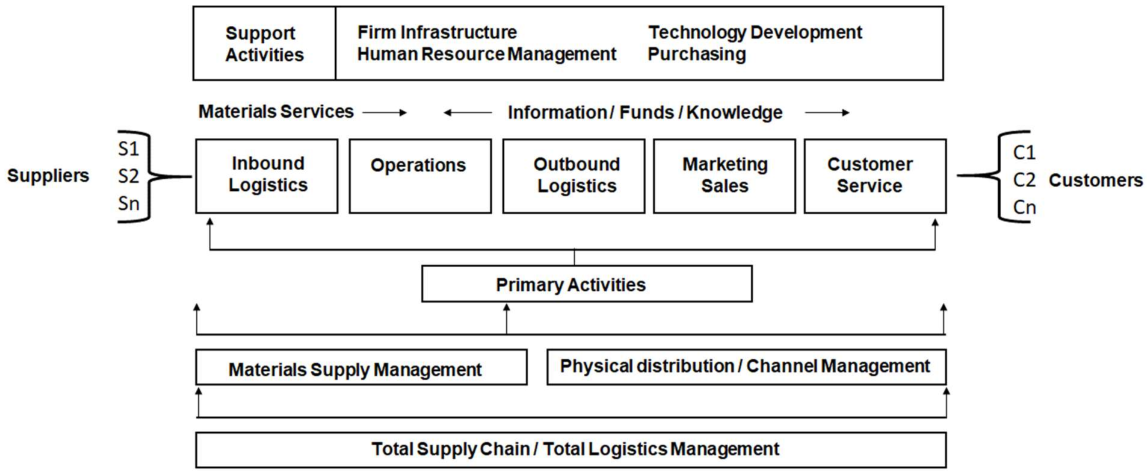

Figure 2.10: Modified version of Porter's value chain

Source: Adapted from Monczka, Handfield, Giunipero and Patterson (2020)

This model depicts multiple suppliers and customers, which form the basis for this extended value chain concept. This implies that *"success is a function of effectively managing a linked group of businesses past first tier level suppliers and customers"* (Monczka et al. 2020).

2.9.3. Value in automotive value chains

Focusing on the important aspect of 'value' in value chain, it can be argued that most business initiatives are, first, directed at understanding and appreciating the importance of customer needs and, second, organising the business's activities to meet the customer's needs most efficiently and cost-effectively. Value is therefore created in the exchange of goods and/or services in exchange for payment while keeping in mind that competitive forces in the market can impact the value of goods and services being exchanged.

When a business has the capability of generating revenue that exceeds the cost of generating that revenue in the process of generating value for the business's customer base, the net result is the creation of profitability, which consequently generates upstream shareholder value. An important aspect of this study, and the corollary to this view, is that competing offers can often erode the value and profit margins of businesses, especially when the lowest price becomes the determining factor in the exchange process (Dubey, Singh, Singh, Mishra & Singh, 2020). According to Porter

(1991), the value chain provides *"a template for understanding the cost position because activities are the elemental unit cost of behaviour"*. This implies that the value chain offers a mechanism of being able to systematically understand the sources of buyer value (Van Wijnen, 2014).

The linked activities of a business (both primary and secondary) that constitute a business's value chain have a significant impact on the business's competitiveness by not only linking business activities but also connecting value chains between businesses. Although the value chain concept has traditionally been suited to the analysis of individual businesses, it is also useful to use to describe industries. One of the disadvantages of the value chain approach is that the model implies a linear industry structure, which is not always the case in contemporary industry structures. While traditional industry structures such as those in the automotive manufacturing industry consist of upstream and downstream activities with OEMs as the focal point, contemporary automotive industry value chains lean more to a value network structure that is made up of nodes and links where the focus shifts to the value-creating system within which various players in their respective roles as suppliers, partners, and customers play an integral role in producing value. As the businesses in the network are independent, the role of inter-relationships amongst network businesses is therefore paramount to their respective competitive positions (Van Wijnen, 2014).

2.10. THE CONCEPT OF SUPPLY CHAINS

In the prevailing global economic environment, companies have realised the importance and value of the supply chain to their respective businesses where the supply chain is strategically relevant to both external and internal business activities. Although supply chains are not specifically focused on financial improvements, they do have a significant influence on the profit of a business.

A supply chain refers to the organisation, people, technology, activities, raw materials, information, and resources required to transform raw materials into finished products and move products from suppliers to customers. As with value chains, supply chains can exist within a business or between businesses in a local economy, a regional grouping of economies, or globally (Shashi, Tavana, Shabani, & Singh, 2019). A supply chain can therefore be described as a network of organisations, resources, activities, technology, and people involved in the creation and sale of a product. The term ‘supply chain’ encompasses the process of purchasing and delivering raw materials from source suppliers to the manufacturer of the organisation’s products, to the sale and delivery of the organisation’s products to the end-user. There are several basic steps involved in the supply chain process, namely sourcing of raw materials, combining the raw materials to create a finished product, fulfilling end-user orders, delivering the product to the end-user, and providing customer support service. Supply chains are managed by supply chain managers who monitor and co-ordinate the steps in the process to ensure the timeous delivery of products to the end-user and assure customer satisfaction.

As alluded to in Section 2.9.2 of this chapter, there is often some confusion as to the inherent differences and similarities found in value chains and supply chains. Supply chains and value chains contribute to the end-product in slightly different ways. The aim of a supply chain is to meet customer demands while the value chain seeks to add value to a product and provides the business with a competitive advantage over its competitors. Therefore, supply chains and value chains work in tandem to meet two slightly different definitions of demand. Dubey et al. (2020) put forward the view that a supply chain and value chain are reciprocal views of a business’s integrated business processes, with the only difference being the direction of flows. The concept of value chain is described as set of interrelated activities which a company uses to add value to its raw materials to produce products which are sold to the company’s customers and is derived from a business management perspective. The value chain comprises a sequence of activities which originate from the customers’ request, and ends up at the finished product (demand from customer to supplier). The concept of supply chain on the other hand is derived from an operational management perspective and is comprised of the flow of information, products, materials and funds between the different stages of creating and selling product to the end user (downstream flows of products from source to customer). Dubey et al. (2020) conclude that the main difference between a supply chain and a value chain is the basic shift in focus from the supply base to the customer. These reciprocal flows are depicted in Figure 2.11.

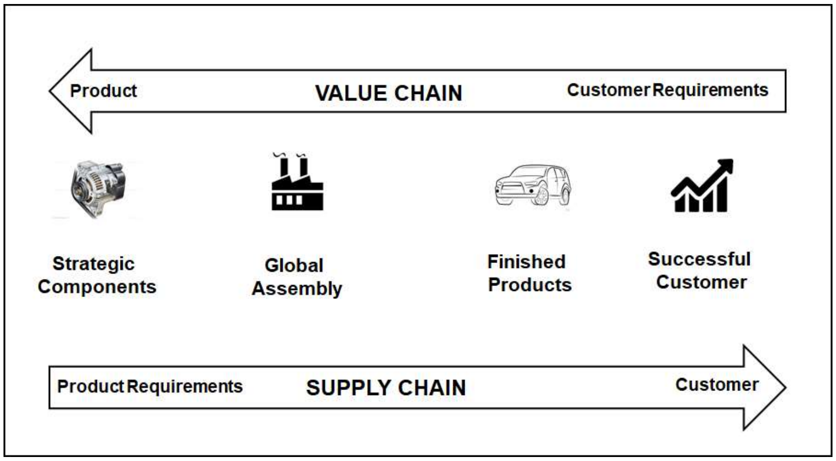

Figure 2.11: Value chain and supply chain flows

Source: Adapted from Dubey, Singh, Singh, Mishra and Singh (2020)

The flows of business supply chains are synchronised with the flows of value from customers in order to be able to maximise business value and subsequent profitability. This is especially relevant in dynamic environments where customer preferences and demands are continuously changing. Because value is derived from customer needs, businesses need to ensure that the processes and functions that deliver the products and services that customers value are streamlined. This is achieved through continuous improvement activities and the elimination of waste in the business's supply chain to ensure that the margin between customer value and the cost of the delivery process increases, thereby improving the business's profit margin. According to Dubey et al. (2020), contemporary supply chains need material flow and product delivery to be lean and synchronised as the success of a business's performance will be determined by its ability to fully integrate the concurrent flows of value and supply.

2.11. SUPPLY CHAIN MANAGEMENT

The literature offered numerous definitions of SCM that very much depended on the position and logistics school of thought of the researcher (Mukhamedjanova, 2020). Many researchers suggested that SCM is an integrative philosophy aimed at controlling the entire distribution channel from the supplier through to the end-user. Martins and Pato (2019) offered the practical definition of SCM as *"the process of planning, implementing and controlling the operations of the supply chain with the purpose of satisfying customer requirements as efficiently as possible. Supply chain* *management spans all movement and storage of raw materials, work-in-process inventory and finished goods from point of origin to point of consumption."* According to Mukhamedjanova (2020), some researchers have defined the concept of SCM as a philosophy which is associated with ways of combining actions within and between organisations to fulfil customer needs from a supply chain perspective.

Contemporary views on SCM relate to the integration of business processes and relationship management in a supply chain in order to achieve a competitive advantage for a business. In the context of the ever-changing business environment and its impact on business organisational structures, Kotzab, Grant, Teller and Halldorsson (2009) raised the question of how inter-organisational business relations and supply chain processes can contribute to overcoming the challenges of responsiveness, hyper-competitiveness, and long-term competitive sustainability of businesses. This raises the all-important issue of supply chain integration. Empirical studies have shown that supply chain integration contributes to the improvement of value addition in customer and supplier supply chains by reducing cost and improving flexibility, speed, quality, and uninterrupted supply. The concept of supply chain integration can therefore contribute to both the creation of value and SCM improvement, which in turn leads to the maximisation of sales, profit, market share, and overall superior business performance. The success of supply chain integration is dependent on the degree of collaboration and customer supplier relationships, which have a significant impact on supply chain integration. Shashi et al. (2019) contended that without collaboration supply chain integration cannot be achieved. Integration of customer and supplier businesses will therefore assist both entities to fulfil increases in demand promptly and more effectively while at the same time minimising their costs compared to their competitors.

2.11.1. Collaborative customer–supplier relationships in business-to-business markets

The increased competitiveness of global industries and the need for significant cost reductions in the increasingly globalised supply chains have necessitated the need for more definitive inter-business influencing strategies. These strategies have led to a more adversarial approach between customer buyers and their suppliers as cost reduction requirements are short-term and need to be achieved more immediately

(Carnovale, Henke, DuHadway & Yeniyurt, 2019). Establishing effective collaborative relationships are generally only brought about by commitment and trust between buyers and suppliers over a long period of time. Carnovale et al. (2019) believed, while global industries such as the automotive industry have produced numerous examples of supplier relations moving away from an adversarial approach to one of collaboration, there are still several automotive industry leaders that continue to maintain an adversarial approach.

An important aspect of collaborative customer-supplier relationships in B2B markets is its link to the economic dimension of sustainability. It has been suggested that economic sustainability takes place through value creation (the business's ability to capture value) in the process of striving for competitive advantage (Jokela et al., 2015). Although economic sustainability has mostly been explored from an individual business point of view, Pitelis (2013) offered an alternative perspective in which economic sustainability is viewed from a dyadic viewpoint. In other words, as both customers and suppliers participate in creating value, they both contribute to the economic sustainability process at a dyadic level. This provides for a widened perspective of business relationships in which industry customers and suppliers can jointly work towards creating and capturing value and enabling both parties to achieve competitive advantage and economic sustainability, which is referred to as mutual orientation. According to Jokela et al. (2015), mutual orientation is *"a measure of how much a company is prepared to refrain from its own individual goals or intentions in order to increase the positive outcomes of others and through this ultimately increase its own well-being"*. In other words, mutual orientation encompasses the belief in the importance of common goals and interests of a multitude of businesses in the value chain. Applying this concept implies that businesses must be encouraged to desist from using unfair and opportunistic business practices when dealing with each other. An important element of mutual orientation that leads to the subject of profitability and long-term economic sustainability of suppliers is that of applying joint consideration to cost in a way which will provide positive economic outcomes for both suppliers and customers. Jokela et al. (2015) asserted that a more responsible approach by both parties to each other's costs will contribute to mutual economic sustainability and provide a sound foundation for long-term relationships.

In summary, it appears that sharing the management of business processes can be economically significant. This does however depend on the emphasis on the long-term orientation, common interests, inherent business relationships, and uncertainties prevailing in particular industries.

2.11.2. Long term collaborative relationships and business economic performance

The increasing importance of the need for the establishment of long-term relationships between suppliers and buyers in B2B industries is especially pertinent against the background of the beneficial effects of cost reduction and improved efficiency on business profitability (Somogyi & Gyau, 2009). An important factor to be considered in long-term relationships is that of price satisfaction. According to Somogyi et al. (2009), the concept of price satisfaction in industrial markets from a supplier's point of view has not been sufficiently explored. They claim that in a B2B market price is invariably established by customer buyers because of relational power asymmetries and are subject to varying market conditions.

2.11.2.1. Pricing capabilities

Many businesses have historically relied on pricing models, such as cost-plus pricing, that only reflect a partial understanding of the value of their products and services to their customers (Burns & Schottland, 2018). Many of these businesses have opted for a measured approach to increasing prices, which emanates from concerns related to loss of sales to competitors. Burns et al. (2018) believed these pricing approaches have been inclined to neglect the value of commercial relationships, the supplier business's reliability, the quality of its products, or any other capabilities which the business may have that would place it in a position to set prices that maximise profit margins. This points to the question of the importance of business pricing strategies and the ability to react to market fluctuations by executing price changes efficiently to preserve margins.

Kienzler and Kowalkowski (2017) referred to an early study by Lancioni, Schau and Smith (2004), who stated that from a customer demand perspective a business's pricing strategy can be described as a *"quantification of the perceived value that a business creates for its customers."* However, from a supply side perspective, Kienzler et al. (2017) further referred to the study by Lancioni et al. (2004), who concluded that pricing must be seen as *"a strategic and tactical expression of how a business wishes to compete to generate revenues and realise a profit."* They further assert that, in this competitive environment, a sound pricing strategy is required to facilitate customer value creation, structure price decisions, and earn a profit

Considering the supply side of pricing and the abundance of internal and external economic and political influencers who impact a business's pricing decisions, the task of price setting by suppliers remains challenging (Kienzler et al., 2017). The level of difficulty in formulating a pricing strategy in an environment which consists of both multinational supplier and customer businesses, for example in the South African automotive industry, is compounded by the fact that suppliers to the automotive industry must take cognisance of multiple foreign automotive markets in which both domestic OEMs and automotive suppliers operate.

Internal factors such as cost levels, profit maximisation objectives, return on investment (ROI) levels, and factory utilisation levels are important internal influencers. Kienzler et al. (2017) pointed out that many of the obstacles experienced in the price setting process of a business are as a result of the business's internal organisation and political system, which is reflected in interdepartmental co-ordination and rivalries that shape the business's pricing decisions. Many departments such as finance, accounting, marketing, and production all have a direct or indirect impact the business's pricing process. Each department may have its own mandate to contribute a different type of value add to the business, which may translate into procedures and activities that conflict with each other. According to Kienzler et al. (2017), numerous articles in the academic literature have called attention to the importance of understanding the dynamics of price setting in a business and the associated complexity of undertaking this task.

In summary, pricing strategies are influenced by both internal and external factors. As a result, in many instances, industrial price-setting decisions are made without giving due consideration to the aforementioned contemporary market factors. It is therefore important for businesses to take cognisance of external factors such as buyer sensitivity to prices, barriers to entry, and both domestic and international economic trend influences on their price-setting strategies.

2.11.2.2. Cost dimensions

According to Burns et al. (2018), continued deflationary trends in markets worldwide are creating pressure for cost reduction in order to maintain profit margins. At the same time, input costs have continued to increase pressure on upstream businesses to improve their pricing capabilities. Against this background of continued downward pressure on upstream supplier product prices and rising upstream supplier input costs, to remain profitable upstream suppliers must find ways of reducing their costs to correspond with declining product prices. Of particular interest to this study was the inherent internal and external obstacles which could hinder the price-setting and cost-control processes in ACIS businesses.

In summary, it is evident that the management of both input cost escalation and pricing strategies are important aspects of an ACIS business's long-term sustainability and protection from the impact of commoditisation of the business's products and services. To gain some insights into the obstacles encountered by ACIS businesses, this formed part of the survey questions in the empirical research phase.

2.12. THEORETICAL FRAMEWORK TO BE SURVEYED IN THE EMPIRICAL RESEARCH PHASE

A theoretical framework can be defined as a representation of a system which comprises a set of concepts which, in turn, can be used to assist with the understanding of the subject represented by the framework. The framework can also assist in guiding the research process by providing a visual representation of constructs and variables which are of importance to the study. In the case of this study, the theoretical framework depicted in Figure 2.12 below was developed around the primary research question. The theoretical framework in Figure 2.12 exhibits the complexity and interaction of interconnected elements contributing to the price and cost components of commoditisation, and its impact on economic sustainability.

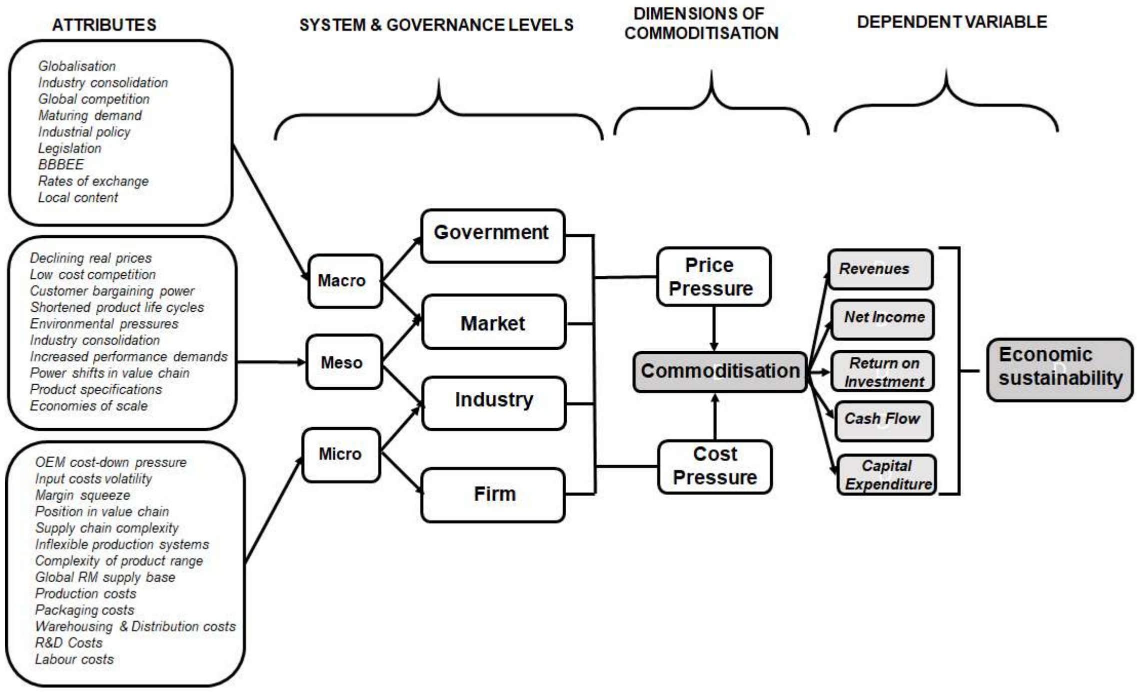

Figure 2.12: Theoretical framework

Source: Researcher's own illustration.

In the absence of a comprehensive construct that captures the multiple dimensions of commoditisation in the literature, contemporary key factors present in the automotive and specialty automotive chemical industry value chains that contribute to the commoditisation of the automotive chemical industry need to be identified in order to determine the impact of commoditisation on the economic sustainability of ACIS businesses (Reimann et al., 2010). In the context of this study where automotive OEM price-reduction strategies and ACIS business input-cost increases played a significant role in squeezing ACIS businesses' profit margins, commoditisation is deemed to be the net result of OEM pricing pressure and business input-cost increases that cannot be recovered from customers, resulting in profit losses, which in turn negatively impacts the economic sustainability of ACIS businesses.

The researcher therefore attempted to depict the interactive impact of price-reduction pressure, input-cost escalation challenges, and their respective influencing factors emanating from the automotive and specialty chemical industries respectively, which can lead to commoditisation and a resultant impact on the economic sustainability of automotive chemical businesses, in a theoretical framework.

The theoretical framework suggests that economic sustainability is influenced by commoditisation, which is in turn affected by independent variables at macro-, meso- and microsystem levels. It also suggests that there are complex interactions at various governance levels.

2.13. SUMMARY

Chapter 2 addressed theories and topics which related to the focus of this study and contributed to providing answers to the primary research question. The aim of this chapter was to link the concept of economic sustainability and the phenomenon of commoditisation to constructs such as globalisation, competitiveness theory, the role of strategy, value chains, supply chains, and SMC in the context of evolving competitive strategy in the automotive chemical business environment in South African.

Theories and constructs that can assist in identifying environmental factors that give rise to the phenomenon of commoditisation and its impact on long-term business economic sustainability in the automotive chemical industry were identified, examined, and discussed. Theoretical principles underlying economic sustainability and commoditisation were explored in the context of the South African ACIS businesses, citing examples which linked theory with practice. The phenomenon of commoditisation, its relationship with hyper-competitive markets, its root causes, and its impact on ACIS business performance was addressed.

Central concepts and theoretical foundations such as globalisation, competitiveness theory, the role of strategy, value chains, supply chains, SCM, and customer supplier relationships were explored and elaborated on in terms of their influence on economic sustainability. The discussions were interspersed with examples to link theory with practice in the context of the automotive chemical industry.

Finally, a theoretical framework that highlights the complexity and interaction of various potential price and cost influencing factors associated with automotive chemical industry businesses was developed (see Figure 2.12). The theoretical framework reflects the relationship between the attributes of the price and cost dimensions of commoditisation and their potential impact on automotive chemical industry business profitability and economic sustainability and which provided a basis for this qualitative empirical study. The following chapter will provide an overview of the automotive industry which, together with the specialty chemical industry, forms part of the automotive chemical industry business environment.

CHAPTER 3:
OVERVIEW OF THE GLOBAL AND SOUTH AFRICAN AUTOMOTIVE INDUSTRY

3.1. INTRODUCTION

In order to gain a contemporary perspective of the automotive industry from a global and South African perspective, Chapter 3 addresses two important aspects of relevance to the research problem, namely developments in the global automotive industry and the status of the South African automotive industry.

The global automotive industry is examined in terms of the impact of changing global external environmental conditions on the automotive industry value chain and the consequent structural adaptations to the global automotive industry. Important aspects of the global automotive industry such as contemporary value chain governance, geographic market trends, and future business challenges are also explored in this chapter.

Following on from a review of the global automotive industry, the South African automotive industry is examined. The discussion is directed at structural issues, governmental influences, industry competitive pressures, and contemporary industry performance of South African-based automotive OEMs and their automotive supplier base. Environmental and industry pressures in the domestic automotive supplier industry are also examined and discussed, with specific reference to upstream ACIS businesses, which were the focus of the study.

3.2. DEVELOPMENTS IN THE GLOBAL AUTOMOTIVE INDUSTRY BUSINESS LANDSCAPE

An early study by Sturgeon, Memedovic, Van Biesebroeck and Gereffi (2009) pointed out that the global automotive industry has traditionally been characterised by a highly concentrated business structure in which a few large leading businesses such as United States of America (USA), European Union, and Japanese-based automotive businesses have traditionally dominated global production with tight control of their global supply chains. This triadic structure has changed with global automotive production moving from advanced countries to emerging countries. This shift away from a triadic power-base can be attributed to common features of globalisation such as an increase in cross-border trade and foreign direct investment (FDI), largely driven by trade and investment liberalisation through World Trade Organisation (WTO) agreements (Pavlinek, 2019). This restructuring of the global automotive industry has also been driven by industry pressures such as increasing emission and safety regulations, quality standards, and cost competition. Economies of scale (EOS), however, remains a dominant factor in automotive manufacturing and continues to be a vital aspect of vehicle manufacturing globally. Despite these changes, automotive manufacturing remains in the hands of a relatively small number of leading automotive manufacturers from advanced countries who still dominate automotive manufacturing globally (Sasuga, 2011).

The substantial growth experienced by late-industrialising countries such as South Korea, Brazil, China, and India, who have built up significant manufacturing capabilities, has led to these countries becoming significant players in the global automotive industry. South Korea has become a noteworthy exporter and the size and market potential of China and India, together with their high rates of economic growth, has positioned them firmly in the global automotive market. As a result of an increase in global production and cross-border trade, these emerging markets have experienced substantial growth and have attracted large FDI inflows in support of both local and export demand back to developed countries. China and India have become the beneficiaries of significant FDI from advanced countries, which has provided an opportunity for leading automotive businesses to exploit a global market in order to sustain their growth.

The global automotive industry had also gravitated towards increased outsourcing in the mid-1990s, together with bundling of value chain activities in supplier businesses. This tendency has been particularly evident in large emerging countries such as Brazil, China, and India where there is a surplus of low-cost labour. Large suppliers who are based in developed countries and who have operations in developing countries have effectively transformed into global suppliers, supplying a multitude of lead businesses in various locations (Jacobides, MacDuffie & Tae, 2015; Pavlinek, 2019). The contemporary globalised automotive business landscape can therefore be characterised by saturated mature markets, increased competition, economic volatility, and the emergence of new markets, which has resulted in a significant downward pressure on global vehicle prices.

3.2.1. Changes in the global automotive industry value chain

The reshaping of GVCs between 1995 and 2015 has been deemed to be the most important trend in the automotive sector over the last 20 years (Degain, Meng & Wang, 2017). Contemporary vehicle manufacturing globally has become more complex with costly R&D and shorter vehicle platform lifecycles, which add to the complexity of the industry. It is evident that these factors have subsequently led to numerous challenges and changes to the traditional automotive industry value chain.

In an earlier study, Bailey, de Ruyter, Michie and Tyler (2010) described the global automotive value chain as being dynamic with numerous changes continuously taking place. Automotive GVCs are seen to be producer-driven, with OEMs being responsible for most of the innovation activity, the production of powertrains, and the large percentage of vehicle assembly functions. The top 10 automotive companies therefore continue to dominate the automotive market by exercising control over production and supply chains, using their strong co-ordination ability and significant buying power.

From a supply perspective, this restructuring of the global automotive value chain has led to the establishment of a group of large global automotive suppliers that support several automotive assemblers through global sourcing contracts and production networks. This has resulted in numerous large Tier 1 suppliers playing a more significant role in innovation, production, and allocation of investment. Although these automotive suppliers now have a greater degree of power in the value chain, control remains with the OEMs.

One of the major changes to the GVC is that of supplier consolidation. Original equipment manufacturers (OEMs) following a lean-manufacturing operating model demand quality, cost, and delivery performance from suppliers and prefer dealing with fewer suppliers in order to reduce overseeing costs in the value chain. The objective of this approach is to pass down some of the roles and responsibilities, such as greater R&D roles and increased responsibility via modularisation for delivery of complete modules, to Tier 1 suppliers. The automotive value chain has thus been consolidated with modular responsible Tier 1 suppliers gaining considerably more power over Tier

2 suppliers in the process. Numerous major modular suppliers have set up operations in close proximity to the OEMs' plants, which has resulted in little incentive for many Tier 1 suppliers to source components domestically for the modules for which they are responsible. Preference has shifted to the sourcing of imported lower-cost components, putting pressure on suppliers in mature markets (Degain et al., 2017).

From a design perspective, the quest by automotive OEMs to leverage their design efforts across vehicles sold in numerous end-markets has resulted in the automotive industry being able to develop a substantial degree of global integration at the design level. As component suppliers have taken on more responsibility for design activities, more design facilities have been established in close proximity to those of their OEM customers to facilitate and promote collaboration.

Contemporary vehicle production and supply chain processes have become significantly more complex with numerous geographically dispersed businesses, which include powerful mega-suppliers, operating in the automotive production network. Aligning operations to real-time fluctuations in customer demand, understanding potential risk in the supply chain, ensuring sufficient production capacity to meet customer demand, and improving information flow and material visibility across the supply chain are some of the biggest contemporary challenges confronting automotive vehicle production and supply chains (Pavlinek, 2019).

The fact that there are limited generic parts or subsystems that can be used in the wide range of vehicles produced without some level of customisation has created added complexity to the automotive value chain. This has primarily been driven by the wide range of unique vehicle performance specification requirements, which vary from model to model. According to Gastrow (2012), specifications are developed for almost every part on every vehicle model. He argues that this creates limitations for the design of vehicle platforms, which in turn leads to limitations in value chain modularity and EOS. Consequently, this limits EOS in production and flexibility in design, which in turn can have an unfavourable effect on the automotive supply chains.

Interestingly, the challenges of value chain modularity and EOS, alluded to earlier in this discussion, have predominantly been overcome by modern car manufacturers with the introduction of the concepts such as part-sharing and platform-sharing as a means of achieving EOS. From a part-sharing perspective, most automotive assemblers' source many of their parts from the same suppliers, these parts being identical for each vehicle manufacturer or with slight modifications to the parts. This often enables vehicle manufacturers to reduce R&D costs and speed up time to market. Mazda and Ford, for example, shared numerous parts over many years as a result of a manufacturing co-operation agreement. Platform-sharing is a concept whereby vehicle manufacturers use a common base upon which the entire vehicle is constructed. Vehicle manufacturers share a single platform amongst various models in order to achieve higher production volumes at reduced costs. The concept of platforms provides automotive manufacturers with the opportunity of creating sub-structures that can be used across multiple vehicle models, which saves on the cost of building platforms with unique subassemblies. The advent of technological developments in the industry have made it possible for automakers to share platforms between models of the same brand as well as, to a lesser extent, competing brands. Volvo is a prime example of platform- and part-sharing amongst several models within a brand with its new Scalable Product Architecture (SPA) approach to manufacturing that will underpin all their new cars (Danilovic & Mats, 2009). The most recent example of platform-sharing in the South African automotive industry is the collaboration between Ford Motor Company of South Africa and Volkswagen South Africa. Ford will produce the next generation of the Volkswagen Amarok light commercial vehicle at Ford's Silverton plant, alongside the new Ford Ranger in 2022 (IOL, 2019). The importance of this collaboration is that both Ford and Volkswagen will use the same platform for these vehicle models. The use of platforms therefore offers the opportunity of sharing the same materials and components, allowing vehicle manufacturing businesses to take advantage of EOS. Production processes have been the greatest beneficiaries of the platform approach.

3.2.2. Structural developments and global value chain governance

This leads to the question of the effects of globalisation on the structure and governance of the automotive value chain. According to Gastrow (2012), regional production networks underpin the need for a global organisational structure that provides for centrally-designed vehicles that are adapted for local markets and produced in multiple regions using components that are manufactured in a multitude of regions. This implies that design activities and buyer-supplier value chain relationships typically cover several production regions.

The pressure of cost recovery, together with fierce competition, has caused OEMs to look for EOS and outsource what they believe are non-core activities. Increasing customer demands and regulatory pressures have driven new technological developments aimed at greater efficiencies. Market pressures have forced OEMs to look for new segments, resulting in more body style variations on a common platform, leading to market fragmentation. This in turn has led to a substantial change in the underlying economics of the contemporary automotive value chain (Degain et al., 2017).

The fact that the value chain concept deals with inter-business relationships and involves the co-ordination of non-market economic links between value chain participants highlights the importance of the existence of a governance relationship within the value chain (Bounya, 2018). According to Bounya (2018), lead businesses influence the activities and decisions of supplier businesses involved in the automotive manufacturing process by imposing parameters and specifications on GVC participants, such as product specifications, mode of production, location of production, volume of production, and maximum price. Of importance is the fact that the form of governance will differ from participant to participant.

In an early study, Gereffi, Humphrey and Sturgeon (2005) identified five different types of GVCs, namely market, modular, relational, captive, and hierarchy. Figure 3.1 below depicts these five types of governance links in a GVC, which are ranked according to the degree of lead business co-ordination and power asymmetry. Lead business co-ordination and power asymmetry increases from left to right on the x-axis. The type of linkages in value chains have an influence on how the value chain is governed. Value chains and industries tend to display a variety of linkage types with businesses and typically differ between different segments of the value chain (Gereffi et al., 2005)

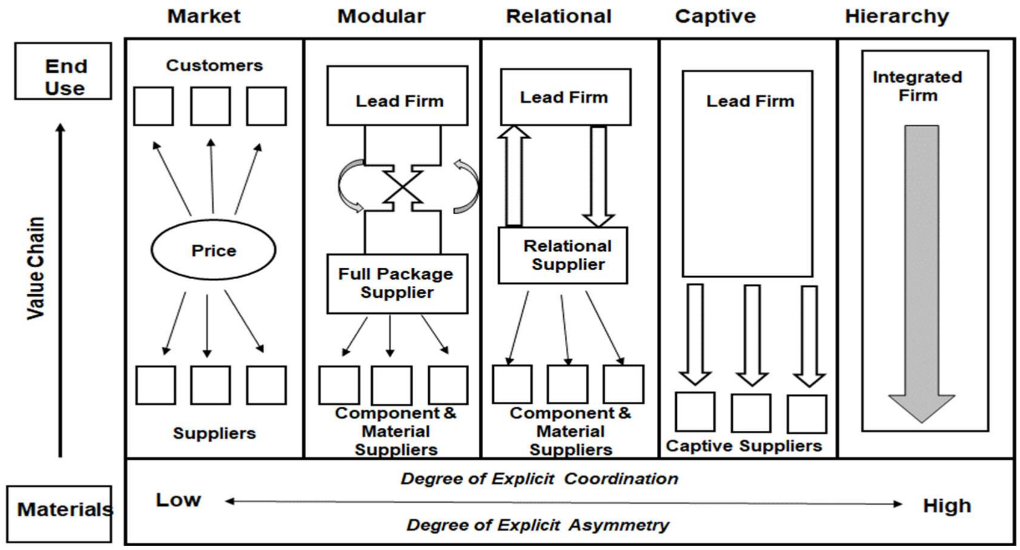

Figure 3.1: GVC governance types

Source: Adapted from Gereffi, Humphrey and Sturgeon (2005)

Governance refers to the role played by powerful value chain drivers. Market-based governance is characterised by simple arms-length transactions based on price dictated by the lead firm. In modular value chains the lead firm dictates this specification to which products are manufactured while the supplier retains responsibility for the technology. In relational value chains, buyers and suppliers tend to have very close relationships with detailed information exchange between the parties, which is based on trust developed over time. In relational value chains, suppliers tend to have a close geographical proximity to lead businesses. These relational type links are generally reserved for a limited number of strategic suppliers. In captive GVCs, power is exerted over suppliers by lead firms. Captive governance types are characterised by a significant degree of monitoring and control by lead firms and consist of a large measure of power asymmetry. The final governance structure depicted in Figure 3.1 is that of a hierarchical chain, for example a parent-company and its subsidiaries where the value chain is controlled by the parent-company. The choice of governance structure by lead businesses is largely determined by the number and type of constraints that lead businesses encounter in the process of ensuring optimal supply inputs in terms of cost, quality, and delivery (Gereffi et. al., 2005).

3.2.3. Geographic market trends in the global automotive industry

Within the context of these industry dynamics, the establishment of new markets in India and China, with large inflows of FDI into these countries, has resulted in increased vehicle production reaching a record high of 97.4 million vehicles in 2017, 96 million in 2018, 92.8 million in 2019, 78 million in 2020, and 80 million in 2021 respectively (Placek, 2022).

At the same time, substantial growth in Korean, Brazilian, and Mexican markets have shifted the distribution of global production from west to east, with North America and Western Europe experiencing negative growth in demand and production. Despite the formation of these new global market structures, important structural features of production and sales has remained significantly regionalised. Most of the major American and European assemblers continue to produce and sell a significant proportion of their vehicles within their own regions in the face of erosion of these markets and the geographic transition of the automotive industry to developing countries (Gastrow, 2012).

Regional integration has become a dominant trend in vehicle and component production. Both automotive OEMs and large suppliers of components are closely associated with progressing the set-up of multiple regional production systems with a view towards locations with lower operating costs (Sturgeon et al., 2009). According to Nitschke (2011), home markets remain important to many automotive businesses within this scenario. This is supported by the fact that, while the leading OEMs extended their markets by producing and selling vehicles in a growing number of countries, the concentration of their production and sales have tended to remain in the home countries, albeit a changing scenario.

From an organisational perspective, although production activities have become widely distributed around the world as a result of globalisation, these activities have remained structured within regional and national markets, which are in turn nested within this global framework. Gastrow (2012) depicted these national and regional value chains nested within global organisational structures in Figure 3.2 below.

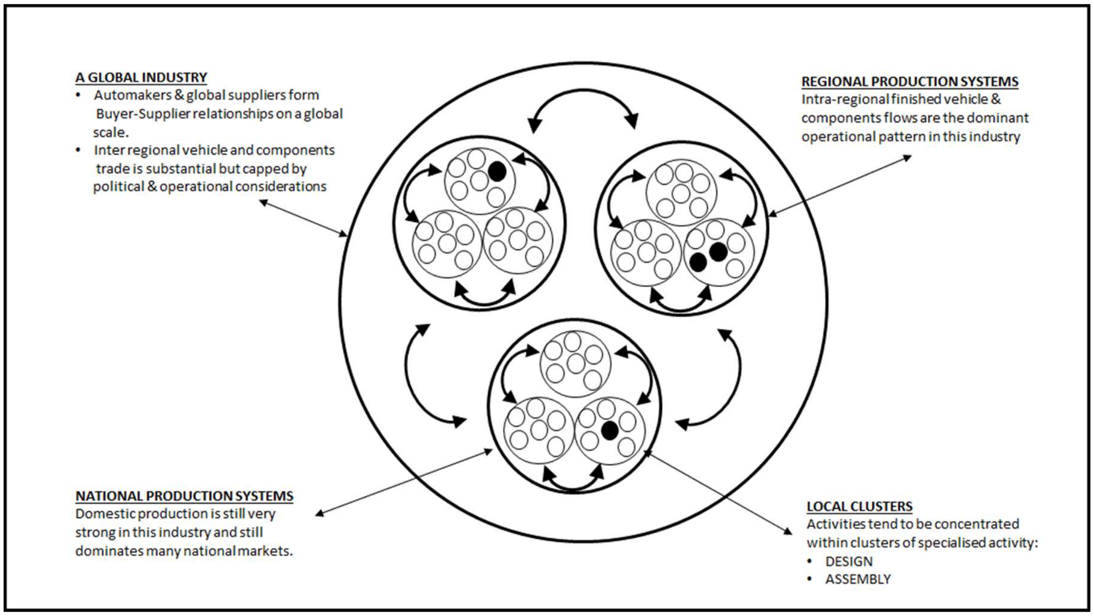

Figure 3.2: Nested geographic and organisational structure of the automotive industry

Source: Adapted from Gastrow (2012)

The organisational structure of the global automotive industry, depicted in Figure 3.2, can be characterised as being split into regional, national, and local value chains, which are consolidated into the global organisational structures and businesses of the largest businesses.

Against a background of increasing globalisation, regional, national, and local market conditions have remained important, mainly as a result of market differences. Local conditions in emerging markets demand local adaptations to vehicle designs, requiring specific automotive engineering knowledge to adapt designs to meet local requirements. Within this dichotomy of intensified globalisation and regional integration, there are several national and local aspects that are defining factors and prevail in the global automotive industry today. Gastrow (2012) highlighted a number of these local conditions, such as consumer taste, purchasing power, road and driving conditions, labour market regulations, standards and industry regulations, and public policies, to name but a few.

An important point raised by Degain et al. (2017) was that the key factors that initially played an important role in attracting automotive investment outside of the old core regions, such as fiscal incentives and low labour costs, have largely been exhausted.

As an example, low labour costs, which have historically been the cornerstone of China's economic growth, are no longer key attraction for manufacturing as the country has experienced a rapid increase in labour costs in the traditional coastal manufacturing hubs. Coastal cities in China that have traditionally been the primary beneficiaries of FDI and government support have historically attracted large numbers of migrant workers from inland China. The availability of migrant workers has, however, more recently diminished, causing a rise in competition for labour in these coastal hubs together with demands for increased wages. This has consequently led to a substantial rise in manufacturing costs. These contemporary trends, together with increased government investment in the interior regions of China, has created a 'self-migration' of industry, with China's industrial base moving inland to take advantage of labour availability and lower labour costs (Amrosia, 2019). Future expansion in these regions will therefore be more reliant on being able to develop competitive advantages based in localised economies where many companies, services, and industries exist in close proximity to one another in order to benefit from cost reductions and gains in efficiency (agglomeration economies).

Degain et al. (2017) contended that what we are seeing is not globalisation per se but rather what can be described as a regionalisation within a global network as OEMs set up operations to enable them to design and assemble vehicles close to the customer.

3.2.4. Structural adaptations and global industry performance

Despite the numerous structural adaptations made to the automotive value chain in support of globalisation and regional integration, global automotive industry development stagnated significantly as a result of the global financial crisis in 2008-2009 compared to the highs experienced in 2006 and 2007. Industry capacity utilisation shrank to levels where previously-profitable operations became marginal and OEMs turned to dealing with strong suppliers to secure deliveries, limiting their exposure to the so-called high-risk suppliers (Roland Berger & Lazard, 2010). This created huge pressure in the automotive supplier environment and automotive suppliers in the three big markets were severely impacted with shrinking margins and consequent bankruptcies. The industry was characterised by sharp declines in new-vehicle sales in numerous markets and a serious deterioration in the financial situation of the industry. Developed countries, which were already weakened by low-capacity utilisation and low profit margins, were severely impacted. This threat of automotive industry collapse prompted a multitude of government interventions in several developed countries (Stanford, 2010).

Ongoing changes in global economies, technologies, government regulations, prices, market dynamics, and market uncertainty in the global automotive industry post 2010 increased the level of market competition and slowed sales growth in mature markets as a result of changing consumer demands and demographic shifts. Original equipment manufacturers (OEMs) have had to contend with low assembly-plant utilisation levels while at the same time balancing the global trends of developing alternative powertrains (such as electric) in the face of increasingly stringent legislation focused on controlling carbon dioxide and exhaust gas emissions such as nitric oxide. In addition, competitive pressures on cost, quality, performance, and manufacturability of vehicles have continued unabated, forcing automotive manufactures to adjust their strategies to achieve growth and profitability in this changing global business environment as the industry moves ever closer to peak demand.

From a sales perspective, the global automotive industry has recovered significantly since the global financial crisis. This has largely been as a result of strong automotive industry growth in China and other emerging markets. Profit growth in the USA, Europe, Japan, and South Korea, on the other hand, has remained relatively stagnant. The management of costs in the face of stagnating prices, especially in the more established markets of Europe, North America, Japan, and South Korea, has been a major challenge for the industry. Meeting increasing customer demands, rising competition, and regulation have forced OEMs to increasingly add more features and improvements to vehicles at a premium in order to differentiate themselves. The net effect has been a decline in profit per vehicle produced. Tighter regulations for emissions and safety have added further costs to the vehicle, which has further contributed to the narrowing of the price-cost gap, negatively impacting OEM profitability.

Original equipment manufacturers (OEMs) have focused on cost improvement strategies in order to tighten costs. Rising complexity has seen more OEMs responding to initiatives for platforming (discussed in Section 3.3.1), that is to build more models off a single platform. The focus on greening has become more extensive as carbon dioxide regulations become more stringent in order to reduce emissions, with the net effect being an increase in costs. Growth in automotive sales volumes has gradually been gravitating from established markets towards emerging markets, with more than 60% of the market residing in emerging markets as early as 2012 and with the volume growth in emerging markets predicted to markedly exceed 60% by 2020 (McKinsey, 2013).

3.2.5. Future business challenges for the global automotive industry

Parkin, Wilk, Hirsh and Sing (2017) of PricewaterhouseCoopers (PwC) are of the opinion that the global automotive industry is facing more challenges than is generally recognised. On the surface, automotive industry performance seemed to be robust, with reported worldwide vehicle sales reaching 88 million in 2016 and OEMs and automotive suppliers achieving 10-year high profit margins.

Notwithstanding these seemingly robust industry sales and profitability figures, Parkin et al. (2017) were of the opinion that two critical business performance indicators, namely total shareholder return (TSR) and return on invested capital (ROIC), do not support medium- to long-term industry sustainability. In the five years leading up to 2016, the average TSR achieved for automotive manufacturing was a 5.5% ROIC compared to the S&P 500 and Dow Jones industrial averages of 14.8% and 10.1% respectively (Parkin et al., 2017). They argued that the industry TSR and ROIC results are indicative of the industry facing some difficulty. Taking the differing cost pressures and complexity in the industry into consideration, it is evident that the industry does not have a simple solution to improve their return on capital (ROC) in the short term.

The global over-production state of the automotive industry, which was predicted in an early study by Barnes (1999) and which was particularly evident during the financial crisis in 2008, has again been manifested in a slowing global economy, which has been compounded by the advent of the COVID-19 pandemic in 2020. According to a report by Germany’s Centre for Automotive Research (Winton, 2019), the global car market was expected to lose 4 million vehicles in reduced sales in 2019. According to Statista (2020), 75 million vehicles were produced globally in 2019 compared to 78.9 million in 2018, a drop of 3.9 million vehicles, fulfilling this expectation. This drop in global sales was largely attributed to the USA sanctions policy and a huge drop in China's vehicle sales, which is predicted to continue until 2023. These negative predictions have not discounted the impact of BREXIT (United Kingdom withdrawal from European Union) and the USA's intention to impose tariffs on European vehicle imports. These issues are expected to further reduce automotive industry earnings and liquidity significantly.

As alluded to above, the reduction in automotive earnings and liquidity in 2019 was further compounded by the spread of the global COVID-19 viral pandemic in 2020, which brought public life in many countries to a complete standstill. The global COVID-19 pandemic brought about exponential infections and deaths worldwide. From an economic perspective, the COVID-19 virus forced many businesses to either cease or dramatically slow down operations. The automotive industry was arguably amongst the hardest hit. According to Hausler, Heineke, Hensley, Moller, Schwedhelm and Shen (2020) of the McKinsey Centre for Future Mobility, the COVID-19 pandemic may have a lasting impact on the automotive industry as it drives change in the macro-economic environment, regulatory trends, technology, and consumer behaviour. Hausler et al. (2020) were of the opinion that the most immediate and visible effect of COVID-19 in the traditional automotive sector was the cessation of production activities at many OEM and supplier factories. They predicted that automotive production would yield 7.5 million fewer vehicles globally in 2020. Statista (2020) took a more pessimistic view, predicting a 15.5 million reduction in vehicle sales when compared to 2019.

According to Iyer (2022), the COVID-19 pandemic has been particularly destructive for the automotive sector. When the pandemic was at its peak in 2020, the automotive sector faced a host of challenges. Iyer (2022) highlighted six major challenges facing the automotive industry post COVID-19. Recovery from massive production shutdowns have exacerbated the existing automotive industry challenges of excess production and resource shortages. Reduced car sales, as a result of production shutdowns and plant closures, has emerged as one of the critical challenges facing the automotive industry while loss of labour has emerged as one of the crucial challenges for the automotive manufacturing sector in the attempt to achieve pre-COVID production levels. Automotive supply chains are now facing further disruption due to the bottleneck in the semiconductor manufacturing industry, which is particularly impacting the manufacture of electric vehicles. Production shutdowns and slumping sales have gradually led to heavy financial losses with OEMs operating on minimal liquidity. The current inflationary state of the global economy and rising prices have brought about changes in consumer buying patterns, which have negatively affected new vehicle sales. According to Placek (2022), global vehicle volumes improved in 2021 by 2 million vehicles when compared to 2020 and the growth outlook for 2022 is positive.

3.3. THE SOUTH AFRICAN AUTOMOTIVE INDUSTRY

The discussions so far raise the question as to how the South African automotive industry integrates into this global automotive enigma. What are the South African automotive industry's key opportunities and challenges with respect to its position GVCs and where is the South African automotive industry currently positioned within the global industry? The South African automotive industry and its position in the global market will be examined in more detail in this section.

3.3.1. The South African automotive industry in an international context

Although the South African automotive industry is comparatively small in terms of global standards, it can be described as a microcosm of the global automotive industry. Since 1992, the South African automotive industry has evolved from a domestic, inwardly-focused, protected sector to a globally competitive sector with a substantial export programme that has led to numerous changes to the nature and structure of the South African automotive industry. This transformation can best be explained in terms of the political-economic context in which this change to the automotive industry has occurred. An early research study by Barnes and Morris (2008) described the current configuration of the South African automotive industry as being a result of specific policy choices, international competitive pressures, and a balance of power between state institutions, MNCs, domestic automotive businesses, and organised labour.

With the advent of change in political dispensation in 1994 and the implementation of the Motor Industries Development Programme (MIDP) in 1995, major international automotive manufacturers and the development of a supporting automotive supplier industry have been at the centre of South Africa's export-oriented automotive industry

(Alfaro, Bizuneh, Moore, Ueno & Wang, 2012). Increased FDI and international trade in the automotive sector have resulted in domestic OEMs being incorporated into multinational parent-companies. The South African automotive industry is now dominated by multinational businesses that are extensively integrated into global automotive value chains. Key decisions regarding vehicle sourcing are made by a small number of global businesses, compelling domestic subsidiaries to compete for vehicle export contracts, which has now become a quintessential characteristic of the South African automotive industry (Barnes et al, 2008).

With South Africa's economic growth being coupled to the rest of the African continent, recent efforts of Regional Economic Communities (RECs) to stimulate steps towards integration by the formation of a tripartite free-trade area. It is envisaged that this tripartite free-trade area will include the Southern African Development Community (SADC), the East African Community (EAC), and the Common Market for Eastern and Southern Africa (COMESA) and will accrue numerous opportunities for further export growth for the South African automotive industry (AIEC, 2020:54).

3.3.3. Targeted domestic policy initiatives

Although significant improvements have been achieved in the domestic industry, resulting in increased exports and improved productivity, targeted automotive industrial policies have achieved mixed results, leading to numerous changes to the nature and structure of the South African automotive industry value chain over the last few decades. With the growth of exports being incentivised by import-export rebate mechanisms provided for in automotive industry policy vehicles such as the MIDP and Automotive Production and Development Programme (APDP), the reduction of imports was simultaneously disincentivised. This disincentive was accomplished by means of concessions to exporting businesses, which reinforced the balance of power of MNC OEMs and foreign ownership of Tier 1 suppliers. Therefore, although the migration of the industry to a higher export orientation with the consequent development of a more technologically sophisticated industry has been successful, structural weaknesses in the domestic value chain remain, which could have an unfavourable impact on the future sustainability of the industry if not addressed.

3.3.4. Competitive challenges in the South African automotive industry

The South African automotive industry is exposed to a distinct set of challenges as it attempts to get to grips with several environmental, competitive, and global technology headwinds while at the same time having to contend with depressed domestic and regional market conditions. Increased competition from other low-cost emerging economies have placed further pressure on the South African domestic automotive industry to achieve world-class quality, delivery, and technology standards

One of the major challenges of the South African automotive industry is one of competitiveness (AIEC, 2016). The industry is characterised by numerous competitive challenges, which have been widely documented in previous research (Barnes, 2000; Barnes & Morris, 2008; Barnes, 2013; Barnes, Black & Duxbury, 2016; Barnes, Black & Techakanont, 2017). The challenges facing the South African automotive industry are primarily reflected in the increased competitiveness of the global industry and in the ability of domestic OEMs and automotive supplier businesses to achieve and maintain economic sustainability.

The South African domestic automotive industry clearly does not command the vehicle production volumes that provide the EOS to be competitive from a world-class production perspective. It is therefore evident that domestically produced export volumes play an important role in achieving international competitiveness in support of domestic manufacturing growth opportunities and taking advantage of the global shift of vehicle manufacturing to low-cost countries.

An early research study by Naude (2009) concluded that ongoing pressure from OEMs to reduce costs has resulted in downsizing and/or closure of many manufacturing operations in the automotive supplier industry in the triad regions. This has led to a shift in focus to emerging economies such as South Africa. Being an integral part of the global automotive value chain, domestic OEMs are under continuous pressure to conform to international requirements for cost, quality, and customer service levels, which are determined by their multinational parent-companies. These global requirements have consequently been passed through to domestic automotive suppliers by OEMs operating in the domestic automotive value chain.

As a part of the automotive value chain, the automotive supplier industry in South Africa has a critical role to play in improving its own competitiveness by augmenting its operations with world-class manufacturing standards. Strong global linkages together with supplier development have become vitally important to ensure the sustainable development of the automotive industry as a whole in South Africa.

3.3.5. Impact of environmental variables on automotive industry in South Africa

The number of contemporary environmental variables facing South African automotive industry businesses has increased significantly over the last 10 years. The South African automotive business environment has been confronted by numerous global and domestic pressures. Although globalisation has opened new markets for automotive businesses' product offerings, it has also opened up new avenues for foreign competition to enter domestic markets. From a domestic point of view, macro-environment issues such as political uncertainty mixed with economic stagnation has continued, and will undoubtably continue for the foreseeable future, to plague the South African automotive industry.

The combination of economic and political uncertainty, the impact of global economics, and the resultant weak and volatile South African currency, which are reflected in the South African Business Confidence Index, are a cause for concern. The Business Confidence Index in South Africa declined to a level of 21 in the third quarter of 2019, its previous lowest level of 28 being in the previous quarter. According to the Bureau for Economic Research (BER) (2020), in the second quarter of 2020 the Business Confidence Index exhibited a further decline from 18 in the previous quarter to 5, which is a record low since the series began in 1975.

This decline can be primarily attributed to the lockdown measures imposed on the country by the South African Government to address the health emergency posed by the global COVID-19 pandemic. This resulting business activity collapse has severely impacted already weakened business conditions across business sectors, resulting in a severe gross domestic product (GDP) contraction in the second quarter of 2020. Since then, the Business Confidence Index has recovered to 93 in February of 2022 (see Figure 3.3 below).

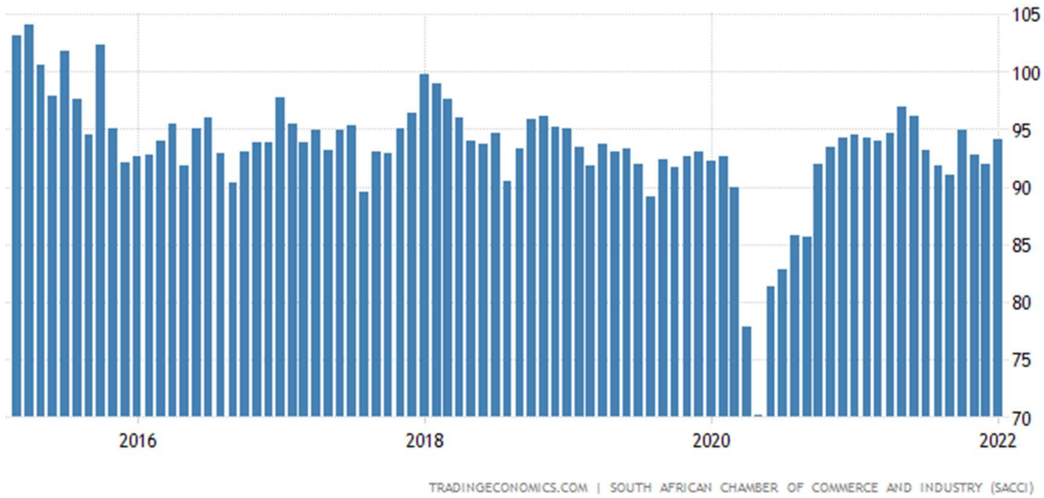

Figure 3.3: South African Business Confidence Index

Source: Trading Economics – Bureau for Economic Research (BER) (2022)

From an automotive industry perspective, although the automotive subindex reflected some improvement in 2019 as a result of improved total vehicle sales, total vehicle sales declined when compared to 2019 and plummeted in the second quarter of 2020 as a result of COVID-19 lockdown and consequent business inactivity. This decline due to the COVID-19 impact and subsequent recovery in 2021/22 are reflected in Figure 3.4 below.

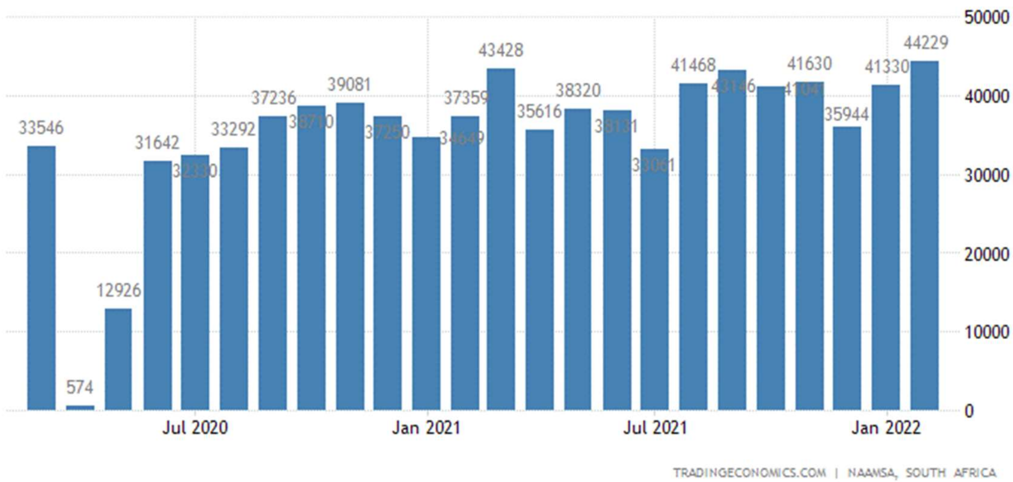

Figure 3.4: South African total vehicle sales

Source: Trading Economics – NAAMSA (2022)

While immediate/operational environmental factors which relate to issues such as skill levels, broad-based black economic empowerment (B-BBEE), codes of practice, competitive intensity, industry disruption, and emerging new entrants to the domestic market remain a cause for concern for South African automotive industry players, they appear to be somewhat insignificant when compared to the effect of the COVID-19 pandemic on the South African automotive industry. The COVID-19 pandemic and consequent lockdown in South Africa brought the automotive industry to a virtual standstill. This means that the government's economic plan of boosting growth and creating jobs by increasing the automotive industries production to 1.4 million vehicles per annum by 2035 has been severely impaired. This has resulted in the South African automotive industry's intended implementation timeline for the South African Automotive Master Plan (SAAM) 2021-2035 being delayed.

3.3.6 Domestic automotive industry performance in South Africa

Domestic automotive industry performance has slowed significantly. At the same time, imports into the domestic market have increased as global vehicle manufacturers aggressively look for markets to fill their excess production capacity. Although the South African automotive industry is comparatively small in the global context, it remains a critical part of the domestic economy, contributing approximately 6.4% to the country's GDP and 27.6% of value addition to South Africa's manufacturing output, with 499 087 units produced in 2021 (AIEC, 2022). The industry remains a marginal player in the global framework and forms part of a group of countries producing less than one million vehicles per annum. South Africa's manufacturing position relative to global automotive production has been described as a marginal light-vehicle player globally, with a 0.62% global production market share with a global ranking of 14th in 2021 (AIEC, 2022).

3.3.7. South African automotive market development

Barnes, Black and Monaco (2018) believed the industry, from a production perspective, remains largely unchanged since the introduction of the APDP in 2013. An important deficiency, in respect of South Africa's automotive industry position, is that it has primarily been as a result of poor domestic market performance, the number of direct imports into the domestic market, and deteriorating regional market conditions

(Barnes, 2017). In addition, there is limited demand within the Sub-Saharan African market for South African produced vehicles due to the availability of low-priced pre-owned vehicles imported from developed countries (Barnes, 2017). Production volume growth has largely been attributed to exports from South Africa to developed economies such as the European Union and the USA, who account for 63% of South Africa's exports.

When analysing the recent performance of the South African automotive industry in 2019 and 2020, a downward trend in export units is evident. In 2019, passenger and light-commercial vehicle exports accounted for 387 092 units (61.25%) of the total domestic light-vehicle production of 631 921 units (AIEC, 2021). In 2020, a total of 499 087 units were produced, of which 298 020 were exported (59.7%).

Table 3.1 below summarises the production of domestic and export passenger and light commercial vehicles in 2019, 2020, and 2021.

	2019	**2020**	**2021**
Total domestic light-vehicle production	631 921	446 215	499 087
Total light vehicles exported	387 092	271 288	298 020
% Light vehicles exported	61.25%	60.7%	59.7%

Table 3.1: Production of domestic and export passenger and light-commercial vehicles – 2019-2021

Source: AIEC (2020), AIEC (2021), and AIEC (2022) (*Medium- and heavy-vehicle production is not included in this table)

South African vehicle production declined by 29.2% from the record vehicle production of 631 921 in 2019. This decline was largely as a result of the COVID-19 pandemic, which caused supply chain bottlenecks and declining new-car sales (AIEC, 2021).

Notwithstanding the recovery of domestic vehicle production in 2021 and 2022 year to date (YTD), the South African automotive industry remains reliant on the success of its export programmes as the country remains in a position of not being able to generate sufficient EOS with the production of vehicles for the domestic market only. In summary, exporting remains the only viable option for improving the international competitiveness of the domestic industry.

From an economic perspective, there has been a substantial improvement in the automotive industry's vehicle trade balance position since the advent of the APDP, with the industry experiencing a substantial trade surplus of 16.8 billion Rand and 27.1 billion Rand in 2018 and 2019 respectively. Table 3.2 below reveals that the trade surplus under the APDP measurement widened to 48,2 billion Rand in 2020, its highest level on record, and remains positive at 39.1 billion Rand in 2021.

Year	Imports into South Africa (R billion)	Exports from South Africa (R billion)	Trade Surplus/Deficit (R billion)
2013	126,7	102,7	(24,0)
2014	131,5	115,7	(15,8)
2015	146,2	151,5	5,3
2016	147,9	171,1	23,2
2017	154,6	164,9	10,3
2018	162,0	178,8	16,8
2019	174.6	201,7	27,1
2020	127.5	175.7	48.2
2021	168.4	207.5	39.1

Table 3.2: APDP-related trade balance for the automotive industry 2013-2021

Source: AIEC (2022)

As previously discussed, anticipated growth in domestic vehicle production levels did not materialise in 2020, however growth has been reflected in 2021 (see Table 3.1). The South African new-vehicle market made a robust recovery in 2021, increasing production to 464 493 units (+22.2%) compared to COVID-19-affected 2020. This recovery occurred despite numerous challenges ranging from global supply chain disruptions, global semi-conductor shortages, and adverse domestic political and economic events (AIEC, 2022). It is predicted that further vehicle and component export growth in 2022 will be a function of the performance of global markets and global demand within any constraints levied by the COVID-19 pandemic. Imports of new vehicles into South Africa will be firmly linked to the strength of the domestic economy and the Rand exchange rate in 2022. With low economic growth rates predicted to continue in South Africa in 2022, imported new-vehicle volumes are predicted to stagnate.

3.3.8. Structural change and productive transformation

A significant change which has taken place in South Africa is that of change of ownership of domestic automotive businesses. The South African automotive assembly sector is currently completely foreign-owned. This also applies to a significant number of businesses in the component sector, especially at Tier 1 level. According to Barnes, Black and Monaco. (2018), this foreign ownership has opened the doors to global networks for the domestic automotive industry. They also point out that domestically-owned component businesses have largely been forced to reposition themselves as Tier 2 suppliers due to a lack of capability and ambition to become Tier 1 suppliers.

There are currently seven producers of light vehicles in South Africa: BMW, Ford, Nissan, Toyota, VW, Mercedes Benz, and General Motors. In May 2018, the USA company General Motors decided to disinvest in South Africa after 90 years of presence in the country. According to the DTI, the disinvestment is due to the inability of General Motors South Africa (GMSA) to achieve the scale it required to significantly benefit from the APDP. The manufacturing plant was taken over by Isuzu, whose pickups were historically assembled in the GMSA plant. The company was renamed Isuzu Motors South Africa and incorporated the 30% of Isuzu Trucks SA that was owned by GMSA.

A new player in the domestic automotive manufacturing market is on the horizon. The company is the Beijing Automobile Group Company Limited (BAIC) South Africa, a wholly-owned subsidiary of a state-owned Chinese company BAIC International Corporation Co. Ltd. The domestic company, BAIC South Africa, is a joint-venture between BAIC (65%) and the South African Government's Industrial Development Corporation (35%). Targeted production has been reported to be set at 50 000 vehicles per annum within the first three years of the start of production, after which the output is expected to be increased to 100 000 vehicles per annum (Venter, 2019).

Changes in OEM ownership that have taken place from 1990 to 2021 have been summarised in Table 3.3 below. Table 3.3 depicts domestic OEM ownership and changes from 1990 to 2021, indicating no further ownership changes since 2018.

SOUTH AFRICAN ASSEMBLER	COMPANY OWNERSHIP 1990 to 2007	COMPANY OWNERSHIP 2018	COMPANY OWNERSHIP 2018 - 2021
TOYOTA	SA to Transnational Company - dominated joint venture.	Toyota South Africa Motors (Pty) Ltd 100% subsidiary of Toyota Motor Corporation (TNC)	No change
VOLKSWAGEN	Volkswagen AG 100%	Volkswagen Group of South Africa 100% subsidiary of Volkswagen Aktiengesselschaft Germany (VWAG) (TNC)	No change
BMW	TNC - no change	BMW(SA) (Pty) Ltd 100% subsidiary of Bayerrische Motoron Werke Aktiengesellsschaft (AG) (TNC)	No change
MERCEDES BENZ	Joint Venture to Transnational Company	Mercedes Benz Suth Africa Limited (100% Corporate holding company - Daimler AG business activities in South Africa) (TNC)	No change
FORD	South African to Transnational Company	Ford Motor Company of Southern Africa 100% subsidiary of Ford Motor Company USA	No change
NISSAN	Primarily South African to Transnational Company	Nissan South Africa (Pty) Ltd) 100% subsidiary of Nissan Motor Corporation LTD (TNC)	No change
GENERAL MOTORS	South African to Transnational Company	General Motors divested from South Africa	No change
ISUZU	Manufactured by General Motors. No domestic ownership	Isuzu Motors South Africa (IMSA) 100% subsidiary of Isuzu Motors Limited (TNC) new CKD operation in South Africa	No change
BAIC	No Presence	BAIC SA: 65% Beijing Automotive Group:35% Industrial Development Corporation SA (Joint Venture) Newly established SKD operation	No change

Table 3.3: Changes in South African OEM ownership from 1990 – 2021

Source: Adapted from Barnes and Morris (2008)

3.4. GOVERNMENTAL INFLUENCES ON THE SOUTH AFRICAN AUTOMOTIVE INDUSTRY

As a consequence of the South African automotive industry being isolated from the 1980s to 1994 due to apartheid-driven sanctions, the industry, in addition to being inwardly focused, was characterised by numerous other issues such as poor-quality products, outdated products, and inefficient supply chains (Bronkhorst, Steyn & Stiglingh, 2013).

Governments worldwide actively support their automotive industries via numerous policy measures in order to attract automotive investment. Governments recognise the benefits that investments generate for the country in terms of economic growth, employment, fiscal contributions, technology transfer, and the multiplier effect on the general economy, and South Africa was no different. The South African Government played an important support role in the domestic automotive industry. This was achieved via the introduction of local content programmes over a number of years under South Africa's industrial policy. These programmes were systematically amended over time, with the goal of addressing these problems and progressing the integration of the industry into the global automotive environment.

3.4.1. Industrial policy and government support

Governmental influences on the automotive industry and the importance of the enabling role played by the South African Government through industrial policy initiatives such as the MIDP, APDP, and the recently proposed SAAM plan will briefly be examined in this section. Initiatives such as these have proved to be important enablers for the domestic automotive industry to continue contributing positively to the country's economy.

3.4.1.1. The Motor Industries Development Programme (MIDP)

Discussion on the MIDP in this section will be limited as the focus of the study was directed at contemporary and future policy initiatives. Notwithstanding this approach, it is important to mention that the main reason for the introduction of the MIDP in 1995 was to remedy the poor performance of the South African automotive industry. The MIDP was introduced to assist the South African automotive industry to become globally integrated and, in so doing, increase its competitiveness. The implementation of the MIDP greatly assisted the domestic automotive industry to gradually integrate into the global automotive environment by incentivising the rationalising vehicle production and automotive component production (Lamprecht, Rudansky-Kloppers & Strydom, 2011). This implied reducing the range of different vehicles produced to achieve EOS benefits that would be derived from exports.

The performance of the South African automotive industry under the MIDP was generally regarded as positive, with the MIDP achieving its stated policy objectives. Notwithstanding this view, several early studies by Black (2001), Black (2002), Flatters (2005), Flatters and Netshitomboni (2006), and Black and Bhanisi (2006) concluded that the performance of the MIDP was not immune to critique. These studies have mostly all come to different conclusions as to the extent to which the MIDP has achieved its objectives. Despite the numerous critiques levelled at the MIDP, there is a common view amongst industry stakeholders that, within the framework of global pressures that exist, it would have been difficult for the industry to compete and survive without the MIDP (Lamprecht, 2009).

3.4.1.2. The Automotive Production and Development Programme (APDP)

The MIDP was replaced by the APDP on 1 January 2013 and it was intended to remain in place until 2020. The APDP was designed to change the industry's emphasis from being primarily export-focused to one with a focus on scale of production of vehicles. This change was made to meet the industry objective of a total annual production figure of 1.2 million vehicles (AIEC, 2013). More specifically, the programme was designed to ensure that the automotive sector has a greater positive impact on the country's economy, thereby bolstering employment levels in the industry by increasing local component manufacturing and encouraging greater domestic sourcing of semi-finished goods.

According to Barnes et al. (2016), the APDP was only partially aligned with the factors underlying its development. Although being more aligned to the rules of the WTO, they point out that some of the distortions of the MIDP were not adequately dealt with, such as recognition of certain standard materials as local value additions. This has resulted in the benefit provided to the industry being potentially too generous. Barnes et al.

(2016) argued that this would result in an increase in vehicle imports, incurring minimal duty with very little pressure on vehicle assemblers to increase their local content levels.

The DTI pointed out that the main purpose of the APDP was to resolve important automotive issues, namely the lack of EOS in vehicle assembly, the lack of depth in domestic component manufacturing, a limited number of components dominating exports, and the stagnation of local content (DTI, 2008). Further reasons for the implementation of the APDP can also be attributed to issues such as the significant increase of imported vehicles and components, the potential conflict of direct export subsidies to qualifying businesses, and WTO prohibition of such practices amongst its members (Kilbourn, 2015).

Having been in operation since 2013, the APDP has provided the local automotive industry with a predictable and transparent policy environment. The APDP has two main objectives, namely the increase of production of light vehicles to 1.2 million per annum by 2020 and the diversification and deepening of the components supply chain in the country.

During the APDP review in 2014/15, it was resolved that the 2020 target of achieving a 1.2 million vehicles per annum domestic production target was unlikely to be achieved. The reasons provided were that, first, the global economy was still recovering from the 2008/9 financial crisis and, second, significant expansion could not be achieved under the prevailing economic conditions at the time (South African Government, 2015).

It is evident that manufacturing competitiveness and employment opportunities across the domestic value chain must be improved through appropriate levels of government support while at the same time ensuring compliance with WTO rules. At this stage, the APDP only applies to light vehicles and automotive components. Hopefully, the South African Government, together with automotive industry stakeholders, will consider expanding the scope of the APDP to other automotive industry suppliers.

According to the AIEC (2013), the APDP policy has four key policy instruments (outlined in Figure 3.5) which drive the programme, each of which are briefly discussed below.

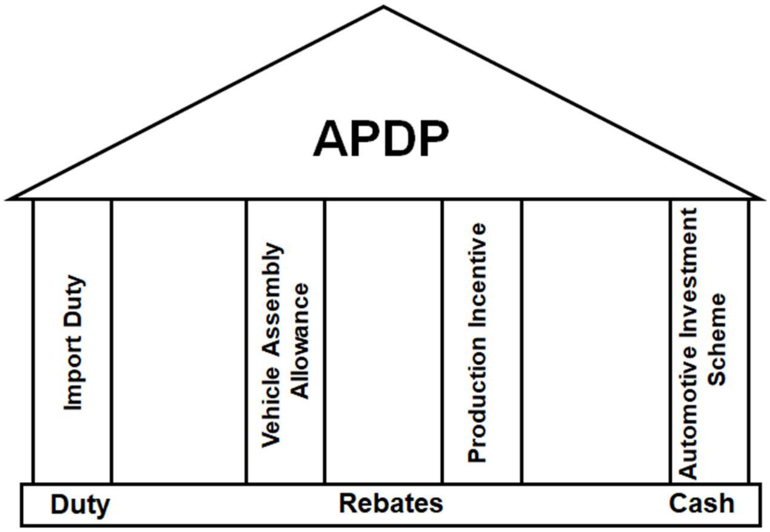

Figure 3.5: Policy instruments of the APDP

Source: Pitot (2013)

The first of these four policy instruments addresses import duties. According to this policy element, import duties on vehicles and components will incur tariffs of 25% and 20% respectively through to 2020, which would provide adequate protection and encourage continued domestic vehicle production (AIEC, 2016:20).

The second policy instrument addresses a Vehicle Assembly Allowance (VAA) which replaced the Duty-Free Allowance (DFA) which formed part of the MIDP. The VAA provided for an import duty rebate on components to a maximum of 20% of the ex-factory price of domestically assembled light motor vehicles in 2013, which was reduced to 19% in 2014 and 18% in 2015, where it remained fixed until 2020. This incentive was specifically directed at domestic assemblers with a high export potential where credits can be earned and offset against imported components for vehicles produced for the domestic market.

The third policy instrument, the product incentive, was established with the aim of increasing local component production (Kilbourn, 2015). It provides for an allowance for the duty-free importation of vehicles and components and replaces the MIDP's export scheme. According to Kilbourn (2015), it replaces the Import Rebate Credit Certification (IRCC) incentive system, with the main difference being that the rebate is now based on production output as opposed to export values and is determined based on local value added. Kilbourn (2015) further pointed out that these rebates can be earned from the supply chain up to and including the final producer, which can be either the OEM or ACM if the components are exported. According to ITAC (2013a), from 2015 manufacturers can be rebated at 55% of local value, reducing by 1% annually for five years until it reaches 50% in 2018.

The fourth and final policy instrument is the Automotive Investment Scheme that replaced the Productive Asset Allowance (PAA) in 2009 and takes the form of a taxable cash grant of 20% of the value of a qualifying investment in productive assets by component manufacturers and tooling businesses. This is another important aspect that was explored by this study as it excludes strategic non-component suppliers such as the ACIS businesses from participation in this incentive scheme. According to the DTI, it was the intention of this scheme to promote manufacturing investment in both new and replacement automotive models and automotive components. The South African automotive industry in return is required to demonstrate an increase in vehicle production and an increase in turnover which is linked to the investment that has been made. The incentive is in the form of a cash grant incentive and is available to OEMs and ACSs with an overall aim of increasing production volumes, promoting employment, and strengthening the automotive value chain (Kilbourn, 2015).

Although the APDP has been widely accepted by the automotive industry in general, it has received criticism from some stakeholders. The component supplier association, NAACAM, has been the most critical, arguing that the programme remains skewed in favour of OEMs. They believe that not enough has been done to motivate domestic vehicle assemblers to increase their sourcing of local content for their production requirements, even although there are incentives in place to increase local production volumes. NAACAM is of the opinion that the APDP is not sufficiently supportive of domestic component suppliers since it continues to make use of the duty rebate system employed by the MIDP (Venter, 2019).

Barnes, Black and Monaco (2018) pointed out that the move from the MIDP to the APDP resulted in a significant change in government policy. The net effect was a change from an explicit export focus to one of production support, irrespective of market focus. This resulted in a change in the way benefits were earned. The way in which revenue was derived from these benefits remained unchanged as export duty rebates were substituted with production-linked duty rebates. This was instituted via the change from a VAA to a product incentive for OEMs and ACMs.

To date, under the APDP, the expectation that OEMs will balance their production between domestic market supply and exports and simultaneously balance their completely built-up unit (CBU) import programmes with production for the domestic market has not materialised (Barnes, Black & Monaco, 2018). Based on international CBU export opportunities and the ability of OEMs to increase the levels of rebates earned via the VAA, OEMs have elected to boost their CBU export programme volumes as opposed to deepening their local content. Arguably, the growth in exports under the APDP can be largely attributed to the strong incentivisation by the import-export rebate mechanisms mentioned above, which were initially designed for the MIDP and continued under the APDP (see Table 3.4).

Light Vehicles	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Total LV Production	**571 791**	**574 075**	**581 469**	**603 082**	**446 215**	**499 087**
# LV Units Exported	**343 766**	**337 105**	**350 003**	**386 265**	**271 287**	**298 020**
Export %	**60.1%**	**58.7%**	**60.2%**	**64.1%**	**60.8%**	**59.7%**

Table 3.4: South African export profile for passenger and light commercial vehicles under the APDP

Source: AIEC (2022)

Another important aspect of these concessions is that they have allowed exporting businesses to reinforce a balance of power (bargaining strength) in favour of OEMs. This has resulted in OEMs achieving a dominant position in the value chain, in relation to state institutions (Barnes, Black & Monaco, 2018). This has clearly been a concern for automotive suppliers in the component sector and, arguably, automotive suppliers in general. Although component suppliers have voiced their concerns, it seems that these concerns have not yet been adequately addressed. The perception from the component sector is that the government is not applying sufficient pressure on the OEMs to source more components domestically.

3.4.1.3. The South African Automotive Master Plan (SAAM)

Following the mid-term review of the APDP conducted by the DTI, it was concluded that the monetary support provided to the automotive sector under the APDP programme could be better focused. However, the APDP changes following the review, as previously mentioned, did not address the concerns raised by the component sector.

According to IOL Business Report (2016), part of the reason can be apportioned to the fact that globalisation has strengthened the role of multinational business in automotive value chains, giving them disproportionate power relative to governments and smaller local businesses, the point being that automotive multinationals operating in South Africa are able to extract significant government subsidies in support of their operations. Clearly, the small domestic market in South Africa provides multinational OEMs with additional leverage when bargaining with the government.

In response to pressures of declining domestic market demand and the export of domestically assembled vehicles with declining local content levels prompted the South African Government to commission the development of SAAM, which runs up to 2035. The master plan concept was derived from an analysis of Thailand's automotive industry development experiences combined with research conducted on developments in Turkey, Morocco, Malaysia, and Australia (Barnes, 2017). The brief was to develop a clear, strategic roadmap for the development of the South African automotive industry through to 2035.

Because of the importance of this policy development to the domestic automotive industry going forward, it is pertinent to provide a brief overview of the SAAM policy framework.

According to Barnes, Black, Comrie and Hartogh (2018), the vision consists of four components. The first component refers to the industry's competitive position, which states the industry's intention to be globally competitive by 2035, while the second component of the vision relates to the expectation of the industry's contribution to the transformation of the South African economy, encompassing several elements from employment equity to the greater inclusion of black-owned businesses within the automotive value chain. The third component, the sustainable development of the

South African economy, relates to the growth of the industry and encompasses elements such as provision of employment, skills development, and improved environmental impact of products and productions processes. The importance of this element has a direct bearing and a substantial influence on the contributions of ACIS businesses and the nature of chemical product supply to the automotive industry, which was the core focus of this study and which will be discussed in more detail in chapter 4 of this study.

The fourth component, the vision directed at the shared prosperity of the industry, leads to fair employee remuneration and the financial health and well-being of businesses within the value chain. This element is deemed to be vitally important as it provides a platform for further discussion regarding the challenges of supplier costs, price pressure, and margin squeeze relating to ACIS businesses.

Barnes, Black, Comrie and Hartogh (2018) pointed out that these four components of global competitiveness, industry transformation, sustainable development, and societal contribution represent the *aspirational heart* of SAAM. SAAM is summarised in Figure 3.6.

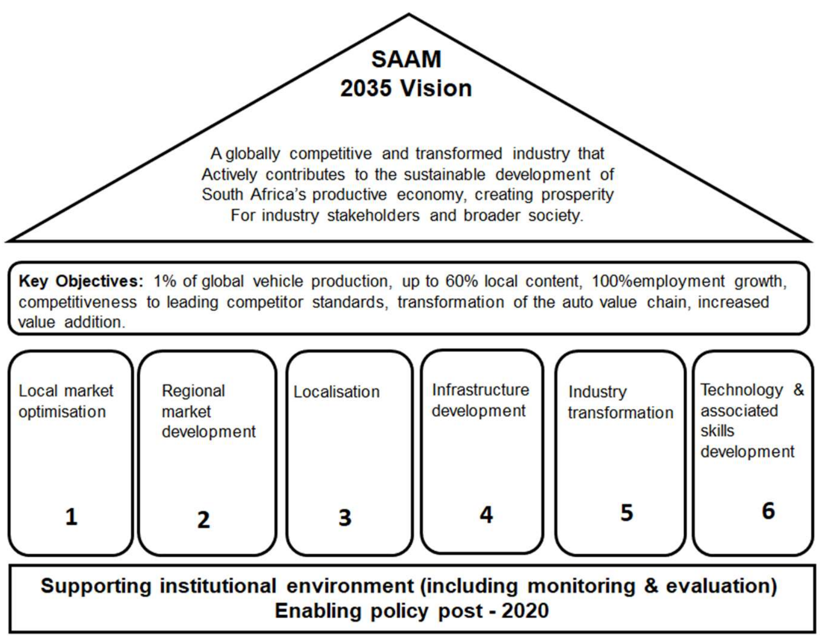

Figure 3.6: SAAM's 2035 vision, objectives, and strategic focus areas

Source: Barnes, Black, Comrie and Hartogh (2018)

The industry's SAAM vision must be realised through a set of key development opportunities, as depicted in Figure 3.6, which are central to the success of SAAM. Table 3.5 below provides an overview of the expected transformational impact of attaining these key objectives on the automotive industry.

Objective #	Objective	Estimated Impact on SA automotive industry
1.	Grow SA vehicle production to 1% of global output	CBU production to 1.39m units (129% higher than 2015 levels). Increase total value of vehicle production to ZAR 314bn.
2.	Increase local content in SA assembled vehicles to 60%	Increase of ZAR 135bn on 2015 local contents levels 55% local content increase per vehicle produced.
3.	Double employment in the automotive value chain	Employment growth of 112 000. Aggregate employment from 112 000 to 224 000.
4.	Improve Industry competitiveness levels to that of leading international competitors.	Sustainable automotive industry based on comparative price and non-price competitive indicators. Sustained export competitiveness.
5.	Achieve transformation of the South African automotive value chain	25% Black-owned involvement at tier 2 and 3 component manufacturing levels, as well as in dealership networks andauthorised repair facilities. Amplified skills development of Black South Africans. Enhanced employment equity at senior management, artisan and professional employment levels across the automotive value chain.
6.	Deepen value addition within SA automotive value chains	Growth of automotive component exports and production for the aftermarket at the same rate as CBU local content increases. Growth in R&D / other innovation metrics within the SA auto value chain.

Table 3.5: SAAM objectives to 2035 – Estimated impact on the South African automotive industry

Source: Barnes (2017)

Barnes, Black, Comrie and Hartogh (2018) asserted that each of the pillars depicted in Figure 3.6 will require support via clear institutional and enabling automotive policies which still must be developed. The fact that SAAM is more than likely to be filled with challenges through to 2035 means that it will be essential that an institutional approach is undertaken, in other words an authoritative SAAM institution that is responsible for its implementation is established. It is evident that developing suitable policies will not be an easy task and will be compounded by the emergence of technological advances and other changes which are set to transform the automotive industry globally (Barnes, Black, Comrie & Hartogh, 2018).

In the context of the SAAM goals, a current major concern for the domestic automotive manufacturing industry is the impact of the COVID-19 pandemic on domestic vehicle manufacturing output. The South African automotive manufacturing industry is going to be hard pressed to achieve the SAAM goals in the face of the impact of the global COVID-19 pandemic. According to Rumney (2020), the extent of the medium- to long-term negative impact of the COVID-19 pandemic, globally as discussed in Section 3.3.5, and which brought domestic vehicle manufacturing output in South Africa to a virtual halt, is going to be difficult to predict.

The purpose of the points reflected upon in this brief discussion on the current and future automotive policy initiatives was to highlight the importance of governmental policy in support of the South African automotive industry transitioning from a domestic to a globalised industry. The evolution of initiatives such as the MIDP, the APDP since 1995, and the pending change to SAAM 2035 in 2021 were discussed, highlighting the as-yet-unknown COVID-19 negative medium- to long-term impact on the SAAM 2035 manufacturing output goals.

3.5. SUSTAINABILITY CONCERNS IN THE SOUTH AFRICAN AUTOMOTIVE INDUSTRY

According to the AIEC (2020), the South African automotive industry, which is dominated by MNCs, is an integral part of the global automotive environment. Therefore, in order to secure a sustainable future for the domestic industry, what South Africa needs is a globally competitive and transformed automotive industry with high levels of economic growth. To achieve this, large-scale localised vehicle production needs to be achieved through a combination of increased domestic demand, localisation, and higher exports (AIEC, 2020). There are, however, some concerns and issues which need to be overcome in order to achieve a globally competitive domestic automotive industry. Two major concerns are examined and discussed in this section.

3.5.1. South African automotive value/supply chain underdevelopment

The first major concern raised in the literature is that of the underdevelopment of the domestic automotive supply chain. According to Barnes, Black and Monaco (2018), the South African automotive value/supply chain is deemed to be underdeveloped compared to leading international competitors. Low and declining local content levels in domestically produced vehicles and sizeable volumes of component imports endorse this view (Barnes et al., 2018).

The basis for the underdevelopment of the South African automotive value/supply chain although diversified has primarily been attributed to the legacy of the weight-based local content programme between 1961 and 1989 and the way in which vehicle manufacturing evolved as government policy changed. As an example, the MIDP, according to Barnes, Black and Monaco (2018), exposed domestic component businesses to significant levels of international competition, eroding levels of local content in the mid-1990s. This consequently led to the closure of numerous large South African-owned ACMs. Therefore, the profile of the South African automotive supply chain does not resemble that of the global automotive industry. Figure 3.7 places this into perspective in terms of value addition.

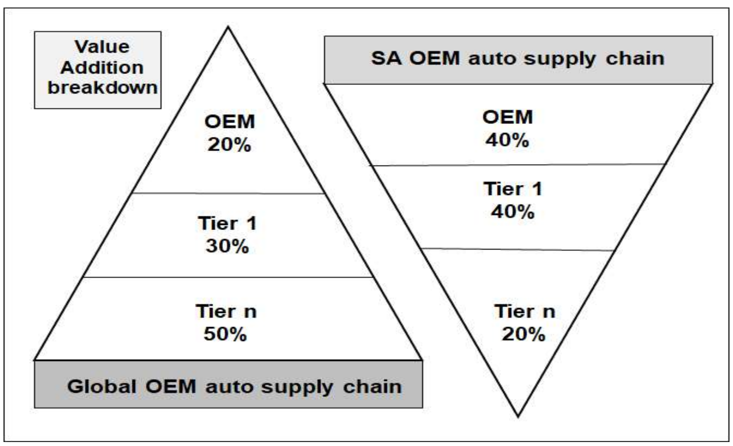

Figure 3.7: Value addition breakdown comparison between global and South African automotive supply chains

Source: Adapted from Barnes, Black, and Monaco (2018)

Global OEM activity is responsible for 20% of value addition compared to 40% estimated in South Africa. Global Tier 1 suppliers account for 30% with lower-tier suppliers accounting for 50% of value addition. This is in stark contrast to South African Tier 1 suppliers adding an estimated 40% and lower-tier supplies accounting for only 20% of value addition.

3.5.2. Supply chains in the South African automotive industry

The sustainability of domestic automotive businesses is heavily dependent on the effectiveness of the supply chains of stakeholders participating in the automotive value chain. Aligning SCM to business strategy creates a positive impact on the business. It has therefore become imperative that supply chains become an integral part of the business strategy in the contemporary automotive business environment.

As the South African automotive industry continues to face the growing challenge of fierce competition, mergers and acquisitions amongst vehicle manufacturers and automotive suppliers globally are likely to continue. Because of the global linkages between South African OEMs and component suppliers, one can safely assume that these ongoing industry changes will have an impact on the South African automotive industry. Cost reductions amongst other fiscal initiatives by both OEMs and automotive suppliers means that SCM activities will become more significant in driving the profitability and economic sustainability of automotive manufacturing and supplier businesses.

In an early study by the IBM Institute for Business Value study on SCM, Belzowski, Flynn, Edwards, Ban and Martin (2004) concluded that intense cost pressures and managing a global supply chain are two of the most important issues to be addressed. Based on their research, three crucial issues were identified that have impacted, and continue to impact, contemporary global automotive supply chains: relationship models between OEMs and suppliers determine which supply chains are the most cost-effective and efficient; globalisation challenges the most mature and well-resourced automotive businesses in terms of developing a global sourcing capability and manufacturing footprint; complexity stemming from varying company cultures, pricing models, product designs and multiple sourcing challenges SCM requirements.

This is supported by Pavlinek (2020), who pointed out that, as automotive OEMs migrate to global platforms, the supply chain will become increasingly more complex. This is particularly evident as OEMs weigh up the benefits of global design and scale against cost savings and local market demands. Contemporary automotive industry dynamics has impressed upon the importance of SCM and efficiency to counter supply chain risk, reliability, and flexibility. Many automotive OEMs have sought to increase collaboration with their supply chain partners as a means of addressing supply chain complexity by focusing on the reduction of operating expenses, gaining real-time demand insights, identifying inventory shortage or overages, and improving sales performance and customer satisfaction.

Although numerous benefits have already been extracted from manufacturing and supply chains, OEMs are continuing with an operations-oriented focus to find alternative pockets of value from a value chain perspective. This implies that, for supply chains to extract maximum value in this dynamic automotive industry environment where significant changes in preference and demand are the order of the day, it is imperative for all automotive businesses to synchronise the flows of supply to customers with the flows of value from customers.

3.5.3. Domestic vehicle manufacturing challenges

The second major concern is that of the status of vehicle manufacturing in South Africa. The contemporary South African automotive industry has not completely transcended the three vehicle production stages proposed in an earlier study by Black (2009) (see Table 3.6).

CATEGORY	CKD ASSEMBLY	TRANSITION	FULL MANUFACTURING
Target Market	Domestic	Domestic & export	Domestic & export
Level of parent company integration	Low – import of CKD packs	Medium	High
Model line up	Multiple models	One to two	One to two
Derivatives	Limited to reduce costs	Full range for export market	Full range for export market
Local content	Generally low but can be high due to legislated local content requirement	Moderate base on cost factors	Medium to high
Quality	Below source plant	On par with source plant	On par with source plant
Production cost	High	Medium: penalties incurred by high logistics cost	Low
Domestic design	Local adaptations	None	None. Possible R&D in niche areas.

Table 3.6: Vehicle production stages in South Africa

Source: Adapted from Black (2009)

The first production stage is that of a completely knocked-down (CKD) assembly stage in which imported CKD packs are fully imported and assembled locally. Low volumes of vehicle production and high costs are characteristic of this stage, with a focus on design and production of vehicles specifically for the domestic market.

In the second phase, which is the transition phase, the industry expands to include both domestic and export markets with comprehensive vehicle model ranges and world-class quality and design features. This stage is characterised by automotive OEMs not fully supporting the achievement of local content targets. This is mainly as a result of high domestic costs as OEMs continue to import components to achieve a cost advantage. Black (2009) classified the cost structure of the industry in this phase as being medium, largely as a result of insufficient EOS.

In the third and final manufacturing stage, the full manufacturing stage, OEMs become fully integrated into their respective parent-companies, model volumes increase, and model ranges are singular with one or two platforms. An important aspect of this stage is the accrual of FDI due to higher volumes, which in turn supports the domestic automotive supplier industry.

Previously protected developing country industries, such as the South African automotive industry, typically follow this sequence of the conversion process (Nitschke, 2011). Although South Africa currently finds itself in the transition phase, there are opportunities to move to the full manufacturing stage once sustainable production volumes can be achieved from servicing both the domestic and export markets. The inception of government industrial policy, in the form of the APDP, has facilitated substantial upgrading and integration of domestic supply chains into international markets; however, production volumes have not yet achieved the required EOS.

As discussed in Section 3.5.1.3, the transition from the APDP to the SAAM 2035 policy and objectives in 2021 was intended to influence the trajectory of the domestic automotive manufacturing industry to achieve improved competitiveness and EOS.

3.6. THE SOUTH AFRICAN AUTOMOTIVE SUPPLIER INDUSTRY

One of the features of the South African automotive business environment is the fact that it is characterised by a prominent automotive component manufacturing industry, with the majority of the component suppliers supplying directly to OEMs. As a point of note, the term ‘automotive suppliers,’ as used in this research study, broadly encompasses the multitude of suppliers that operate in the South African automotive industry.

3.6.1. Auto supplier ownership in the domestic automotive industry

Many of the domestic component manufacturers have links to European- and Japanese-based businesses where numerous European- and Japanese-based OEMs have exerted pressure on their suppliers to form links with South African-based companies in support of their export programmes in South Africa. This has led to the development of a tiered structure with a Tier 1 supply status carrying substantial benefits. In an early study, Barnes (1999) concluded that many large automotive component businesses have failed to meet the business size and R&D capability criteria and have therefore been acquired by larger businesses. The impact of these acquisitions on South African component businesses relates to changes in ownership of many subsidiary operations in South Africa.

Although domestic automotive component businesses have improved their competitiveness as a result of globalisation and the incumbent pressures of global competition, economic difficulties remain. These are mostly as a result of domestic businesses having to meet the operating standards of global competitors. Stagnation of the domestic automotive market has exacerbated the pressures being experienced by automotive component businesses. The stagnation of the domestic automotive market prompted automotive OEMs to augment their own competitive situation by looking for more cost-effective global sourcing opportunities and improve supply chain efficiencies. This, unfortunately, was to the detriment of domestic automotive component businesses.

The expectation of South African OEMs is that, in line with their own integration into their parent-companies' global operations, they want to purchase components from MNCs located in South Africa. Because expanding manufacturing into global markets is difficult for smaller suppliers who do not have the necessary capital available, selling to larger strategic suppliers has become a growing option. This means that domestic ACSs will either sell out to larger suppliers or private equity buyers or become joint-venture partners with or subsidiaries of MNCs.

3.6.2. Automotive suppliers in the upstream automotive value chain

According to Nitschke (2011), the role of the various suppliers in the automotive industry is derived from their responsibilities in the upstream automotive value chain, which can be classified in several ways. Classification can be done according to the tier level of the supplier or type of product manufactured by the supplier. The typical automotive value chain is characterised by suppliers of components (commodities), modules (modified or customised commodities), or systems (fully-integrated systems). This is typically the classical classification of suppliers of dimensional products (engineering components) to the automotive OEMs. Nitschke (2011) further pointed out that suppliers can also be characterised by their market presence, which is linked to their tier position. In other words, it is generally accepted that Tier 2 and lower-tier suppliers operate in regional or domestic environments whereas Tier 1 suppliers operate globally.

3.6.3. Automotive component supplier tier structure and classification

Suppliers to the automotive industry can be divided into two broad groupings. The first group consists of those suppliers that supply automotive-specific parts and components directly to OEMs. The second group consists of businesses that contribute non-automotive-specific products and services to the automotive value chain. As a rule, this second group of automotive supplier businesses are not considered to be part of the automotive industry.

Automotive suppliers are further differentiated into three tiers, according to the value they add to the automotive value chain, and are depicted in what is known as a supplier pyramid. The definitions of Tier 1, Tier 2, and Tier 3 automotive industry suppliers are briefly summarised in Table 3.7 below.

TIER LEVEL	DEFINITION
Tier 1 Suppliers	Firms that supply OEMs directly and are typically but not restricted to large firms of which many are multinational organisations.
Tier 2 Suppliers	Firms that are broadly defined as those supplying Tier 1 firms and are usually smaller firms. In certain circumstances these Tier 2 firms may also be large firms.
Tier 3 Suppliers	Firms that supply raw materials, or close-to-raw materials such as metal or plastics to OEMs directly. These firms are typically smaller firms of which many are multinational organisations.

Table 3.7: Tier 1, 2, and 3 level definitions

Source: Crampton (2017)

The definitions provided in Table 3.7 allude to the fact that Tier 1 businesses are not necessarily large businesses and Tier 2 businesses are not necessarily small businesses. Furthermore, Tier 3 businesses can be domestic or multinational organisations. Comrie et al. (2013) argued that the varying degrees to which many supplier businesses supply either or both Tier 1 businesses and OEMs makes precise classification difficult. NAACAM, who is the recognised voice of the South African automotive component industry both domestically and internationally, provides an alternative classification for automotive supplier member businesses, which is depicted in Table 3.8 below.

SYMBOL	CLASSIFICATION
A	Manufacturers and suppliers of OE components to vehicle assembly plants only.
B	Manufacturers and suppliers of OE as well as parts & Accessories and aftermarket / replacement components.
C	Manufacturers of accessories and replacement parts.
D	Manufacturers of allied products supplied to vehicle assembly plants and other sectors of the industry e.g. Steel; Paint; glass; Abrasives; Upholstery; Tooling; Pallets; Packaging and identification / Marking.
E	Suppliers of related / support products to the motor industry.
SP	Service providers (associate members).

Table 3.8: NAACAM Supplier Classification

Source: NAACAM (2021)

According to the NAACAM (2015) directory, the association has approximately 140 national member companies and 16 affiliate companies providing an array of different services to the automotive OEMs. Approximately 40% of the manufacturing member companies operate at the Tier 1 level, providing components directly to OEMs. The balance of NAACAM members make up Tier 2 and Tier 3 suppliers. The NAACAM classification, while not addressing the tier levels, provides a classification of various types of automotive suppliers, any of which may occupy any of the tier levels. The application of a tier level to automotive suppliers may therefore be deemed to be the prerogative of each individual OEM.

The trend worldwide by OEMs is to reduce the number of Tier 1 suppliers and establish long-term relationships with fewer suppliers. This global consolidation of ACSs has led to a pyramidal or tiered structure being implemented by automotive manufacturers in the automotive component industry. Tier 1 suppliers have taken on greater R&D responsibilities and have become system integrators. These Tier 1 system integrator businesses have increasingly been taken over by transnational companies (TNCs). According to Frigant (2016), vehicle producers have widely accepted the vision of an automotive supply chain with a pyramidal structure that works in favour of mega automotive supplier businesses. This has led to a significant reshuffling of supply chain architectures and the structure of the businesses that operate within the automotive supply chains with modularisation playing an important role in the adoption of this pyramidal structure by the Western world. Modularisation has led to the emergence of mega-suppliers who have largely occupied the pyramid's Tier 1 level. According to Frigant (2016), a product can be assumed to be modular *"when an overall product (in this case a vehicle) is assembled from numerous different subassemblies (modules) which are characterised by their autonomous and independent nature and interlinked by previously defined interfaces"*.

The structure of the automotive supply base can be depicted as pyramidal, with vehicle manufacturers occupying the top of the pyramid, below which are a small number of Tier 1 suppliers that sell components directly to the vehicle manufacturer. These Tier 1 suppliers purchase materials and components from Tier 2 suppliers who, in turn, purchase from Tier 3 suppliers. This pyramidal model was introduced by Japanese vehicle producers as a precursor to a narrowing of the supply pyramid (cutting out suppliers) and the introduction of modularisation where certain suppliers became single sources for a particular vehicle model (Frigant, 2016). Mega-supplier businesses have hastened to fill the Tier 1 space, transforming them into key supply chain players.

The net effect of tiering and modularisation has been to squeeze smaller independent supplier businesses into lower tier positions, triggering changes in the organisation of the automotive supply chain. The architecture of the automotive supply chain is thus characterised by what is termed to be 'imperfect modularity,' which implies that there are spaces for small- and medium-component businesses to supply OEMs directly.

This imperfect modularity is demonstrated in Figure 3.8, which provides a schematic representation of the pyramidal supply chain structure of a modularised vehicle manufacturer, depicting spaces in the market that small- and medium-sized enterprises (SMEs) can take advantage of.

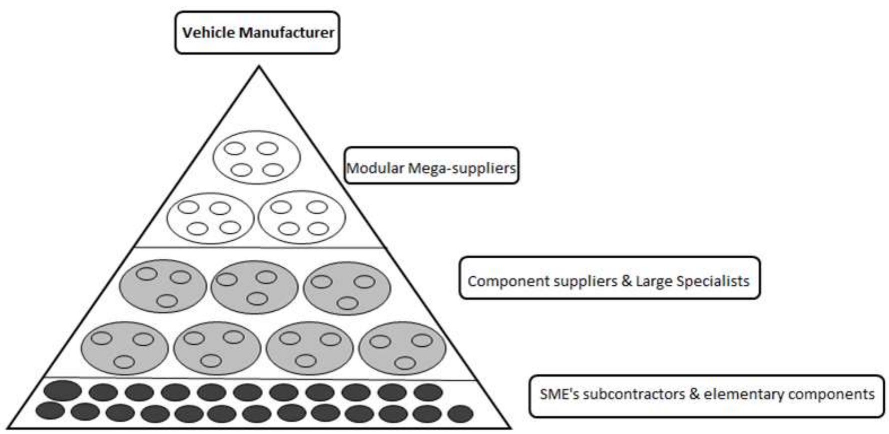

Figure 3.8: Pyramidal supply chain of a modular vehicle manufacturer

Source: Adapted from Frigant (2016)

There are, therefore, certain opportunities for small and medium businesses to occupy spaces when independent supplier input is specifically required by OEMs. As each country has its own peculiar operating environment, this opportunity generally occurs when an independent supplier is closely associated with the domestic market dynamics of various individual countries. Therefore, businesses operating at a Tier 2 level still have an opportunity to take advantage of and benefit from expanded automotive business opportunities, provided they remain competitive in terms of their production, operations, and supply chain capabilities.

3.6.4 Non-automotive suppliers in the upstream automotive value chain

The discussion thus far has been directed at domestic ACMs/ACSs. There are numerous suppliers who are not component suppliers but actively supply products directly to the OEMs. NAACAM makes provision for the classification of these suppliers who fall under NAACAM's classification (see Figure 2.8) as D-type suppliers or *"manufacturers of allied products supplied to vehicle assembly plants and other sectors of industry, for example. Steel; Paint, Glass; Abrasives; Upholstery; tooling; Pallets; Packaging and Identification/ Marking."* The point of this NAACAM classification is that these D-type suppliers do not uniquely supply products to the automotive sector.

Notwithstanding the fact that many of these D-type suppliers play a strategic role in the vehicle manufacturing process, they are deemed to be non-automotive suppliers by the automotive OEMs. Although recognised within the NAACAM classification as a direct supplier of products to OEMs, the question remains as to why these suppliers are not integrated into the automotive supply chain to the same extent as component suppliers if they play a strategic role in the OEM manufacturing process from both a product and service perspective. Nitschke (2011) argued that these non-automotive suppliers could be a source of competitive advantage for the OEMs.

As an example, ACIS businesses, which were the focal point of this study, can provide OEMs with a competitive advantage in terms of the provision of chemical products and on-site chemical process management services customise to the specific needs of individual OEMs, the provision of products in support of OEM advanced multi-metal vehicle construction and light-weighting strategies, environmentally compliant products in support of pervasive green initiatives required by OEMs, customised packaging and dispensing equipment in support of reduced cycle times and reduction in manufacturing cost structure improving OEM profitability, and the management of outsourced key OEM chemical and application processes in support of OEM reduced fixed cost initiatives. A further important competitive advantage that can be provided by automotive chemicals businesses is in supporting the OEMs management of the increased regulatory oversight of chemical products in terms of European Union REACH (Registration, Evaluation, Authorisation, and Restriction of Chemicals) regulations.

The fact that automotive OEMs have embarked on a process of reducing the number of suppliers with the objective of establishing strategic relationships with fewer suppliers supports the relevance of supplier classification and its application to automotive supplier businesses. Tier 1 suppliers find themselves in a relatively privileged position with respect to communication with OEMs compared to lower-tier suppliers. According to Tolmay (2012), as part of a competitive and long-term survival strategy it is vital that suppliers communicate more effectively with their customers, in this case the OEMs, in order to facilitate the development of long-term relationships that create value within the B2B environment. One can argue that Tier 1 suppliers occupy privileged positions by being afforded more direct access to vehicle manufacturers and exposed to vastly improved relationship opportunities. The domestic automotive manufacturing industry is reliant on numerous different automotive suppliers that form part of the automotive supply chain that do not carry the same prominent profile as ACSs in the automotive supply chain. Although the prior discussion has focused on the competitive challenges of globalisation on the ACS industry, these challenges can be extrapolated to all automotive suppliers to a larger or lesser extent depending on the supplier industry.

Most of the ACSs that form part of this industry supply components directly to OEMs and are affiliated to several prominent industry support organisations. The interests of automotive suppliers in South Africa (component and non-component) are largely represented by NAACAM. According to the AIEC (2018), there are approximately 500 ACSs in the South African automotive industry of which less than 300 are dedicated ACSs.

There are, however, also several Tier 2 suppliers who supply directly to OEMs but are not affiliated to automotive support organisations such as NAAMSA or NAACAM. Some of these Tier 2 suppliers do not only supply products to automotive OEMs but also supply to non-automotive industries and are therefore not viewed as being part of the overall automotive industry (Comrie et. al., 2013). The varying degree to which businesses supply either OEMs or Tier 1 businesses, or both, renders the task of non-automotive supplier classification in this case challenging.

As this study was specifically focused on automotive chemical industry businesses supplying specialty process chemicals to South African based global automotive

OEMs and ACSs, it is appropriate at this juncture to briefly introduce this industry in the context of its position in the upstream automotive value chain, its strategic importance in the vehicle manufacturing process, and the comparatively low profile held by ACIS businesses in the automotive value chain. Automotive chemical industry supplier (ACIS) businesses are not deemed by automotive OEMs to be automotive suppliers, which is more than likely as a result of ACIS businesses not being restricted to supplying automotive products only and are thus able to supply non-automotive markets as well. For domestic ACIS businesses, the question remains as to the extent to which these businesses as part of the chemical industry, which is markedly different to the automotive industry within which it operates, can achieve an integrative approach to supply and value creation in the automotive value chain. The ACIS industry will be explored and discussed in more depth in Chapter 4.

3.7. SUMMARY

This chapter outlined some of the common features of globalised industries and distinctive features of the global automotive sector that differentiates this sector from other globalised industries. Reshaping of the global automotive value chain was discussed, highlighting consolidation within the value chain. Competitive pressure amongst OEMs and market pressures leading to OEMs looking for improved revenue opportunities and reduced operating costs in emerging markets were discussed.

The South African automotive industry was discussed in the context of its integration into the global automotive industry's key challenges facing the domestic industry. The importance of strong global linkages from an OEM perspective, and that of automotive suppliers, to ensure the sustainable development of the domestic automotive industry were highlighted. The importance of the automotive supplier industry in improving their competitiveness by raising manufacturing standards to world-class levels was discussed with the view to contributing to overall competitiveness of the domestic automotive industry.

A brief overview of the South African automotive market was provided to contextualise the size and position of the domestic industry within the global automotive industry. Decreased domestic market production and increased production for the export market has characterised domestic production output with an aggregate production increase. South African governmental automotive policy initiatives were discussed with the aim of highlighting the importance of current and future automotive policies and their contribution in assisting the domestic automotive industry to become and remain a sustainable market-share contender. South African-based OEMs and automotive supplier businesses have been forced to become more competitive in order to participate in both domestic and international markets, resulting in the increased presence of multinational OEMs and component suppliers in South Africa through the establishment of wholly-owned affiliates.

Although the essence of the discussion on auto suppliers in this chapter was focused on ACSs, numerous other strategically important non-component suppliers have been subjected to similar challenges as well as their own unique challenges. The automotive chemical industry, which was the focus of this study, was briefly introduced as part of the discussion. Chapter 4 will provide an overview of the automotive chemicals industry in South Africa, where the industry will be explored in terms of the nature of the supply, importance of automotive chemicals to the automotive industry, and the economic sustainability challenges facing the industry.

CHAPTER 4:
THE SOUTH AFRICAN AUTOMOTIVE CHEMICALS INDUSTRY

4.1. INTRODUCTION

The aim of Chapter 4 is to contribute to an understanding of the South African automotive chemical industry, its role and significance in the greater automotive industry value chain, and the unique challenges facing the industry. The global specialty chemical sector and the South African automotive chemicals industry business environment are examined from a domestic ACIS business's perspective.

Key aspects of the South African automotive chemicals industry are discussed in terms of the industry's position within the broader context of the specialty chemicals sector and its relevance and importance to the South African automotive manufacturing industry. Long-term economic sustainability challenges faced by domestic ACIS businesses in the business environment in which they operate are extensively explored in terms of the impact of escalating business input costs and price-reduction pressures from automotive OEMs on ACIS business profitability. A brief analysis of automotive chemical industry supply chains is undertaken, highlighting distinguishing features and some of the challenges of integrating automotive chemical and automotive industry supply chains.

The dearth of available literature pertaining to automotive chemical industry and specific challenges experienced by the industry and the abundance of available literature related to the challenges of Tier 1 ACSs in the South African automotive industry means that applicable parallels are drawn regarding the challenges experienced by other primary automotive suppliers such as ACSs. Relevant early literature studies and industry reports are referenced where necessary in order to provide historic background support to the discussions in this chapter.

4.2. THE GLOBAL SPECIALTY CHEMICALS INDUSTRY

The global specialty chemicals industry is one of the major global industries which presents with management challenges which are unique to the industry. From an economic perspective, the crucial role that the global specialty chemicals industry plays are reflected in the size of its market, which was estimated to be around 641 billion US Dollars in 2021 (Fortune Business Insights, 2022). Compared to its economic importance and its pivotal role in providing solutions to societal and industry challenges, the specialty chemicals industry has not received much attention from management literature (Leker & Utikal, 2016).

The global specialty chemicals business environment can be described as one in which rapidly changing customer demands are increasing the complexity of doing business while at the same time increasing the level of competitiveness in the industry. These characteristics are indicative of the challenging nature of the global chemical industry environment, not only from a scientific and technological perspective but also from a business point of view. Traditional ways of operating have changed appreciably over time in the specialty chemical industry. The consequences of emerging business trends alluded to above have necessitated that specialty chemical businesses become more flexible and adaptable. Specialty chemical businesses must now depend on their ability to respond to accelerating customer demands for increasingly specialised and integrated products and services, more rapid time-to-market capabilities, higher quality, and more responsive services to ensure their survival. Successful business interventions are therefore dependent on a clear understanding of the range of external and internal forces influencing specialty chemical industry businesses at various levels. More importantly, the substantial impact of these influencing forces on specialty chemical businesses could, in all probability, affect their economic sustainability (Hernaus, 2011).

4.3. ATTRIBUTES OF THE SPECIALTY CHEMICALS SECTOR

To gain an understanding of the nature and scope of the automotive chemicals industry, which is a subsector of the specialty chemicals sector, it is necessary to briefly examine and discuss some of the characteristics of this sector. In the search for a definition for specialty chemicals, one would expect to find a clear definition somewhere in the literature on the history of the specialty chemicals sector, which covers more than a hundred years of research, development, and production. This however is not the case. Although the term ‘specialty chemicals’ has been used in the broader chemical industry for many years, it is still used loosely and tends to create some confusion as to exactly what specialty chemicals are (Storck, 2004). A very practical definition of specialty chemicals is offered in an earlier study by Goldhill

(2008): *"functional, formulated and compounded and/or chemical process enabled materials with a focus on performance".* The term 'performance chemicals' has also been widely used and accepted to describe the specialty chemicals sector. The aim of the term 'performance chemicals' is to position specialty chemical products as products that will improve the performance of either the manufacturing process in which they are used or an end-use product.

Specialty chemical producers generally serve a relatively small or narrow market such as the automotive industry. This sector is typically characterised by buyer demands for compliance with specifications and on-time delivery, which places unique pressure on specialty chemical producers serving this market to focus on issues such as product design, flexibility, and service delivery. In this sector, competition revolves around aspects such as the quality of service, technical advice, product performance, reliability, and process/application features.

Specialty chemicals are characterised by limited production volumes and are frequently purchased with more emphasis on performance as opposed to price. Although annual volumes of specialty chemicals produced are relatively small compared to annual volumes of, for example, commodity chemicals produced, they are nonetheless critical to the success of customer businesses as they perform critical functions.

4.3.1. Global specialty chemicals industry landscape

According to Baumler and Morawietz (2009) of Strategy&, a division of PwC, the global specialty chemical industry's landscape has been significantly restructured since the 1990s. In the early 1990s, traditional oil and gas businesses such as BP and Shell and large integrated chemical businesses such as BASF, Hoechst, and ICI dominated the market. This landscape has changed significantly, with oil and gas players divesting themselves from their chemical businesses. Baumler et al. (2009) pointed out that, although large oil and gas chemical companies remain in the chemicals business, they have vastly more differentiated and/or focused product portfolios. Some of these chemical companies have restructured and optimised their portfolios while others have enhanced their portfolios through acquisitions in order to enhance their competitive positions. For example, BASF enhanced its portfolio by acquiring specialty manufacturers such as Degussa's Construction Chemicals, Engelhard, and Ciba. Dow and Akzo Nobel have followed similar acquisition strategies.

These changes in the global specialty chemical industry have been in response to challenges such as globalisation, profit margin pressure, commoditisation, and the changing nature of innovation faced by established chemical companies. Elements of globalisation continue to have a significant impact in terms of cost competitiveness on specialty chemical industries. This is particularly evident in Western countries, forcing chemical value chains to move to Asia and the Middle East.

Driven by improved customer sourcing abilities, many specialty chemical products have become commoditised, resulting in profit margin pressure in the specialty chemical industry with consequent stagnating financial performance. While pricing competition has not been a significant factor for companies in the speciality chemical sector, power of specialty chemical businesses has substantially diminished.

Innovation has been an area of specialty chemical businesses that has come under enormous pressure. Customers now expect low-cost products, quicker launch times, and improved performance from their specialty chemical suppliers. Contemporary innovation strategies have had to change and differ extensively from innovation in the past. Consequently, investment in product innovation has come under pressure. According to Baumler et al. (2009), the contemporary focus of innovation strategies in specialty chemical companies has been directed at the optimisation of processes, the development of new product formulations, and the development of new business models such as the addition of a significant technological service component to their product offerings.

After many years of struggling with declining margins, product commoditisation, growing competition from developing countries, and customers demanding lower prices, industry analysts such as PwC believe that current trends in the specialty chemical industry are pointing towards specialty chemical companies rethinking their growth strategies and opting for more lean aggressive business models (PwC, 2018). Although this trend is in an embryonic stage, PwC (2018) asserted that these trends can support an improved short-term performance and provide long-term growth opportunities and economic sustainability in the face of accelerated commoditisation and declining margins.

It is evident from the above discussion that the fate of players in specialty segments of the chemical industry, such as the automotive chemical industry, remain inevitably linked to end-markets demand, price volatility of key feedstocks, trade and regulatory barriers, and sustainability.

4.3.2. Contemporary characteristics of the global specialty chemicals industry

The operating footprint of the specialty chemical industry is largely determined by production facilities, raw material accessibility, and energy costs on the one hand and mitigated by the need to provide cost-effective market access on the other. As the specialty chemical industry has an impact on different geographic markets globally, it is accepted that the industry plays a significant multiregional role.

The specialty chemical sector is a process industry where value is added to raw materials by means of mixing, separating, forming, and chemical reactions. The production processes in process industries such as the specialty chemical industry are particularly important. Finished products in the specialty chemical industry can act as intermediates, which can either be further processed to synthesise other products or used as a saleable finished product (Leker et al., 2016).

Specialty chemical manufacturing businesses are generally characterised by capital-intensive production facilities. These facilities are geared towards ensuring that production processes of specialty chemical companies producing process chemicals are stable and optimised in order to consistently comply with the high-quality product requirements, flexibility, and agility demands of their customer base. These requirements consequently contribute to the complexity of planning for and optimisation of production processes in specialty chemical companies.

The final aspect of this discussion on the contemporary characteristics of the global specialty chemical industry is that of the environmental aspect of the industry and the impact of the footprint of chemical products on the environment. Leker et al. (2016) pointed out that specialty chemical industries are highly dependent on non-renewable resources as input factors for their production processes. Specialty chemical businesses are acutely aware of the strategic importance of being able to develop substitutes for these limited raw materials while considering available energy sources and the protection of the environment. The impact that chemical products worldwide potentially have on the environment raises the issue of minimising waste by minimising the use of resource inputs and the creation of waste, pollution, and gaseous emissions without the loss of revenue or added costs for manufacturers. As environmental issues become progressively more important globally, it follows that specialty chemical businesses are experiencing increasing pressure from an environmental compliance perspective (Leker et al., 2016).

4.3.3. Specialty chemical sector challenges

As alluded to in the above discussion, the global specialty chemical industry has its own unique set of challenges which are independent of the competitive pressures exerted from the industry sectors in which it operates. This means that specialty chemical businesses must deal with unique challenges in their specific chemical business environments while at the same time finding ways to tailor their operations to ensure that they offer profitable products and services to their customers. These challenges will be the subject of a brief discussion in this section.

Pflug (2015) highlighted a few critical challenges that global specialty chemical businesses need to deal with. While perhaps not all-encompassing, the challenges reflected in Figure 4.1 below are real and extremely important. Although these challenges are global in nature, they can easily be extrapolated to South African specialty chemical industries and, more specifically, the automotive chemicals sector as a consequence of being integrated into the greater global specialty chemical industry.

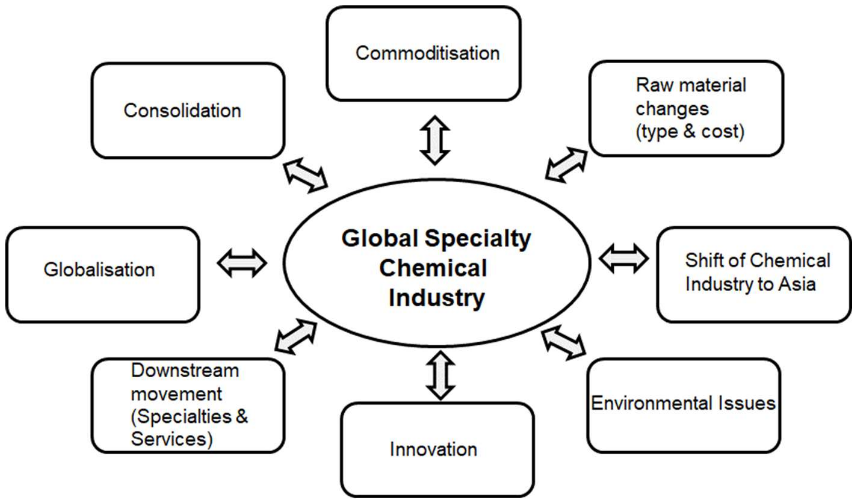

Figure 4.1: Crucial challenges to the global specialty chemical industry

Source: Adapted from Pflug (2015)

The following discussion briefly deals with each of the challenges highlighted in Figure 4.1.

4.3.3.1. Commoditisation

Commoditisation, according to Pflug (2015), is an ongoing threat to leading specialty chemical businesses globally. Specialty chemical businesses expend a lot of time, effort, and resources in developing superior differentiated product portfolios to enable them to command premium market prices. Unfortunately, over time and as products mature, competitors can produce similar competitive products, thereby usurping a business's initial competitive advantage. Simultaneously, customers tend to become less reliant on current suppliers and become more amenable to switching suppliers. In order to protect their business, many businesses in this situation revert to competitive pricing as a strategy, which ultimately results in deceased profit margins despite increased sales volumes.

4.3.3.2. Raw material availability and changes

One of the biggest cost drivers in the specialty chemical industry is that of raw material inputs. Raw materials used in the chemical industry are, to a large extent, organic substances derived from fossil fuels. Fossil fuels are non-renewable resources whose prices are subject to long-term upward pressure which has, in turn, led to extreme cost pressure on speciality chemical businesses. Specialty chemical businesses are regularly subjected to unforeseen changes in the availability and cost of raw materials, which make up a significant portion of their manufacturing costs. Any fluctuations in the price of these raw materials have a significant impact on business profitability. It is important to note that many of the raw materials procured by specialty chemical businesses have been commoditised and are traded globally on the open market daily. Dependency on imported feedstock by domestic speciality chemical businesses has resulted in opportunistic buying. This has essentially become an imperative of the specialty chemical industry to exploit cost saving opportunities and protect business profitability.

The recent global outbreak of the COVID–19 pandemic has had, and is expected to continue to have, an adverse impact on the sourcing of input raw materials for automotive chemical manufacturing businesses for the foreseeable future. Global supply chains have been acutely disrupted due to abrupt oversupply and inventory imbalances in end-user industries who halted production as a result of the COVID-19 pandemic (Consultancy.eu, 2020). This has led to a steep decline in demand for specialty chemicals and loss of sales revenue for specialty chemical businesses. This reduction in demand has accelerated the specialty chemical industry into an oversupply situation, which was already problematic pre-COVID-19 (Consultancy.eu, 2020). Specialty chemical businesses exposed to industries such as the automotive manufacturing sector are consequently suffering from the resultant impact of decreased demand.

With a phased resumption of automotive manufacturing and renewed demand in South Africa, automotive chemical businesses may experience shortages of raw materials, especially those sourced from Asia. This implies that specialty chemical companies may have to source input raw materials from alternative sources such as South America and Europe at higher prices.

4.3.3.3. Shift of specialty chemicals manufacturing to Asia

Many specialty and process chemical products require modification and adaptation to customer needs. It has therefore been advantageous to have production facilities close to a business's customer-base. From a global perspective, this has resulted in numerous specialty chemical businesses moving their operations to Asia, more specifically China, which has now become the biggest market for both chemical and automotive product manufacturing According to Pflug (2015), by 2010 China was already the largest chemical-producing country with the production of commodity and specialty chemical products tripling in the period 2000 to 2010. This phenomenal growth in chemical production in the Asia Pacific region has had a negative effect on competitiveness in numerous domestic markets with threats from cheaper direct imports out of China and the Asia Pacific region in general.

4.3.3.4. Environmental issues impacting specialty chemical businesses

As discussed in Section 4.3.3, environmental issues have strong implications for specialty chemical businesses. Due to the nature of chemical manufacturing, specialty chemical businesses are profoundly impacted by environmental regulations. Complex supply chain requirements regarding the handling of hazardous goods require chemical businesses to make conscious efforts to engage in business and operational environmental sustainability initiatives, especially in areas relating to the general handling of hazardous goods such as storage, transport, packaging, hazard classification, and labelling of chemical products. Environmental sustainability initiatives in these areas are consequently prone to additional costs that must be incurred by specialty chemical manufacturers.

4.3.3.5. Innovation in the specialty chemicals industry

Innovation has always been an integral part of the specialty chemicals industry as markets become more competitive. As an example, many specialty chemical businesses supplying industries such as the automotive industry have resorted to the development of innovative products as being the best way of increasing sales volumes and profit margins. According to Pflug (2015), developing innovative products is not that simple and many specialty chemical businesses have not achieved the required returns on investment in R&D. Although specialty chemical businesses continue to invest in R&D, the focus now tends to be more on improving their own internal innovation capabilities and spending money on R&D more effectively.

4.3.3.6. Competitive challenges from upstream commodity chemical businesses

Because margins in basic or commodity-type chemical products are lower than in the specialty chemical sector, there has been an active move by numerous upstream commodity producers to seek improved profitability in downstream specialties and services, adding to market competition and price pressure in the specialty chemicals segment. As specialty chemical industry businesses globally contend with product commoditisation and competitive challenges from new entrants, there have been numerous initiatives by specialty chemical businesses to augment their product offerings by providing specialised services in order to protect themselves from low-cost competitors. Consequently, numerous specialty chemical businesses' core capabilities have been transformed from solely product production to a more value-adding process augmented with application knowledge and customised customer technical-service programmes.

4.3.3.7. Globalisation in the specialty chemical industry

One of the most important trends in the global chemicals industry is that of globalisation. The chemical industry is globalising at a rapid rate and the dominance of established companies is being challenged by increasingly sophisticated emerging-market companies. With the opening of domestic markets to foreign competition, global demand for specialty chemicals has shifted to emerging markets where MNCs have invested in the establishment of local production. These competitive trends have consequently forced specialty chemical industries to globalise their supply chain capabilities and consolidate the industry through mergers and acquisitions, joint ventures, and alliances in order to drive business development and remain competitive (Lang et al., 2015).

4.3.3.8. Consolidation in the specialty chemicals industry

Although the global specialty chemical industry remains largely fragmented, there have been numerous consolidation initiatives, as discussed in Section 3.3.1. These have been in the form of either mergers or acquisition and have primarily occurred amongst large chemical industry players. Smaller specialty chemical companies are at a distinct disadvantage when attempting to target foreign markets, mainly because of a lack of EOS. According to Pflug (2015) the quickest way for smaller specialty chemical companies to achieve substantial growth is to either acquire or merge with a competitor. The acquiring company must take the following factors into consideration in the acquisition and/or merger process: profitability, operational capabilities and chemical segments within which the competitor company operates, and the general fit between the acquiring company's business and competitor company's business in terms of technology, operational capabilities, and regional footprint of the business.

4.4. THE SOUTH AFRICAN SPECIALTY CHEMICALS INDUSTRY

The South African chemicals industry has its roots in the supply of explosives to the mining industry in the late 1800s (Department of Environmental Affairs & Tourism, 2015:5). Numerous domestic chemical manufacturing plants were constructed in the early 1960s, with government support for strategic reasons, to counter sanctions and provide for import substitution. The type of government support provided was in the form of the implementation of import tariffs and protectionist policies such as import quotas. From a manufacturing perspective, none of these plants ever achieved EOS by global standards as they were only designed to service a small domestic market. They were also designed with limited automation and were therefore effectively labour-intensive, fulfilling one of the main objectives of the government: providing employment opportunities.

The specialty chemicals sector covers a range of technologies and applications, including adhesives, water treatment chemicals, leather chemicals, and automotive chemicals, to name but a few. It is, however, quite difficult to classify chemical companies as pure specialty companies as many product offerings have traits of both specialty and commodity chemicals. The industry consists largely of a few major domestic companies (such as Sasol, AECI, and Dow/Sentrachem) who have extensive manufacturing facilities and manufacture a diversity of sophisticated specialty products. There are also many smaller companies who are involved in manufacturing a wide range of speciality chemicals. The industry also hosts several MNCs who have manufacturing and trading operations in South Africa. Multinational companies (MNCs) such as Hoechst, Bayer, BASF, Henkel, Chemetal, Bostik, Shell, Unilever, Ciba Speciality Chemicals, du Pont, ICI, and CH Chemicals operate in South Africa as manufacturers and/or distributors. The domestic specialty chemical industry has thus been able to develop a noteworthy infrastructure with the potential to become world-class players in the chemical industry. With technology historically being licensed from first-world countries and subsequently adapted to suit domestic conditions, R&D efforts were mostly directed at implementation as opposed to product development. The fact that most of the technology had been either purchased or licensed from first-world overseas companies has placed the domestic industry in a position where it has been negatively impacted by technological change. In addition, the challenges of the high cost of capital equipment, exacerbated by a weak currency and volatile foreign exchange conditions, is a weakness in the domestic specialty chemical sector.

4.5. THE AUTOMOTIVE CHEMICALS INDUSTRY IN SOUTH AFRICA

The automotive chemicals industry is a complex interlinked specialised industry subsector of the specialty chemicals sector. Automotive chemicals can be described as *"products that are sold on the basis of their performance or function rather than their composition"* (IHS Markit, 2017).

Automotive chemical products are predominantly formulated products, the composition of which has an influence on the performance and processing of the customer's product. Suppliers of automotive chemicals to the automotive industry can be characterised as being unique in their position within the automotive value chain when compared to ACSs. The dichotomous relationship between automotive chemicals and the automotive industry is underpinned by the fact that automotive chemicals, which are predominantly non-dimensional products implying quantity where no physical dimension is applicable, are supplied into what is essentially a mechanical-engineering environment predominantly consisting of dimensional components, in other words quantity with physical dimension. Products and technical services provided by ACIS businesses in support of chemical product processes and applications play a vital role in vehicle-build quality in the OEM and ACS assembly processes.

From a manufacturing and supply chain perspective, there are a few important differences between OEM and ACS businesses, namely the complex and diffuse nature of formulated chemical product manufacture, the reliance of the industry on many different commodity suppliers for input raw materials (mostly imported), the concentrated market at the end of the supply chain, and the close connection between production processes and the quality and safety of the products produced. It is also important to recognise that the automotive chemical industry supply chain does not effectively mirror that of the supply of dimensional components and subassemblies to OEMs. This implies that the automotive chemical industry has its own unique set of supply chain complexities and challenges over and above the OEM supply chain requirements, which will be the topic of further discussion in the following sections.

4.5.1. Automotive chemical industry complexity and product classification

The complexity of the automotive chemical industry reinforces the need to have some sort of commercially-based classification system within the industry, which is perhaps not quite as straightforward as a 'scientific' classification of chemicals. Gaining some perspective as to what exactly automotive chemicals are and their role and importance in the automotive industry and how they are classified within the industry is important for automotive OEMs.

The problem encountered with the classification used by many chemical companies for their products is that they can be made up of numerous different levels simultaneously and can be confusing for user industries. The number of different levels commonly used and the individual segments are unfortunately not well defined. According to Pflug (2013), this issue is often further compounded by the tendency of chemical companies to use their own unique market definitions, in many cases with a questionable underlying rationale. The five most commonly used levels are: individual chemicals, chemical groups, functional segments, application segments, and end-use industry. In the case of automotive chemicals, they can be classified in the functional and application segments simultaneously. These products can also simultaneously be classified under the end-use segment, using the customer industry as a classification level, in this case the automotive industry.

Table 4.1 depicts the functional, application, and end-user industry-classification levels that can be applied to the automotive chemical industry. It is evident in this classification that the trend is towards a smaller number at the end-use side (number of industries) as opposed to classifying many thousands of individual chemicals.

END USE INDUSTRY	FUNCTIONAL SEGMENT	APPLICATION SEGMENT
AUTOMOTIVE	Metal Pre-treatment	Sealants (pumpable - extrudable)
	Bonding	Screen Washers
	Seam Sealants	Glazing sealants
	Direct Glazing	Structural body stiffeners
	Preformed Parts	NVH Pillar Fillers
	Anti-flutter & Spotweld Sealants	Metal Cleaners
	Profiled Sealants	Metal Pretreatment
	Acoustic Coatings	Acoustic Coatings
	AntiCorrosion Waxes	Interbox waxes
	NVH Coatings & Pads	Underbody and Sill Coatings
	Underbody Coatings	Antiflutter Adhesives
	Trim Adhesives	NVH Body Panel stiffeners
	Hem Flange adhesives & Sealants	Bonding

Table 4.1: Classification levels applicable to the automotive chemical sector

Source: Researcher's own illustration of a typical classification of automotive chemicals for the automotive chemicals industry. Adapted from Pflug (2013)

Functional segments are normally used in specialty chemical companies that offer solutions for customer-related technical problems as opposed to proving specific chemical components. At this level, a considerable amount of customer knowledge is required where there is a substantial amount of interaction and communication between supplier and customer technical staff.

The application segment also requires a high level of understanding of the customer industry. In this scenario, however, technical problem-solving knowledge-ownership remains solely in the hands of the supplier. At the functional segment level, problem-solving knowledge tends to be shared between supplier and customer. The application segment level of classification will therefore ideally be applicable to a solution provider in the specialty chemical industry.

The end-user segment can be useful in two scenarios. The first scenario is generally where the specialty chemical business focuses exclusively on the sale of chemical products without much technical service. The second scenario is applicable in the case when supplier businesses carry an extensive knowledge of the end industry where just about all the product, process, and application knowledge reside with the supplier, with the customer only providing the production facilities. In summary, the more customer-or application-focused the chemical products are, the more an application-oriented level will be a suitable classification for the chemical supplier.

4.5.2. Vehicle production processes

To understand the role of chemical technology in the automotive industry, a brief overview of the vehicle production process flow and the chemical operations within the vehicle production process is provided in this section.

The vehicle assembly process is undertaken in three main areas: the body-in-white, paint process, and trim-and-mechanical assembly lines. The process begins with the framing of vehicle body shells on the body assembly line. Adhesives and sealers are applied to critical areas of the body assembly to seal joints and bond metal to metal surfaces. The assembled vehicle body shells, which are coated with corrosion protection oil and debris from the welding processes, are moved to the paint processing area where they are cleaned and treated with specialised surface treatment chemicals that provide corrosion protection and prepare the metal surfaces for painting. Following the application of an electrolytic paint primer and a primer-surfacer coating supplied by automotive paint suppliers, a variety of paint shop sealers are applied to the interior and exterior of the vehicle body to seal joints to prevent water and dust ingress as well as protect the underside of the vehicle from stone chip damage and corrosion once the vehicle assembly is complete after which a colour topcoat is applied. The coated and sealed vehicles are then moved to the trim-and-mechanical assembly area where wax is applied to enclosed sections of the vehicle in support of corrosion prevention in areas which are difficult to access. Chemical adhesives are used to affix trim components such as door panels and carpets. Finally, windscreens are bonded into the window aperture with a specialised high-strength polyurethane product as the windscreen forms an integral part of the vehicle structural strength.

4.5.3. Automotive chemicals portfolio and applications

A typical automotive chemical technology portfolio used in vehicle manufacturing processes in South African OEMs is depicted in Figure 4.2.

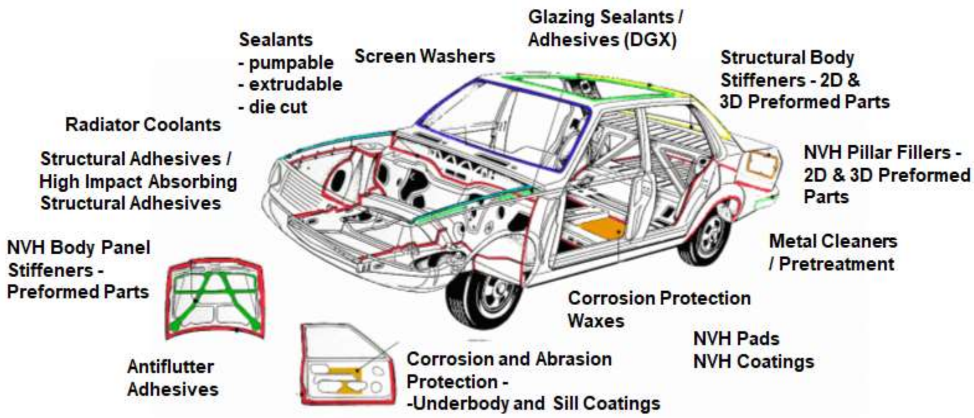

Figure 4.2: Typical automotive chemicals technology portfolio

Source: Researcher's own illustration

This strategic portfolio of automotive chemical technologies is commonly referred to in the automotive industry as "Automotive Adhesives, Sealants, and Surface Treatment" technologies. The product applications making up these technology groups are depicted in Figure 4.3.

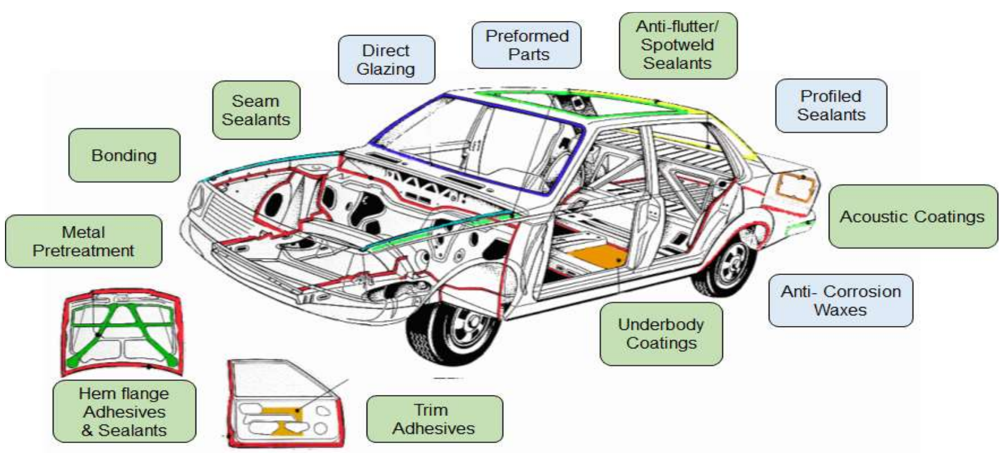

Figure 4.3: Typical automotive chemical applications

Source: Researcher's own illustration

The development of customised solutions for sealing, bonding, and surface treatment applications requires an in-depth knowledge of vehicle assembly and is a prerequisite for ACIS businesses as every product must fit into a complex, mostly-automated automotive production process. All chemical processes and application technologies are directed at making the automotive customers production processes more efficient, resulting in higher quality products for the end-user. This is achieved by ensuring that chemical products, customer applications, and processes meet the highest standards of reliability in the vehicle manufacturing process. Furthermore, specialty chemical suppliers in the automotive industry use their expertise to provide solutions for automotive vehicle design changes, environmental challenges in the manufacturing process, and process efficiency improvements. According to IHS Markit (2017), products and services in the specialty chemical industry require a high level of technical knowledge and expertise supported by ongoing innovation.

4.5.3.1. Surface treatment technologies

Surface treatment technologies are designed to clean and seal metal and multi-substrate surfaces to protect against corrosion and improve adhesion of paint on vehicle surfaces. The automotive industry's focus on weight reduction on vehicles means that they are manufactured from mixed steel (different types of steel) and lighter materials, such as aluminium, which require tailormade specialised surface treatment approaches to prevent corrosion on light and mixed metal substrates.

4.5.3.2. Specialised adhesives

Specialised adhesives contribute to the simplification of complex manufacturing processes during the body-in-white framing process. Structural adhesives offer great potential for body-weight reductions They also contribute towards improvement of vehicle quality by increasing body stiffness and reducing vibrations and noise (noise, vibration, harshness, and acoustics). Paint-shop applied sealers in the form of underbody coatings (UBC) provide long-term corrosion protection from rust to underbody chassis and underbody substrates from environmental road abrasion. Seam sealing applications cover visible seams in the interior and exterior of the vehicle to protect the vehicle from dust and water ingress and electrochemical corrosion. Liquid-applied sound damper (LASD) technology, applied robotically, replaces manually-applied bitumen sound-damper pads, creating a more comfortable inner-car environment.

4.6. KEY ASPECTS OF SOUTH AFRICAN AUTOMOTIVE CHEMICALS BUSINESSES

Automotive chemicals can be characterised as niche products with very specific product applications and, as such, automotive chemical industry businesses rely largely on factors like technology, product patents, and high development costs to maintain high entry barriers to limit competition and sustain higher levels of business profitability.

4.6.1. Risks and profitability

Automotive chemical industry businesses are somewhat unique and are exposed to specific business risks which may inhibit their ability to achieve and sustain profitability. Industry market share, the balance between supply and demand, industry competitive dynamics, and end-market demand conditions play a significant role in ACIS business profitability. Additionally, because of the dynamic and evolving nature of automotive specialty chemical products, new developments in technology and products can challenge current product ranges and pose a risk to the business's profit margins.

The ability of ACIS businesses to offer a broad range of products and services in subsegments such as the automotive chemicals subsector constitutes a competitive advantage and offsets exposure to some of the industry risks. A broad product portfolio of diverse products is deemed to lower business risks in terms of product obsolescence and commoditisation. In other words, if an ACIS business can address buyer needs by offering a wide range of product solutions then the business will more than likely be able to hold a more economically stable market position than businesses offering a single product. This would enable the business to secure better profitability margins in the longer term.

Competitive risks that emanate from the development of alternative applications and technologies can potentially result in product obsolescence and are therefore closely associated with the dynamics of end-user industries such as the automotive manufacturing industry. Automotive chemical industry supplier (ACIS) businesses therefore need to have a good understanding of global chemical product usage trends as well as the inherent stability of current technologies and applications that drive the demand for these products.

From an economic sustainability point of view, the stability of operating margins in the medium to long term is a clear indicator of specialty chemical businesses' pricing power. It is imperative that specialty chemical businesses position themselves to be able to invest substantially in R&D, and specifically in product development initiatives, to ensure the businesses' particular growth objectives are met. Automotive chemical industry supplier (ACIS) businesses are particularly susceptible to variations in business input costs, which would include raw materials, energy, and labour. Automotive chemical industry supplier (ACIS) businesses are generally able to offset the impact of higher input costs by increasing their selling prices to maintain or improve profitability. In South Africa, this has been a particularly difficult challenge due to global and domestic competitive pressures. This therefore implies that the ability of ACIS businesses to offset input cost increases through productivity gains or alternative cost reductions becomes significantly more important in order to maintain profit margins.

Foreign currency risk is another important aspect which is peculiar to South African specialty chemical businesses in terms of achieving economic sustainability. These foreign currency risks arise out of the fact that the businesses' major input costs are denominated in various foreign currencies. As an example, this would apply to domestically-based businesses selling into the domestic South African market while importing large volumes of raw materials. This foreign currency risk can also emanate from unhedged liabilities in businesses earning their revenues in local currency. Domestic ACIS businesses that are affiliates of major global entities do, however, have a significant advantage over purely domestic businesses in terms of the support that is likely to be forthcoming from the parent entity, over and above the domestic businesses' own fundamental technological and financial strengths.

While the use of sustainable technology, together with the ability to consistently introduce new products into the market, probably will have the maximum bearing on the economic sustainability of specialty chemical business, one should not lose sight of the importance of cost structure and diversity of product mix. It can therefore be concluded that business stability and profitability in ACIS businesses is key to understanding their pricing power, which is a primary antecedent of business long-term economic sustainability.

4.6.2. The importance of operating efficiency in automotive chemicals businesses

Operating efficiency is a prime contributor to the economic well-being of ACIS businesses. Factors such as flexibility in production, success in passing raw material cost increases to customers, the inherent flexibility of the business's cost structure to be able to absorb input cost and demand volatility, and the business's relative cost position compared to industry peers are important contributors to sustained business profitability. This implies that, irrespective of prevailing market conditions, it is incumbent on ACIS businesses to operate at high efficiency levels to be able to generate the required business profit margins.

4.6.3. Automotive chemical industries and the environment

Due to the complexity of the automotive chemical industry, which includes a wide range of stakeholders within the supply chain, there are significant levels of environmental concern in the industry. The fact that there are several environmental impacts in various stages of the specialty chemical value chain as well as significant health impacts with the handling and application of chemical products, it is understandable that primary areas of environmental concern have been linked to product innovation to provide more environmentally-friendly specialty chemical products.

Given the fact that environmental regulations are becoming stricter globally as a result of rising environmental pollution concerns, the investments that specialty chemical businesses must make to ensure compliance with global and domestic environmental concerns and support the industry to become more environmentally sustainable cannot be underestimated. Automotive chemical industry supplier (ACIS) businesses will therefore need to make the necessary financial investments in order to comply with the numerous legislative requirements.

4.7. BUSINESS TRENDS IN THE SOUTH AFRICAN AUTOMOTIVE CHEMICALS INDUSTRY

Globalisation has created numerous challenges for ACIS businesses in different areas which, if overcome, can contribute to the future success of the domestic ACIS businesses. In an early study, (Barnes et al., 2008) highlighted, changes in business ownership, intensified competition, and value chain adjustments as being indicative of some of the more important challenges that the South African automotive supplier sector has had to cope with.

4.7.1. Business ownership changes in the domestic automotive chemical sector

Globalisation has resulted in an increase in foreign trade and investment which has led to locally-owned OEM businesses being incorporated into MNCs. Consequently, multinational vehicle producers now influence what vehicle models are produced and in which regions and countries (Black, 2009). This decision-making power has had significant implications for ACIS businesses as global OEM engineering/purchasing departments now make decisions on what chemical technologies and products will be used for their vehicles, from whom these products will be procured, and the target pricing. As markets become more global, domestic OEM customer businesses have become increasingly more unwilling to deal with ACIS businesses that are unable to deliver the same products at the same quality level and at comparable costs available to their parent-companies. This implies that, if domestic ACIS businesses are not part of MNCs or do not at least have technology links to multinational automotive chemical companies, there is a high probability that existing business relationships will be realigned, resulting in products being sourced either from locally-based international subsidiaries or imported directly. The majority of ACIS businesses in South Africa have consequently migrated from locally-owned operations producing automotive chemical products under technology license agreements with MNCs to fully-fledged MNC subsidiaries.

4.7.2. Intensified competition

It is widely acknowledged that the competitive pressure on domestic automotive suppliers, especially from an OEM cost expectation perspective, is extremely high. Roland Berger et al. (2008) believed automotive suppliers are facing one of the most competitive environments ever experienced and that competition is expected to continue to increase. A study conducted by Comrie et al. (2013) of B&M Analysts pointed to the fact that Tier 1 and Tier 2 automotive supplier businesses have been heavily subjected to a profitability squeeze as early as 2011 when average operating profit decreased significantly, according to the South African Automotive Benchmarking Club (SAABC) database. At lower tier level, domestic small- and medium-sized enterprises (SMEs), both multinational and domestic automotive supplier businesses, do not enjoy the same advantages as businesses with multinational linkages and are therefore more prone to business risks inherent in the automotive industry (Comrie et al., 2013).

With South African automotive OEMs having to improve the competitiveness of their products in the global arena in order to survive, they have been pressurised to focus on the competitiveness of their ACSs. When automotive supplier businesses have been not able to meet OEM cost-down targets, OEMs have turned to cheaper imports from regions where suppliers have significantly lower cost bases (Ambe & Badenhorst-Weiss, 2010).

Although some automotive chemical products have been subjected to the direct import of low-cost chemical products, imports of automotive chemical products have not yet become a priority for OEMs for several reasons, such as the nature of automotive chemical products in terms of their hazardous nature, handling requirements, and limited shelf life, especially when being exposed to temperature extremes experienced during shipping. OEMs still expect ACIS businesses to meet global pricing targets set by OEMs, notwithstanding domestic economic conditions. Automotive chemical industry supplier (ACIS) businesses are therefore expected to absorb ongoing input cost increases with little opportunity of being able to pass these costs through to OEMs in the form of higher prices. This cost-reduction pressure, without the ability to pass on their costs through the value chain, has consequently squeezed ACIS business profit margins. This has led to a situation where businesses such as ACISs are increasingly finding themselves in a position where there is very little incentive to make costly investments to improve their operating systems. Automotive chemical industry supplier (ACIS) businesses are being pressured by OEMs to reduce prices and accept lower margins when they could be focusing their efforts on non-automotive markets without having to expend the effort and cost required to implement these systems. These automotive value chain pressures have consequently created an uncertain environment for automotive chemical industry supplier businesses and brought their long-term economic sustainability into question.

4.7.3. Price reduction pressure and automotive chemical industry supplier business profitability

Because of the globally competitive automotive industry environment, it is incumbent on automotive suppliers to continuously search for ways to reduce costs in their own respective value chains while OEMs continue to place pressure on automotive suppliers to reduce prices. In doing so, OEMs do however need to be vigilant of the risk of eroding their domestic supplier base with vigorous cost cutting strategies while keeping in mind that supplier businesses must make reasonable returns on investment (ROIs) in order to be economically sustainable in the long term.

As mentioned in the previous section, and in the context of this study, domestic ACIS businesses have also been subjected to price-reduction demands from OEMs resulting in a profitability squeeze. Value chain dynamics tend to have a greater impact on domestic lower-tier and non-tier suppliers such as ACIS businesses, especially those who do not benefit from the advantage of having multinational linkages. Price-reduction pressures impair the ability of these businesses to sustain healthy profitability levels, which systematically leads to less reinvestment in these businesses with the consequence that, as costs escalate, efficiencies are jeopardised.

4.7.4. Domestic capital investment trends and economic sustainability

According to Comrie et al. (2013), negative investment trends by primary automotive suppliers in their operations are a major concern as these trends can have a significant bearing on automotive suppliers' ability to improve their operational competitiveness. As supplier costs continue to escalate, lower levels of profitability will generally result in less reinvestment in business improvements.

According to Lautier and Moreeau (2012) investment decisions are a net result of an evaluation of macro-economic factors and principally determined by demand volume and market size as opposed to investment risk (which includes political and macro-economic uncertainty). The futuristic nature of investment is therefore characterised by uncertainty, with respect to future business profitability. It is important, however, to keep in mind that the impact of uncertainty on investment behaviour will vary across businesses. Individual business considerations such as fixed costs, degrees of irreversibility of the investment decision, and risk aversion also play a significant role in investment decision-making at business level.

From an ACIS business's perspective, risk is a reality in the South African business environment and in the globalised South African automotive industry in which it operates, the net result being that ACIS businesses tend to be averse to domestic investment under the prevailing macro-, meso-, and micro-challenges being experienced. For ACIS businesses, the prevailing macro-economic conditions in South Africa, namely low business profitability and unattractive growth prospects in the medium term, provide a clear perspective of the adverse conditions facing ACIS business investment decision-makers. Revenue growth is under pressure due to stagnant automotive production output. Domestic automotive production output is mainly driven by export market sales while domestic sales are shrinking and ACIS business profitability is coming under increasing pressure. This means ACIS businesses are only able to consider investing when business profit margins allow and then, in most cases, investments are more focused on sustaining operations as opposed to investing in the creation of innovative opportunities in the long term.

Hartogh (2016) pointed out that capital-intensive subsectors such as the specialty chemical industry need to have continuous investment to remain competitive in their respective GCVs. As previously discussed, the profile of South African automotive suppliers has become increasingly more international with competitiveness measured relative to globalised supply chains and investment is deemed to be a means of becoming more efficient in order to remain cost competitive. This implies that for automotive businesses (OEMs and automotive suppliers) to grow their market share and remain viable, extensive capital investments need to be undertaken.

In the domestic automotive chemicals industry, investments have largely been focused on expansion, for example to serve greater demands from OEMs, achieve EOS, improve efficiencies, and improve business profit margins. Investments directed at plant, machinery, and upgrading technologies to develop innovative product offerings in order to gain premium prices have been limited. Investments that have taken place have greatly been directed at process upgrades to achieve efficiency and cost competitiveness. The low levels of investment in domestic R&D can be attributed to the fact that domestic ACIS businesses are subsidiaries of multinational parent-companies, with product and technology R&D initiatives being undertaken at business headquarters or strategically-placed international R&D centres.

One can therefore question why ACIS businesses are not investing in South Africa. According to Hartogh (2016), the principle of uncertainty has a major influence on investment decision-making. Automotive chemical industry supplier (ACIS) businesses are traditionally averse to uncertainty and generally tend to delay any capital expenditure decisions in the face of uncertainty in the business environment in which they operate. This more than likely comes about as a result of investment decisions being future-oriented, with uncertainty diminishing the business's ability to predict the future profitability of investments. The fact that macro-economic factors such as GDP, rates of exchange, and interest rates are difficult to forecast with any accuracy tends to obscure expectations of future outcomes, resulting in investment decisions being deferred.

This brief discussion on capital investment has, in the context of this study, attempted to highlight the importance for ACIS businesses to be able to generate sufficient profitability to support investments in their respective businesses to ensure long-term sustainability.

4.7.5. Domestic economic and political environment challenges

In the current automotive chemicals business environment, economic and political challenges have created difficulty for ACIS businesses in South Africa in terms of how to simultaneously cut costs, grow their business, retain a competitive advantage, and sustain profitable financial returns. This short- to medium-term approach has developed into a priority strategy for most ACIS businesses and can possibly be attributed to the perception of future uncertainty in the automotive industry and the risk of losing their competitive positions to other businesses, both domestically and internationally.

In the current economic climate, both domestically and internationally, where vehicle production is being curtailed, ACIS businesses cannot continue to only rely on growing revenue through increased vehicle volumes (which is dictated by OEMs) and price increases (stringent OEM cost-down management providing limited opportunity to increase prices) to improve absolute profitability. In order to be economically sustainable in the long term, ACIS businesses need healthy profit margins and the challenge for ACIS businesses is therefore to find innovative ways to reduce input and overhead costs and improve operating efficiencies (Comrie et al., 2013).

4.7.6. Global chemical industry pressures on domestic automotive chemical industry supplier businesses

Over the past decade, the global chemical industry has weathered one of its worst economic storms ever experienced in the industry (Oh, Karimi & Srinivasan, 2008; Kotlik et al., 2017). With chemical manufacturing activities migrating to low-cost regions such as Asia and Eastern Europe creating excess capacity in these newly-established regions, product prices have followed a downward trend as traditional geographic competitors frantically compete to gain or retain market shares.

With the globalisation of the specialty chemical industry, increasing competition (especially from Asia and the Middle East), and customers becoming more demanding in terms of service from their chemical suppliers, pressures on cost are on the rise. On the supply side of the specialty chemicals, the cost of input raw materials is becoming more volatile, together with fluctuating input raw material costs and energy playing a significant role in pressurising chemical company margins. Fluctuations in prices of commodities such as crude oil and natural gas, which account for a large proportion of a chemical company's manufacturing costs, are having a substantial impact on the chemical businesses' profitability and economic sustainability.

Feedstock prices have escalated with detrimental effects to downstream chemical companies' profit margins. As previously alluded to, due to intense business competition in the automotive space, domestic ACIS businesses have experienced difficulty in passing on feedstock price increases to automotive OEMs. Having survived economic downturns, ACIS businesses now must survive the new economic era where they are turning to their operations and supply chains as a means of improving their business profitability.

4.8. AUTOMOTIVE CHEMICAL INDUSTRY SUPPLY CHAINS

Supply chains are undoubtedly a significant determining factor of ACIS business competitive performance. In most cases, it is the part of the business which faces the highest level of ineffectiveness as it involves the input materials to the finished products that are the business's output to their customer base. This view of supply chains is supported in a study by Sakuramoto, Di Serio and de Vicente Bittar (2019), which concluded that supply chain inefficiency was a major cause of low competitiveness in the domestic automotive industry in Brazil, underpinning the important contribution of supply chains and SCM to business economic sustainability.

Managing a supply chain effectively requires meticulous planning, sourcing, manufacturing, and delivery of goods to fulfil customer needs, which is the major determinant of business costs and quality and involves supply chain elements which are fundamental to the success of businesses (Wins, 2018). According to Williamson, Given, & Scifleet (2018), the effective management of supply chains is imperative in every industry that is reliant on partners and suppliers but perhaps none as critical as in the chemical industry where substandard supply chain performance can have a detrimental impact of overall business profitability.

Growing international competition, industry consolidation, and raised customer expectations have exerted further pressure on revenues and margins of ACIS businesses. These trends are pressurising ACIS businesses to improve their efficiency and effectiveness specifically on their end-to-end supply chain. Within the framework of these challenges, automotive chemical businesses are expected to pursue profitable growth and generate value for shareholders by providing competitive returns.

4.8.1. Supply chain competitiveness

Automotive OEMs have realised that material and service inputs from their supply base plays an important integral role in being able to meet their customer's demands (Monczka et al., 2020). Automotive OEMs demand higher quality goods, faster delivery, and products and services that are customised to their particular needs at a lower total cost. As OEM suppliers, ACIS businesses need to become faster, more agile, and more flexible in getting the right quality products and services to customers at the right time, cost, place, and quantity. These new competitive challenges have led to an increased focus on ACIS businesses' supply chain capabilities. There are numerous factors that drive businesses to emphasise the concept of SCM. Perhaps one of the most important factors is that the modern business's supply chain ability to react rapidly in the face of major disruptions will lessen the chance of losing sales revenue (Monczka et al., 2020).

4.8.2. Supply chains and business profitability

With profitability considered to be the primary driver of shareholder value, studies have shown that supply chains, and especially chemical industry supply chains, play an important role in influencing business profitability (Johnson & Templar, 2011; Jin, Jeong & Kim, 2016; Mahmoodi, Hofer, Losbichler 2016). According to Kotlik et al. (2017) of the Boston Consulting Group, improvement in specialty chemical businesses' supply chain efficiency and effectiveness can make a significant difference to chemical companies' financial performance. Spiralling competitiveness and complexity in the chemical and automotive industry has shifted the contemporary focus of domestic automotive chemical manufacturing businesses to improving their own profitability in order to secure their future economic sustainability. It is evident that competition is no longer between businesses but rather between the supply chains of businesses. One can therefore argue that businesses that can establish efficient, cost-effective supply chains will be able to secure a competitive advantage.

4.8.3. Unique aspects of automotive chemical industry supply chains

From an ACIS business's perspective, operating within the greater globalised automotive supply chain is fraught with difficulty. Over and above the pressures emanating from automotive OEM supply chain, chemical supply chains have their own unique set of challenges. The discussion in this section is primarily focused on providing some insights into chemical industry supply chains and examines several important elements which would necessitate management approaches that differ from those of automotive industry supply chains and that can potentially complicate the integration of ACIS supply chains into the globalised automotive supply chain.

From an ACIS business perspective, integrating ACIS business supply chains into global automotive supply chains makes logical sense in the current business environment. While integrating ACIS business supply chains internally is a relatively straightforward process, the external integration of ACIS and OEM business supply chains may not be that simple. Although there are many similarities between automotive and chemical industry supply chains, there are some distinct differences that contribute to challenges in integrating the two supply chains.

4.8.4. Distinctive characteristics of ACIS business supply chains

According to Kotlik et al. (2017), chemical supply chains demonstrate several characteristics which are distinctly different from automotive industry supply chains and that justify the use of management approaches that differ from those of the automotive industry. The following discussion contributed to the study in that, by examining some of these unique characteristics, it provides an insight into the constraints and challenges that ACIS businesses must grapple with in the integration process.

There are four key areas in which unique ACIS business supply chain characteristics exist, namely material sourcing, manufacturing operations, transportation management, and demand management. Figure 4.4 depicts typical automotive chemical supply chain processes and activities highlighting these four key areas, which will be discussed briefly.

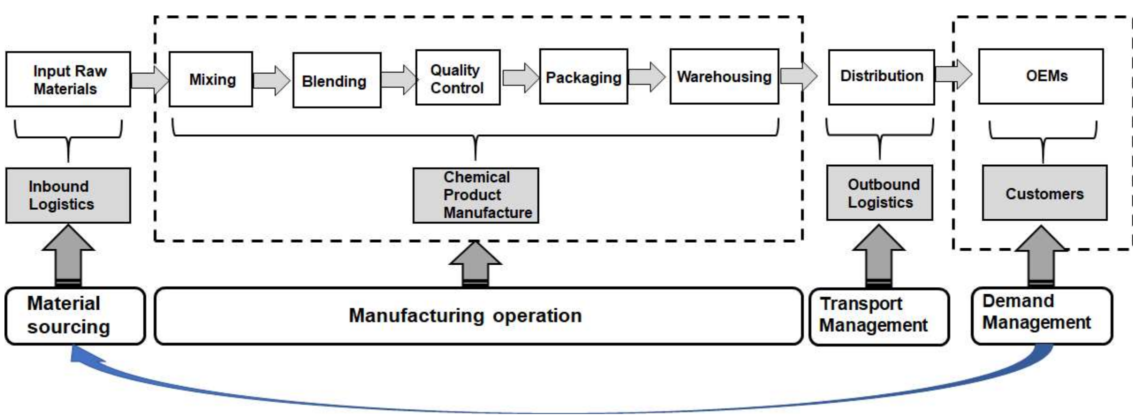

Figure 4.4: Core automotive chemical supply chain processes & activities

Source: Researcher’s own illustration

4.8.4.1. *Raw material sourcing*

According to Oliveira (2014), it was the opinion of Dilshad Booley, industry analyst at Frost & Sullivan, that the most important contemporary challenge in the South African specialty chemicals industries are the large volumes of imported chemical raw materials used which are subject to exchange rate fluctuations, port delays, and stringent regulations on emissions and waste that contribute to the increasing costs of chemical products.

ACIS businesses source and procure most of their raw materials in non-bulk form, except for a few domestically available solvents and inorganic acids. The main reason for this is that approximately 80% of the raw materials used in ACIS products are imported and the quantities required to produce OEM products based on domestic vehicle production do not justify bulk volume purchases. Furthermore, each domestic OEM has its own specified product requirements with few common raw materials, thereby forcing domestic ACIS businesses to carry an extensive range of raw materials. Many of the input raw materials used have been commoditised and are traded on a 24/7 basis worldwide.

Although cost-saving buying opportunities are exploited to some extent by ACIS businesses, consistent technical quality and on-time delivery is a major consideration when buying decisions are made (Kotlik et al., 2017). Many of ACIS businesses' product formulations are extremely sensitive to raw material variations as well as the fact that manufactured product outputs are strongly dependent on the content of the raw materials used. The buying decision-making process is therefore dependent on technical product evaluations based on extensive laboratory sample testing. This process assures the required raw material quality before technical approval is given to purchase raw materials from a new source. Processes such as this are uncommon in non-chemical industries like the automotive industry where the manufacturing process does not involve mixing and blending.

4.8.4.2. *Automotive chemical manufacturing operations*

ACIS businesses use non-discrete batch manufacturing processes with multiple manufacturing formulation options to produce finished and intermediate specialty chemical products. Batch processing is typically the manufacturing method of choice to produce specialty chemical products for the automotive industry. This is vastly different to the continuous manufacturing processes used in the automotive industry, which involves moving a single work unit (vehicle) at a time between each step of the process without any breaks in time substance or sequence. Batch processing is the manufacturing method used to produce specialty chemical products where finite quantities of product are produced over a few hours or days. The batch process typically consists of adding measured quantities of starting raw materials into a mixing or blending vessel. This is followed by a series of unit operations (mixing, heating, reacting, and cooling of the mixture) which takes place at predefined intervals (see Figure 4.5). Products, by-products, and waste streams are stored for later controlled disposal. Mixing vessels are cleaned and prepared for the next batch of product to be manufactured. Production planning and scheduling of formulated chemical product manufacture therefore becomes a complex task.

Raw material variability and product homogeneity impact product quality and are dealt with by means of adjustments to each batch of product to within prescribed specification limits. From a product quality perspective, when quality issues arise the inability to always link each finished product to a corresponding raw material, especially when the raw material is stored in bulk, can hamper root-cause identification efforts. Automotive manufacturers do not have to contend with these limitations since their manufacturing process entails the use of discrete parts, a fixed bill of materials (BOM), single-product output, and an assembly-type process.

Automotive chemicals manufacturing plants usually consist of complex networks of sub-plants for mixing, blending, reactions, and packaging. In many cases, operation of these plants requires various-sized storage tanks for the temporary storage of raw materials, work in progress, and bulk storage of finished goods inventory awaiting packaging (see Figure 4.5).

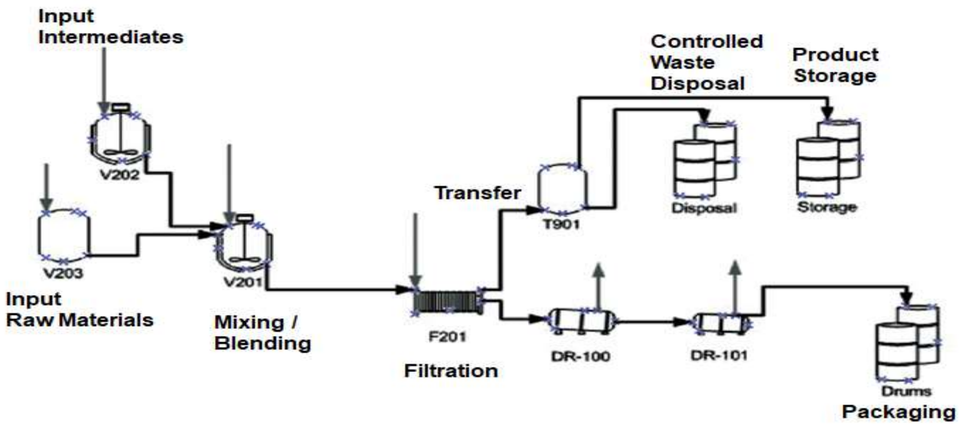

Figure 4.5: Typical specialty chemicals batch manufacturing process

Source: Researcher's own illustration

The differing properties, incompatibility, hazardous nature, and specific storage requirements of many of the products produced means that a wide array of specialised storage vessels is required. Many of the specialty formulated products produced for the automotive assembly plants are deemed to be 'raw materials' by automotive OEMs, in other words a B2B sale. Automotive chemical industry supplier (ACIS) businesses generally adopt a make-to-stock approach, which means having to maintain higher inventories in their respective supply chain networks compared to non-chemical manufacturers such as ACSs (Kotlik et al., 2017).

4.8.4.3. Logistics management

Logistics management of products across chemical supply chains is more complex than in non-chemical industries such as the ACS industry. Co-ordinating the transportation of both inbound (raw materials) and outbound (finished products) materials is fraught with complexity. Various modes of transportation are used (such as tanker ships, airfreight, and road transport from ports) to support the movement of their materials. The hazardous nature of chemicals means that their movement is regulated by numerous environmental and safety policies, adding to the complexity and cost. Additionally, the incompatibility and immiscibility of chemical raw materials and products implies that the various transportation modes are subjected to stringent maintenance requirements. In contrast, most non-chemical industry manufacturers deal with raw material and finished goods which are chemically inert and not subject to the same regulatory requirements.

Domestic automotive chemicals manufacturing businesses are highly dependent on external logistics providers as the increasing trend in the chemical industry is to outsource logistics tasks to third-party logistics providers in order to optimise their costs. Domestic automotive chemical manufacturing businesses therefore require logistics providers who are capable and qualified to transport hazardous goods. Notwithstanding the plethora of logistics providers in South Africa, there is a dearth of logistics providers who can transport hazardous chemical products timeously and safely. Unlike the transportation of dimensional components, the transportation of chemicals creates a whole new set of challenges for the industry.

Automotive chemical products are considered to be hazardous and are therefore controlled by numerous pieces of legislation, both domestically and internationally. The South African chemical industry is controlled by numerous regulations, which include the Occupational Health & Safety Act 1993, and the Hazardous Chemical Substances Regulations and Hazardous Substances Act of 1973. This compliance is extended to third-party logistics providers who transport automotive chemicals on behalf of ACIS businesses and who are obliged to comply with the processes and systems as determined by the various pieces of hazardous chemicals legislation. Domestic ACIS businesses with international parentage are also obliged to comply with international regulatory requirements enforced by parent companies through stringent auditing processes (Jenkin, Molebatsi, Ramsurup & Rosenberg, 2016).

4.8.4.4. Demand management

Managing OEM demand is probably the most important and challenging aspect for ACIS businesses. Automotive chemical industry supplier (ACIS) businesses face greater difficulties in predicting and responding to changes in OEM demand. While fluctuations in automotive vehicle production are the result of general economic volatility, there are also certain industry factors that come into play. Domestic labour volatility and seasonality play a role, as does export destination demand. In many cases, ACIS businesses typically supply many OEMs, with each OEM having divergent market dynamics and product specifications. This, coupled with numerous tactics employed by automotive OEMs, compounds the complexity of demand management for ACIS businesses. The objective of demand is to be able to co-ordinate sources of demand in such a way that the productive system can be used efficiently to deliver products on time (Kumar, 2016). According to Kumar (2016), inventory plays an important role in demand management. In dealing with uncertain markets, ACIS businesses are often placed in a position where they must consider a trade-off between the cost of excess inventory and the cost of lost sales.

While components form an integral part of the OEM production BOMs products supplied by ACIS businesses are excluded from vehicle-build BOMs. Automotive chemical industry supplier (ACIS) business product usage forecasts are generally derived from average product usage per vehicle and therefore rely heavily on the accuracy of OEM vehicle forecasts provided by the respective OEMs. While OEMs endeavour to provide short-, medium-, and long-term vehicle production forecasts to ACIS businesses, the volatility alluded to implies that this approach is unlikely to be adequate. Automotive chemical industry supplier (ACIS) businesses need to anticipate and react to changes in OEM demand timeously. This involves a crucial element, which is the relationship between OEMs and their suppliers, in order to reduce supply chain risk from an automotive chemical's perspective. This requires OEMs to move away from strictly contractual relationships with ACIS businesses to one of close operational collaboration in order to manage demand fluctuations. Countering volatility and supply risk remains a challenge for ACIS businesses.

4.8.4.5. Quality performance

In an early study by Black (2009), he raised the issue of OEM expectations of automotive component businesses to minimise the supply of out-of-specification components. This issue can easily be extrapolated to ACIS businesses. The dimensional characteristics of components make this task a lot simpler for component suppliers in terms of measuring the quality of supply as opposed to measuring the quality of supply of non-dimensional chemical products. It is a well-established fact that input raw materials possess a certain amount of quality and composition variability which make chemical product outputs dependent on the quality of the raw materials used. Product quality decisions in ACIS businesses are therefore supported by the businesses' technical resources which are able to determine the fitness for use of every product produced, based on comprehensive laboratory testing. The use of processes such as these are generally not employed in non-chemical industries like the automotive industry.

4.8.4.6. Environmental challenges, awareness, compliance, and standards

Automotive assembly plants globally are facing increased pressure in the environmental arena (Ferraris, 2019). Environmental awareness in automotive production has steadily become more of a priority for OEMs that have had to realign their business operations and supply chain infrastructures to cope with increasing domestic and global regulatory legislation and voluntary environmental guidelines (Karukar, Unnikrishnan & Panda, 2018). The environmental impact of the automotive manufacturing process is significant, especially the paint-shop process, which is the primary generator of air emissions in the form of hazardous air pollutants (HAPs), which include volatile organic compounds and hazardous waste.

Several environmental management standards have been developed by the International Standards Organisation (ISO). The ISO 14000 series of standards is related to environmental management and responsibility and is directed at assisting organisations to minimise potential negative impacts on the environment and comply with any domestic environmental regulations. All South African OEMs maintain compliance with ISO 14000 and other international and regional standards and, as such, expect their supply base to comply with similar standards. This is particularly applicable to ACIS businesses with respect to the use of harmful and/or banned chemical substances in their respective production processes and products.

Because automotive chemical products have a significant impact on the environmental integrity of automotive paint-shop processes, ACIS businesses play an important role in contributing to the reduction of the environmental impact of OEMs. According to Ferraris (2019), one of the most effective means for ACIS businesses to reduce emissions and hazardous wastes is by substituting hazardous chemicals and volatile organic compounds in their product formulations. Ferraris (2019) suggested that, in collaborative supplier manufacturer relationships where product expertise resides with the supplier, as in the case of ACIS businesses, ACIS businesses can make an important contribution to improved environmental performance. With concomitant knowledge of the OEMs manufacturing operations, ACIS businesses are therefore well-placed to better understand the types of products that will best serve the customer’s needs.

4.8.5. Extraneous automotive chemical industry supplier business supply chain considerations

The strong linkages between the automotive chemical sector and the automotive manufacturing industry, which uses chemical products in their manufacturing processes, implies that the success of ACIS businesses is closely correlated to that of the automotive industry. Negative consumer demand for vehicles in the automotive industry, for example, will have a knock-on effect on ACIS businesses.

In addition to industry-linked economic performance implications, an important consideration for ACIS businesses is that of extraneous costs. Extraneous costs can be categorised as administered costs, logistic costs, and compliance costs. Administered costs are non-raw material inputs and services over which ACIS businesses have very little to no control, for example items such as port tariffs, electricity, water, and municipal rates. Poor service and price increases in these areas negatively impact ACIS business's economic performance. One of ACIS businesses' major concerns is that of uncertain domestic electricity supply and the appreciable electricity price increases. Electricity supply interruptions create significant cost implications for ACIS businesses' chemical production processes.

Logistic costs are costs arising from the movement of input and output goods between ACIS business suppliers and customers. The fact that most domestic ACIS businesses are located inland with automotive OEM customers spread across inland and coastal locations implies relatively high transport costs, which negatively impacts ACIS businesses' industry competitiveness. It therefore follows that any inefficiency or lack of capacity in the transport/roads/rail sectors add to costs and reduce ACIS business profitability.

Last but not least is the issue of compliance costs that ACIS businesses must contend with. These are costs associated with compliance to various forms of legislation and regulations and is inclusive of health, safety, waste management, and other environmental legislation. While these sets of legislation and regulations are essential for the economy and the country, they do have cost implications that add to the administered and logistics costs referred to above.

4.9. AUTOMOTIVE INDUSTRY INFLUENCES ON AUTOMOTIVE CHEMICAL INDUSTRY SUPPLIER BUSINESS SUSTAINABILITY

According to Deloitte (2017), intense cost pressures and global SCM are two key aspects that ACIS businesses in the automotive industry must contend with. The shift to global sourcing has increased the complexity of SCM, which poses complex internal integration and external collaboration challenges for ACIS businesses. These changes are reflected in supplier challenges such as, supply chain risks, customer supplier collaboration, relationship management, and cost and pricing issues (Deloitte, 2017). Automotive chemical industry supplier (ACIS) businesses in the South African automotive industry perceive OEM global sourcing to be an inherent risk to their business in the context of having to compete with direct imports. Collaboration and relationship management within their own supply base as well as customers is perceived to be key to retaining business. With increased supply chain complexity and price reduction pressure from OEMs, cost has been considered by the automotive supplier industry, globally and domestically in South Africa, as the most significant concern.

4.9.1. Original equipment manufacturer price-reduction pressure on automotive chemical businesses

Probably the most published issue is that of the continuous pressure for cost reduction inflicted on primary automotive suppliers. These automotive OEM cost-reduction requirements are generally non-negotiable and place suppliers under intense pressure to achieve the cost reduction targets set by OEMs. The ever-increasing need for OEMs to reduce prices has challenged ACIS businesses to provide ongoing price reductions to OEMs. Automotive chemical industry supplier (ACIS) businesses have traditionally looked to productivity and technology improvements to achieve these cost targets. However, it has become increasingly difficult to achieve ongoing cost reductions in these areas while continuing to provide the high service levels required by OEMs. As previously mentioned, ACIS businesses are subjected to OEM expectations of flexibility, quality, and cost-effectiveness. At the same time, ACIS businesses need to manage a complex portfolio of products and raw materials while simultaneously driving both product and process innovations to improve product functionality and cost improvement. Automotive chemical industry supplier (ACIS) businesses are further confronted with uncertainty in the South African automotive business environment by fluctuating demands from OEMs. Automotive chemical industry supplier (ACIS) businesses therefore need to achieve significant year-on-year operational cost improvements in order to balance out the OEM cost reduction initiatives.

4.9.2. Customer-supplier relationships and original equipment manufacturer demand fluctuations

What has also transpired, however, is that these excessive cost reduction demands have put a strain on the relationships between ACIS and OEMs. While the exchange of information between (component) suppliers and vehicle manufacturers can be described as fairly sound to excellent, communication between ACIS businesses and OEMs are not on the same level. Information flow between OEMs and ACIS businesses is an area which requires significant improvement. This can be explained by the tiered structure of automotive suppliers. Tier 1 automotive suppliers tend to have closer relationships with OEM executive managers due to their privileged tier position in the supplier hierarchical classification. As discussed in Chapter 3, ACIS businesses are often not deemed to be automotive suppliers (for reasons discussed in Chapter 3) and therefore do not share these privileged relationship positions.

An early study by Singh et al. (2007) pointed out that, outside of this core group, relationships and information exchanges leave a lot to be desired. Information exchange systems are not adequate for the transparent exchange of information contributing to the presence of what is known as a bullwhip effect. A bullwhip effect is a supply chain phenomenon describing how small fluctuations in demand, in this case at automotive OEM level, can cause progressively larger fluctuations in demand at ACIS business product supply levels (Wang & Disney, 2015). Forecasting of product usage (demand) remains firmly in the domain of ACIS businesses, with the associated risks attached to this process. Automotive chemical industry supplier (ACIS) businesses therefore rely heavily on short-, medium-, and long-term vehicle production forecasts from the respective OEMs.

4.9.3. The impact of technological obsolescence on domestic automotive chemical industry supplier businesses

Technological obsolescence is another issue which poses a serious challenge to ACIS businesses. There are numerous products, supplied by ACIS businesses, which are vehicle model specific and, as vehicle models change, products may become obsolete. For example, modern vehicle designs include the use of multi-metals such as aluminium combined with a variety of different coated steels. Treating different metal substrates against corrosion requires specialised technologies customised to each different OEM's plant processing requirements. The products used by OEMs are specialty formulated products. These products use numerous different raw materials procured from a multitude of different suppliers, the majority of which are imported. Meticulous planning between suppliers and OEMs is therefore needed to ensure that vehicle run-out planning information is timeously provided to ACIS businesses.

The importance of ACIS businesses being able to anticipate and proactively be involved in obsolescence planning to minimise the risk of product and raw material obsolescence so future technological changes cannot be underestimated. This was supported by Singh et al. (2007) in their early study of the Australian automotive industry. They believed automotive suppliers are generally more vulnerable to technological obsolescence than vehicle manufacturers if they are not proactively involved in the planning of changes.

4.9.4. Domestic automotive industry labour instability

The current labour environment in South African has been regarded as a key threat to the sustainability of the automotive industry. It has been characterised as being a tenuous industrial relations environment, at best, with periodic industrial disputes. Negotiations between labour and industry have become increasingly complex and more than often result in prolonged industrial action by workers, the concern being that lengthy industrial action can limit production and deter foreign investment in the future. Lost production volumes (especially for export programmes) for OEMs due to prolonged strike action will automatically filter down through the entire supply chain and exert more pressure on ACIS businesses' operating margins.

According to Comrie et al. (2013) OEMs and larger Tier 1 suppliers are usually able to avoid the effects of disruptions by increasing their production volumes ahead of any industrial action. Automotive chemical industry supplier (ACIS) businesses on the other hand are not always able to follow this strategy, simply because of the nature of chemical products they produce. Many of the automotive chemical products have a limited shelf life, for example the sealing and bonding range of products which are susceptible to viscosity increase over time and which has a detrimental effect on pumpability of the products and application. Therefore, ACIS businesses are less likely to avoid the consequences of prolonged industrial action with consequent impact on business profitability. Labour inflexibility in South Africa is another issue which is potentially detrimental to both the competitiveness and sustainability of domestic ACIS businesses. Automotive chemical industry supplier (ACIS) businesses are not able to easily increase or reduce their production to meet fluctuating market demands due to restrictive labour legislation dictating working hours.

4.10. SUMMARY

The objective of this chapter was to explore and present insights into the business environment of the South African automotive chemicals industry with a specific emphasis on understanding the factors that can impact the long-term economic sustainability of ACIS businesses. In order to achieve this, key aspects of the specialty chemical industry and the automotive chemicals sector were explored and discussed.

The impact of globalisation, which has resulted in South African ACIS businesses facing numerous challenges, was comprehensively explored. As a consequence of globalisation, domestic ACIS businesses have been exposed to international best practices through the international linkages of their supply chains with their parent businesses and the OEMs they supply.

The specialty chemicals business environment provides an additional unique set of challenges to ACIS businesses, which are independent of the pressures exerted from the industry sector in which it operates. South African ACIS businesses have had to contend with both global and domestic challenges from the chemicals business environment while at the same time ensuring that they offer profitable products and services to their customers. Elements of these unique challenges were highlighted and discussed in terms of their cost contribution to ACIS business supply chains. Profitability and economic sustainability challenges faced by ACIS businesses in the domestic automotive business environment such as ACIS business input costs and automotive industry price reduction pressures were explored and discussed.

Unique aspects of ACIS business supply chains were examined, leading into a discussion on automotive chemical manufacturing supply chain challenges. Challenges such as raw material cost and availability, operational competitive performance with respect to inefficiencies, quality, reliability, flexibility, and lack of adoption of world-class manufacturing principles were highlighted and discussed.

Although the issues highlighted and discussed in this chapter are not all-encompassing, the issues raised do have a bearing on the profitability and economic sustainability of ACIS businesses. Understandably, some of the issues addressed in this chapter, such as the continual pressure from OEMs on ACIS businesses for cost reductions, are seen to be more important than others. It is, however, important to appreciate the interrelatedness of many of the issues identified and their collective potential impact on ACIS businesses' revenue generation, cost structure, and profitability. Besides the primary challenges emanating from the automotive industry supply chain, it is evident from the discussion that ACIS businesses also have to contend with global and domestic chemical industry challenges.

It can therefore be concluded that the low levels of profitability being experienced by ACIS businesses is closely linked to their operational competitiveness and has been exacerbated by ongoing OEM price reduction pressures on ACIS supply chains, which in turn has translated into a real threat to long-term economic sustainability of ACIS businesses.

CHAPTER 5:
RESEARCH DESIGN AND METHODOLOGY

5.1. INTRODUCTION

The secondary data collection phase of this research study constituted the establishment of a theoretical foundation of the study in Chapter 2 and an exploratory overview of the global and domestic automotive and automotive chemical industries in Chapters 3, and 4. This chapter presents an overview of research methods in general and outlines the specific methodology selected for this research study in order to address the primary research question and accomplish the primary and secondary research objectives of this study. The main purpose of this chapter is to explain the steps taken in the research process and provide considerations and justifications for the selection of methodological approaches in the research design and the research methods used to explore commoditisation's impact on the economic sustainability of the automotive chemical industry in South Africa. The broad aspects of research design and methodology addressed in this chapter are the methodological context of the study, research approach, research process, research design, sampling design, methods of data collection and processing, reliability, validity and trustworthiness of the study, data analysis, time frame of the study, and ethical considerations.

5.2. METHODOLOGICAL CONTEXT

5.2.1. Research philosophy

The overarching term 'research philosophy' identifies with the development of knowledge and the nature of that knowledge. It can therefore be implied that research philosophy is a belief about ways in which data and phenomena should be collected, analysed, and used. The research philosophy underpins the research strategy adopted by the researcher.

The research philosophy adopted is extremely important as it realises important assumptions about the way in which the researcher views the world and underpins the selection of a research strategy and methods incorporated in the strategy. Although the philosophy adopted will be influenced by practical considerations, the philosophical commitment has a significant influence on what is being done and an understanding of what is being investigated (Saunders et al., 2016; Rehman & Alharthi, 2016; Kivunja & Kuyini, 2017).

Saunders et al. (2016) highlighted important schools of thought which influence the way in which researchers approach the research process, namely ontology, epistemology, and axiology.

5.2.1.1. Ontological viewpoint

Ontology is concerned with reality and raises the question of the assumptions made by researchers about the way in which the world operates and the commitment to particular views. There are two facets of ontology: objectivism and subjectivism. Objectivism depicts a position of the existence of social entities in reality external to social actors concerned with their existence. Subjectivism, on the other hand, maintains that social phenomena are created from the perceptions and consequent actions of those social actors concerned with their existence. This implies that it is important to examine the details of a particular situation in order to gain a good understanding of what is occurring and the reality behind what is occurring (Saunders et al., 2016; Kivunja et al., 2017).

5.2.1.2. Epistemological viewpoint

Epistemology has to do with what constitutes an acceptable level of knowledge in a field of study. There are three branches of epistemology: realism, positivism, and interpretivism. Realism is a philosophical position which relates to scientific inquiry, the essence of which is that what the senses indicate to us is reality is the truth. Positivism refers to the adoption of a philosophical stance by the researcher that supports the collection of data about an observable reality and which entails the search for regularities and causal relationships in a way that generates *"law-like generalisations"* (Saunders et al., 2016). Interpretivism advocates the necessity for the researcher to understand differences between humans in the role of social actors, which emphasise the difference in conducting research among people as opposed to physical objects (Saunders et al., 2016; Kivunja et al., 2017).

5.2.1.3. Axiological viewpoint

Axiology is defined as a branch of philosophy that studies judgments about value and is the process of social inquiry with which we are concerned. The researcher’s values in all stages of a research study play an important role in rendering the results of the research credible. The relevance of values in the selection of a research topic reflects the researcher’s value of personal interaction with participants and choice of data collection techniques. As an example, to conduct a study where great importance is placed on data collected through interviews suggests that personal interaction with participants is more highly valued than their views expressed through an anonymous questionnaire (Saunders et al., 2016; Kivunja et al., 2017).

5.2.2. Philosophical stances

The philosophical stances are associated with the philosophies discussed above. At this level, deliberate consideration was given to the possible choices of philosophical stance as they provide structure and guidance and indicate possible limitations to the way the researcher can collect and analyse data in order to produce valid findings. Saunders et al. (2016) highlighted several philosophical stances, namely objectivism, constructivism, positivism, realism, interpretivism, and pragmatism.

The philosophical stance selected for this research study was one of pragmatism as this research philosophy positions the research question as being of primary importance to the study and positioned to answer the research question. The selection of a pragmatic approach for this research study allows for the integration of research methods such as qualitative and quantitative methods. A pragmatic approach sanctions the selection of research methods, either single or multi, which are suitable for advancing the research in the most effective manner. Pragmatism argues that both constructivism and objectivism are valid ways to approach research. Pragmatism allows a researcher to view the research topic from either or both points of view with respect to the influence or role of social actors and uses these points of view to create a practical approach to the research study.

5.3. RESEARCH APPROACH

There are two main research approaches which are commonly followed by researchers: deduction and induction. These approaches are briefly discussed in the following sections.

5.3.1. Deductive approach

A deductive approach implies a development of a theory which is subjected to a test. According to Saunders et al. (2016) and Cooper et al. (2018), the theory may consist of an idea, a premise, a hypothesis, or a set of hypotheses. In this approach, the research design is developed around the testing of the theory by means of questionnaires to large samples. The most important characteristics of deductive research are the search for causal relationships between variables and constructs which must be measured (normally quantitatively) and the careful selection of samples.

5.3.2. Inductive approach

An inductive approach involves the collection of data to explore a phenomenon and develop a theory based on the data analysis. Theory development entails the identification of themes and patterns and the development of a theoretical view resulting from the analysis of the data. Following an inductive approach means that the data collected will, in all probability, be qualitative in nature, using a variety of methods in order to widen the researcher's views of the phenomena under investigation. Small samples are associated with an inductive approach due to the need for gaining an in-depth understanding of the way participants interpret the research question. The relevance of hypotheses to a research study is the main distinction between these two approaches (Saunders et al., 2016; Cooper et al., 2018:68).

While the deductive approach tests the validity of theories or hypotheses, the inductive approach contributes to the emergence of new theories and generalisations. An inductive approach therefore does not require the formulation of hypotheses and addresses the research question and aims and objectives that need to be attained during the research process.

5.3.3. Research approach for this study

For the purposes of this study, an inductive approach was selected whereby a theoretical perspective was initially developed to provide direction for the research. The purpose of selecting an inductive approach was to gain a better understanding of the nature of the problem, which can be briefly summarised as follows.

The South African automotive industry is going through a dynamic transformation process which is significantly impacting automotive chemical suppliers who are finding it more and more difficult to operate profitably in an increasingly challenging business environment. The domestic automotive business environment is characterised by globalisation, increasing complexity, supply chain challenges, competitive pressures, and imposed price reductions on suppliers, implying commoditisation of the automotive chemical industry. The challenges confronting automotive chemical industry businesses are reflected in their competitiveness and ability to compete with imported products while sustaining a profitable position in the automotive value chain. Healthy profitability remains a critical component of business-level economic sustainability. The fact that businesses in the automotive chemical industry play a strategic role in the South African automotive industry implies that the survival and growth of domestic automotive chemical industry in a hypercompetitive automotive market is of utmost importance.

The value of the inductive approach selected for this study allows for a more informed research design decision, which relates not only to the methods used to collect data and the procedures used to analyse the data but also the questions about the type of evidential data gathered in terms of where such data was to be obtained and how the data can to be interpreted to provide answers to the primary research question.

5.4. RESEARCH PROCESS

Research is generally described as a multistage process that must be followed to enable the researcher to complete the research study. According to Cooper et al. (2018), the research process is a sequential process involving several linked stages and several clearly defined steps. It is, however, important to note that, although research is often depicted as moving systematically through these stages, in reality this is unlikely to be the case as each stage is likely to be revisited more than once to reflect on issues and refine ideas while considering ethical issues during the process (Saunders et al., 2016).

Figure 5.1 depicts the research process followed in this study. Although the precise number of stages can vary, they generally include the steps proposed by Lamb, Hair, McDaniel, Boshoff, Terblanche, Elliot and Klopper (2015:172), as depicted in Figure 5.1.

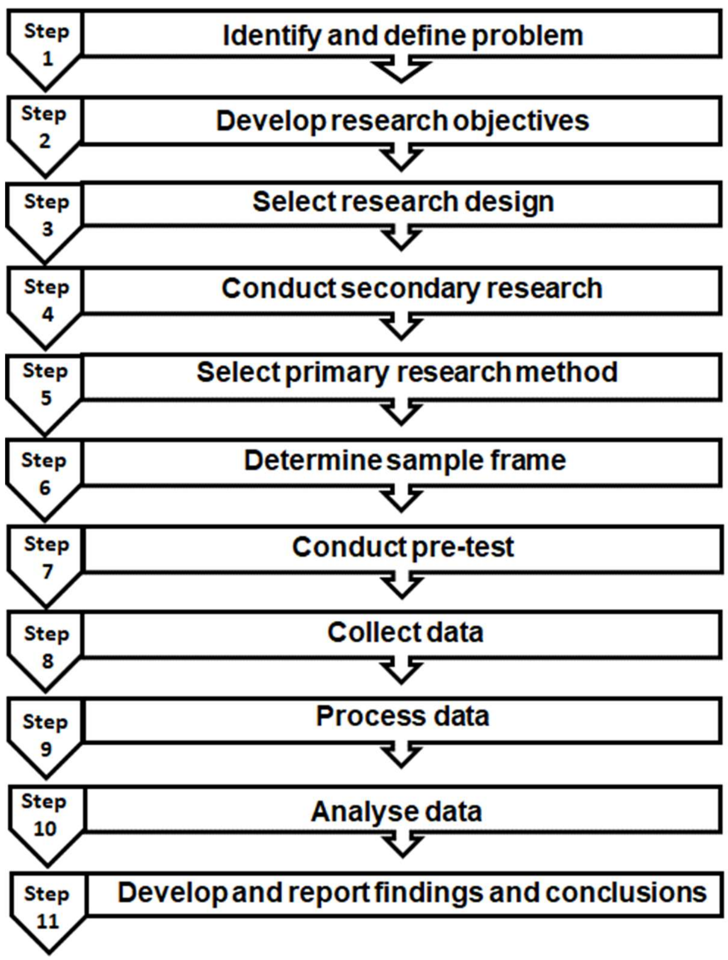

Figure 5.1: Steps in the research process followed in this study

Source: Lamb, Hair, McDaniel, Boshoff, Terblanche, Elliot & Klopper (2015:172)

The steps depicted in Figure 5.1 and how they apply to this research study are discussed in more detail in the following sections. The first three steps in the process were addressed in Chapters 1 to 4.

5.4.1. Identifying the research problem (STEP 1)

The first step in the research process is to identify the problem associated with the study. The background to the research problem was provided in Chapter 1 (Section 1.5) and can briefly be summarised as follows:

South African automotive chemical industry businesses are facing several challenges in the form of escalating input costs in the specialty chemical industry, pressurised price reduction requirements, and a number of other competitive pressures emanating from the South African automotive industry which have been discussed in detail in Chapters 3 and 4. Automotive chemical industry supplier (ACIS) businesses' profit margins are consequently under pressure, which raises the question of the ability of ACIS businesses to maintain a profitable role in the upstream value chain in an economically sustainable manner into the future.

5.4.2. Developing research objectives (STEP 2)

In order to contextualise the research design and methodology of this study, the research question and the primary and secondary research objectives, which were stated in Chapter 1, are briefly revisited.

5.4.2.1. Research question

In support of the aim of this study, the following primary research question was formulated:

"What impact does commoditisation have on the long-term economic sustainability of the South African automotive chemical industry?"

The primary research question was supported by five secondary research questions (see Chapter 1, Section 1.5.2).

5.4.2.2. Primary research objective

The primary objective of this study was:

"To explore the impact of commoditisation on the long-term economic sustainability of the South African automotive chemical industry."

A set of secondary objectives were formulated which contribute to the primary research objective in order to answer the research question (see Chapter 1, Section 1.6.2).

5.4.3. Selecting the research design (STEP 3)

Research design refers to the general plan of how the research questions will be answered. Saunders et al. (2016) defined research design as *"a general plan of how you will go about answering your research question"*. According to Cooper et al. (2018), research design can be viewed as *"constituting the blueprint for the collection, measurement and analysis of data in order to obtain answers to the research questions"* and they offered the following definition*: "research design expresses both the structure of the research problem, the framework, organisation or configuration of the relationships among variables of a study and the plan of investigation used to obtain empirical evidence of those relationships".* Lamb et al. (2015) were of the view that the research design specifies the questions to be answered and how and when the data will be collected and analysed. The research design therefore represents the general plan of how the research question will be answered.

5.4.3.1. Qualitative research

As this study was based on a qualitative-research design, this section discusses the qualitative design method and the rationale for adopting a qualitative method for this study. Qualitative research methods have become increasingly popular in business management disciplines, even although traditionally emphasis was placed on the use of quantitative methods. While quantitative research is mainly concerned with the testing of hypotheses and statistical generalisations, qualitative research focuses on understanding the nature of the research problem as opposed to the quantity of observed characteristics. According to Baskarada (2015), qualitative researchers as a rule assume that social reality is a human creation and they therefore interpret and contextualise meanings from people's beliefs and practices.

Leedy and Ormrod (2014), as quoted by Kilbourn (2015), defined qualitative research as a holistic and flexible approach since the focus, design, and measurement instruments can change as the study progresses. They further pointed out that, in using a qualitative research approach, the researcher is more immersed in the process compared to a quantitative research approach, due to the interaction with the participants. One of the main advantages of a qualitative approach is the ability to be able to probe participant responses to obtain more detailed explanations on 'how' and 'why' questions. Qualitative research differs from quantitative research as regards the purpose and nature of the research, the type of data collected, the way in which the data is analysed and interpreted, and the way in which the findings are communicated. Table 5.1 summarises the main characteristics of qualitative research design.

CHARACTERISTICS OF QUALITATIVE RESEARCH
Research questions: Discovers meaning once the researcher is immersed in data.
Concepts are often only measurable in that they are ideas that can be substantiated by observation or interviews.
Measures are created in an ad hoc manner and are often specific to the setting of the researcher.
Data are in the form of words and images from documents, observations and transcripts.
Research procedures are specific to the setting or participants and cannot easily be replicated.
Analysis involves extracting themes and categories to present a coherent and consistent picture.
In depth studies can be conducted on a topic.

Table 5.1: Characteristics of qualitative research

Source: Researcher's own illustration

5.4.3.2. Rationale for adopting a qualitative research method

It is important that the research design is specifically adapted to the needs that will address the research problem. In the case of this study, because of the nature of a qualitative research approach, it supported the possibility of an in-depth exploration of participant views and opinions related to the study in question, especially as the study did not involve any quantification or hypothesis testing. Furthermore, collecting and analysing the data in conjunction with a theoretical framework justified the use of a qualitative approach to explore the impact of the phenomenon of commoditisation on

South African automotive chemical industry businesses' long-term economic sustainability.

The decision to use an exploratory qualitative research approach was centred around the comparative flexibility of a qualitative methodology. A qualitative approach is largely dependent on the researcher's ability to be immersed in the phenomenon under study in order to obtain comprehensive data and provide detailed descriptions of issues under investigation (Cooper et al., 2018:146). One of the major advantages of a qualitative approach is that in-depth studies can be conducted on a topic, as was required in this research study (see Table 5.2). This approach also takes participants' views into consideration and therefore covers contextual conditions, for example the set of contemporary economic conditions characterising the South African automotive chemical industry, allowing phenomena to be explained in terms of existing or new conceptualisations (Yin, 2016). Additionally, the limited population universe in this study further led to the use of a qualitative approach. For this reason, the researcher adopted a qualitative research approach for this study.

5.4.3.3. Nature of research design

According to Saunders et al. (2016), most research can be divided into three different categories: exploratory, descriptive, and explanatory. Each category serves a specific end purpose and can only be used in a particular way: to explore, describe, or explain.

5.4.3.4. Exploratory research

When it comes to surveys, exploratory research is focused on the discovery of insights as opposed to the collection of statistically accurate data and, most commonly, comes in the form of open-ended questions. The aim of exploratory research is to broaden an understanding of the insights of the participants being surveyed. Text responses provide a rich quality of information that can lead to the discovery of new challenges and initiatives within the topic of research.

5.4.3.5. Descriptive research

Descriptive research is conclusive due to its quantitative nature. It is pre-planned and structured in design so information collected can be statistically inferred on a population. Unlike exploratory research, it does not provide unique insights on issues.

5.4.3.6. Explanatory research

Explanatory research is deemed to be quantitative of nature, pre-planned and structured in design, and is therefore considered to be conclusive research. According to Saunders et al. (2016), the focus of explanatory studies is directed at the explanation of relationships between variable related to a particular phenomenon.

5.4.3.7. Selection of an appropriate research category

The structure of the research question of this study (see section 5.4.2.1) led to a justifiable rationale for selecting an exploratory approach. An exploratory study is valuable when seeking out new insights and assessing phenomena in a new light. Exploratory studies are also useful in clarifying understanding of problems when the researcher is unsure of the exact nature of the problem. The advantage of an exploratory research approach is that it is flexible enough to be able to explore the complexity of a topic and adapt to change (Zikmund, Babin, Carr & Griffin, 2013). Saunders et al. (2016) pointed out that flexibility does not imply an absence of direction but, rather, means that the focus is initially broad and narrows progressively as the research progresses. The primary research process of this study was therefore exploratory of nature in order to gain an in-depth understanding of the impact of commoditisation on the economic sustainability of domestic automotive chemical industry businesses.

5.4.3.8. Research design strategy

The selection of an appropriate research strategy forms an integral part of the research design process and is pivotal in assuring that the primary data collected will suffice in answering the primary and secondary research questions. According to Yin (2018), the most important aspect to be taken into consideration when deciding which strategy to select is to identify the type of research question being asked. The importance of selecting a strategy is underpinned by whether the strategy will enable the research question to be answered and the research objectives to be attained.

Saunders et al. (2016) offered several research strategies that can be considered for qualitative research, namely case study, grounded theory, and ethnography, any of which can be used for exploratory, descriptive, or explanatory research. The strategy selection is therefore guided by the research question, objectives, philosophical underpinnings, extent of existing knowledge, and time and resources available.

5.4.3.9. Research design strategy selected for this study

Based on the objective of the study, which was to determine the impact of commoditisation on the future economic sustainability of domestic ACIS businesses, a case study strategy was selected. Case study strategy is specifically suited to gaining an understanding of the context of the research and processes being used (Saunders et al., 2016; Cooper et al., 2018).

Saunders et al. (2016) defined a case study as a *"research strategy that involves the empirical investigation of a particular contemporary phenomenon within its real-life context, using multiple sources of evidence".* A case study strategy provides answers to 'what' questions and is therefore compatible with an exploratory research approach as the 'what' questions favour the use of an exploratory approach.

According to Yin (2018), a case study is an empirical study that *"investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident"*. This implies that a case study strategy is used where contextual conditions are relevant to the phenomenon under study. Yin (2018) further alluded to the fact that, as the phenomenon and context are not always discernible in real-life situations, data collection and data analysis strategies become important. The case study inquiry is thus able to cope with a technically distinctive situation with numerous variables of interest. It relies on multiple sources of evidence, resulting in data converging in a triangulating manner. In summary, the case study as a research strategy comprises an all-inclusive method integrating specific approaches to data collection and data analysis.

5.4.4. Conducting secondary research (STEP 4)

Secondary research is methodology that involves using data that already exists. This implies that existing data is accumulated, collated, and summarised to improve the overall effectiveness of research. Sources of secondary data for the secondary research include, but are not limited to, material published in research reports and similar documents. These types of documents can be obtained from libraries and websites. Government and non-government agencies also store data that can be used for research purposes and can be readily accessed. For the purposes of this study, secondary data was obtained from academic books, journal articles, industry reports, government publications, and subject-related news articles. Secondary research is much more cost-effective than primary research as it makes use of existing data whereas primary research is data collected first-hand by individual researchers, organisations, and businesses who in many instances acquire the services of third parties to collect data on their behalf. Table 5.2 depicts some of the characteristics of secondary research.

CHARACTERISTICS OF SECONDARY RESEARCH
Research is based on data collected from previous research.
Secondary research is based on tried and tested data which has previously been analysed and filtered.
Data may or may not be according to the requirement of the researcher.
Secondary research is aimed at gaining a broader understanding of the subject matter and is easily accessible.
Secondary research is a comparatively quick process as data is readily available. It is important for the researcher to know where to explore to get the most appropriate data.

Table 5.2: Characteristics of secondary research

Source: Adapted from secondary research – definition, methods and examples; questionpro.com/blog/secondary research/

In support of the primary objective of this study, a secondary literature study was conducted, as discussed in Chapter 2, to establish and elucidate on the theoretical aspects which were central to the theme of this study. This was followed by an investigation and analysis of pertinent secondary literature sources, as discussed in Chapters 3 and 4, in order to develop a perspective of the business environment of the South African light-vehicle automotive manufacturing industry and automotive chemical industry, which was paramount to this research study. These chapters contributed towards determining the availability and unavailability of data for the purposes of answering the research question and addressing the objectives of this study.

5.4.5. Selecting a primary research method (STEP 5)

Primary research can be defined as a methodology used by researchers to collect data directly as opposed to depending entirely on secondary data (data collected from previous research). Primary research is exclusively conducted to address the research problem.

5.4.5.1. Research methods

There are several primary research methods that can be used by researchers in support of qualitative research: interviews, online surveys, focus groups, and observations. The researcher's decision to use an exploratory qualitative research approach (see Section 5.4.3.2) provided the basis for the selection of a primary research tool for data collection. For the purposes of this research, a one-on-one in-depth interview method was adopted and will be discussed in the next section.

5.4.5.2. Interview research method

The use of interviews as a research method is deemed to be appropriate when there is a need for opinions, thoughts, and experiences of interview participants. Interview methods are also useful when the research requires complex questioning and significant probing. Saunders et al. (2016) identified three types of interview question formats that can be used, namely informal unstructured questions, semi-structured questions that are often used in B2B research in order to accommodate varying responses from different participants, and structured questions that are a predetermined set of questions that have both closed and open-ended responses.

Semi-structured interviews were selected for this study, in which the researcher made use of a topic guide. This method of data collection provides a modicum of flexibility and allows the researcher the latitude to probe specific areas based on the participant's answers and ask supplementary questions for clarification. Semi-structured interviews are also suitable for gathering in-depth information in a systematic manner from numerous participants. In-depth interviews can be conducted face-to-face, telephonically, or by means of online virtual meeting platforms. Although face-to-face interviews are seemingly the most appropriate means of conducting interviews as they provide superior responses due to the personal approach, it should be noted that this was not possible in this study due to COVID-19 restrictions in place at the time. Mechanisms of mitigation are discussed in more detail in Section 5.4.8.2. Much rests on the ability and experience of the researcher to ask pertinent questions related to the research. The types of questions used in this research approach are open-ended so that the researcher can gain in-depth insights into opinions and perceptions of the research participants during the interview.

The reason for using a semi-structured interview method in this study was to provide the researcher with the flexibility to explore the opinions and experiences of the participants while at the same time providing a common basis for comparison of the opinions and experiences of all the participants. An interview guide, which is a list of high-level topics that the researcher plans on covering in the interview, was used to assist in the collection of data from one-on-one in-depth interviews with participants.

5.4.5.3. Preparing an interview guide and interview questions

When designing a semi-structured interview guide, one must take into consideration that a semi-structured interview involves several predetermined topics and questions. Semi-structured interview topics and questions are influenced by the research question of the study and the accumulation of knowledge from the literature study, which contribute to the sample and participant selection. A semi-structured interview guide acts as a memory aid which assists the researcher to maintain the interview within the parameters established by the aim of the study. The guide generally consists of a list of topics and/or potential questions that may be supplemented with more questions or modified during the interviews with individual participants. It follows that topics and questions need to be formulated in a way that is directed at answering the research question. Questions must be open-ended and non-leading and structured in a way that has meaning to the participant.

According to Turner (2021), constructing effective research questions for the interview process is one of the most crucial components to interview guide design. It is important for the questions to be structured in a way that allows the researcher to delve into the opinions, experiences, and knowledge of the participants in order to optimise responses gained from the interview opportunity. Turner (2021) recommended that researchers take the following elements into account when developing interview guides and creating questions for the interview:

- *“Wording should be open-ended (respondents should be able to choose their own terms when answering questions).”*
- *“Questions should be as neutral as possible (avoid wording that might influence answers, for example evocative, judgmental wording).”*
- *“Questions should be asked one at a time.”*
- *“Questions should be worded clearly (this includes knowing any terms particular to the program or the respondents’ culture”).*
- *“Be cautious if asking “why” questions.”*

Another important aspect of the interview preparation, alluded to by Turner (2021), is the implementation of an interview guide pilot test. Turner (2021) recommended that a pilot test be conducted with participants who have similar knowledge and experience to the participants of the study. The aim of a pilot test is to assist the researcher in testing the interview design for any inadequacies or weaknesses and allow the researcher to make the required revisions prior to undertaking interviews with participants. A pilot test will also assist the researcher with the refinement of the interview questions. Interview guide pilot testing will be discussed in more detail in Section 5.4.7.

5.4.6. Determining the sampling frame (STEP 6)

In step 6 of the research process, the target population and sample need to be determined.

5.4.6.1. Target population

Cooper et al. (2018) defined a target population as the people and events or records that can contribute to answering the research question of the study and assist in selecting an appropriate sampling method. This research is focused on the domestic automotive chemical industry which comprises several South African automotive chemical suppliers, of which two major automotive chemical suppliers are South African affiliates of multinational companies (MNC's), with domestic product manufacturing capabilities. (Refer section 1.2). These automotive chemical businesses that make up the automotive chemical industry, were the population from which specific key individuals were selected by the researcher to participate in one-on-one, semi-structured, in-depth interviews.

Viewpoints of the selected individuals who had been deemed to have the relevant knowledge of and experience in the automotive chemical and coatings industry were compared. This was in order to meet the triangulation requirement where the use of two or more independent sources of data or data collection within one study is required to validate the data (Saunders et al., 2016).

5.4.6.2. Sampling technique

According to Cooper et al. (2018), the researcher has a choice of selecting participants using either a probability or a non-probability sampling technique. A non-probability sampling technique was adopted by the researcher for this study, based on some practical considerations. The limited population of this study rendered the adoption of a probability sampling technique impractical. According to Cooper et al. (2018), a non-probability sample, conforming to certain criteria, is referred to as purposive sampling, of which there are two types: judgement sampling and quota sampling. Saunders et al. (2016) stated that purposive sampling is applied in cases where the researcher needs to use judgement in selecting individuals who will be able to provide an appropriate response to the study research questions.

The researcher, who had more than thirty years of experience in the automotive chemicals industry, elected to adopt a judgement-sampling approach, with a specific purpose in mind, in this instance to select participants that had either direct or indirect involvement in the South African automotive chemical industry together with an associated knowledge of the industry, a good general overview of the contemporary automotive chemicals industry business climate, and experience of the industry. The reasoning underpinning this selection was that these participants would be best placed to provide the data to answer the research question.

More specifically the criteria applied to the selection of participants was as follows:

- Minimum of five years’ experience in the automotive chemical industry.

- Knowledge of specialty process chemicals and their application in domestic automotive OEM processes.
- Knowledge and experience in automotive chemical industry value chain and business processes.
- Experience in dealing with OEM executive, purchasing, engineering and process departments.
- Intimate contemporary knowledge of both automotive chemical industry and automotive industry.
- Actively involved in the industry at the time of interviews.

The sample selection criteria for this study were based on the premise that the multinational ACIS and coatings businesses in question had a base of operation in their countries of origin with additional operations in South Africa. The selection of individuals involved in these operations in South Africa was additionally based on the availability and willingness of the selected participants to participate in the research interviews.

Qualitative sample sizes need to be large enough to obtain enough data to sufficiently describe the phenomenon of interest and adequately address the research questions. The sample selected for this study was deemed to be heterogeneous as it included participants from different disciplines and MNC automotive chemical and automotive coatings businesses. Six participants were interviewed. In an early study by Guest, Bunce and Johnson (2006), they concluded that a small sample is sufficient in providing accurate information provided participants possess a degree of expertise in the subject under study. During the interview process, the principle of data saturation was applied. Data saturation refers to the quality and quantity of information collected in a qualitative research study and is usually defined as the point at which no new information or themes are observed in the data. It is important to note that, according to Guest, Namey and Chen (2020), predicting the point of saturation in qualitative research is a difficult undertaking because researchers only have the information they have collected. Guest et al. (2020) argued that the stopping point for an inductive study is typically determined by the judgement and experience of the researcher in the industry under study. Some of the challenges in applying the principal of saturation can, however, be overcome if data collected are analysed as they are collected. Saunders, Sim, Kingstone, Baker, Waterfield, Bartlam, Burroughs and Jinks (2018) pointed out that code saturation can be used to determine the point at which no additional issues are identified. This is the point at which coding begins to stabilise and which is indicative of elements of what they term as inductive thematic saturation and data saturation. This principle of inductive thematic data saturation was applied to the interview process.

5.4.7. Conducting a pre-test (STEP 7)

Yin (2016) recommended that an initial pilot semi-structured in-depth interview be conducted in order to test the suitability of the question topics in terms of the relevancy of the questions to obtain adequate responses. The data collection process therefore includes an initial pilot semi-structured interview to test the suitability of the question topics in terms of providing adequate responses and to allow for adjustments to be made to the semi-structured interview topics. Conducting a pilot test additionally allows for the style and approach of the researcher to be tested with the aim of reducing researcher bias and minimise variation in interview technique.

To ensure that the interview questions were relevant and unambiguous, the researcher pre-tested the interview guide on a participant who was not a selected participant but had extensive automotive chemical industry experience. The objective of the pilot testing process was to refine the interview questions based on the feedback from the pilot interview stage. The pilot interview was conducted using the risk-mitigated approach of online virtual meeting platforms, as discussed in Section 5.4.8.2.

5.4.8. Data collection (STEP 8)

Kabir (2016) defined data collection as *“the process of gathering and measuring information on variables of interest in an established and systematic fashion that enables one to answer the stated research questions and evaluate outcomes”.* The goal of data collection is to capture accurate evidence that translates into a data analysis and which will contribute to a valid and reliable answer to the research question. Data are organised into two broad categories, namely qualitative and quantitative. Qualitative data are generally non-numerical and descriptive of nature. In other words, the data collected are in the form of words and sentences and can capture subjective perceptions of the participants. Qualitative approaches aim to address the ‘what,’ ‘how’, and ‘why’ questions and tend to use unstructured methods of data collection, such as semi-structured face-to-face interviews, to fully explore the topic (Kabir, 2016). According to Cooper et al. (2018), there is no single data collection method that is suitable for all circumstances. The researcher therefore had to select a data collection method which best suits the needs of the research study (see Section 5.4.5.2).

5.4.8.1. Data collection instrument

Although a case study supports numerous data collection techniques and combinations of techniques, the researcher elected to make use of a semi-structured in-depth interview technique (refer to Interview Guide – Appendix 1).

Following on from the brief discussion in Section 5.4.5.2 on the selection of a primary research method, the use of in-depth face-to-face interviews with participants is advantageous, notwithstanding the fact that they are deemed to be the most costly and time-consuming method of primary data collection. Personal contact between the researcher and participant has the advantage of providing the researcher with insight into the participant's true opinions and beliefs as both verbal and body language can be recorded. This method of data collection has a relatively high response rate as a result of participants being able to devote dedicated time to answering questions. It should be noted, however, that in using online meeting platforms as a substitute for face-to-face interviews due to the COVID-19 pandemic the advantage of personal contact between the researcher was compromised to some extent.

Saunders et al. (2016) described in-depth interviews as face-to-face, one-on-one conversations between the researcher and the participant, using semi-structured questions. As previously discussed, these non-standardised interviews, often referred to as qualitative research interviews, are conducted with selected industry role players in order to gain participant opinions and views regarding the research question. An interview protocol was used as a conversational guide for the interviews (Refer Appendix B – Interview Guide). Yin (2016) described an interview protocol as a small subset of topics considered relevant to the interview and allows for each topic to be probed and supplemented with additional questions.

5.4.8.2. Face-to face interview risk mitigation

With the advent of the global COVID-19 pandemic, it was paramount that the researcher, research participants, support staff, and general community were adequately protected from any risks or harm in the empirical research phase or at any other time during the study. In line with UNISA's COVID-19 position statement and COVID-19 guidelines for Ethics Review Committees (2020) at the time of the data collection phase of this research study, it was incumbent upon the researcher to assess the risk-benefit ratio of a research study that required face-to-face contact. At the time, UNISA had taken the position that no new face-to-face interviews, which would have carried an inherent risk to participants and/or researchers, were to be undertaken for the duration of the lockdown period.

In order to progress the empirical phase of the research under UNISA's prevailing COVID-19 policy position, the risk of face-to-face interviews with research participants had to be mitigated. The researcher therefore followed a low-risk alternative by electing to conduct the semi-structured in-depth interviews remotely by means of appropriate online virtual meeting platforms which were mutually acceptable to the study participants and the researcher.

5.4.9. Data processing (STEP 9)

Qualitative data processing is a process that involves reducing data to a manageable size and developing summaries in order to generate more information (Cooper et al., 2018:86), in other words a process of deconstructing data into manageable themes, trends, and patterns.

5.4.9.1. Qualitative approach

There are a few approaches available to the qualitative researcher that share a common goal in that they are all focused on arriving at an understanding of the phenomenon being studied from the perspective of those experiencing it (Vaismoradi, Turenen & Bondas, 2013). It was therefore incumbent on the researcher to select a research approach that could answer the research questions of the study. In doing so, the researcher had to consider the characteristics of the approach being selected to ensure validity and consistency between the purpose of the study and the method of analysis. In the case of this study, consideration was given to two commonly used qualitative approaches: content analysis and thematic analysis.

5.4.9.2. Selecting a data analysis approach

When selecting a research approach for the study, the researcher considered the characteristics of the approach to ensure trustworthiness of the study in terms of credibility, transferability, dependability and confirmability and consistency between the purpose of the study and the method of analysis. In selecting a qualitative method of analysis that can be used to conduct a methodically robust study and answer the research question, consideration was given by the researcher to qualitative analysis methods, namely content-analysis and thematic-analysis approaches. These two methodological approaches are introduced, defined, and briefly discussed in the following sections in terms of the differences and similarities between the two approaches.

5.4.9.3. Definitions of content and thematic analysis

Content- and thematic-analysis approaches share a common goal in that they both focus on arriving at an understanding of the phenomenon being studied from the perspective of those experiencing it (Vaismoradi et al., 2013). These two approaches have the same aim, to analytically examine narrative materials by breaking down text into smaller units of descriptive content and describing them accordingly.

5.4.9.4. Content analysis

Content analysis is a general term used to describe the systematic coding and categorisation approach used for exploring sizeable amounts of textual information to determine trends, patterns, and themes and can be defined as *"the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes and patterns"* (Hsieh & Shannon, 2005, as quoted by Erlington & Brysiewicz, 2017). The purpose of content analysis is to describe the characteristics of the documents' content (Vaismoradi et al., 2013). It is a systematic coding and categorisation approach used for exploring large amounts of text-based information to determine trends or patterns and their frequency. This method is generally aimed at exploratory research in areas where little is known about the phenomenon being researched and is useful for reporting of recurrent issues extracted from the data (Vaismoradi et al., 2013).

5.4.9.5. Thematic analysis

Thematic analysis is an approach that can be described as a method for identifying, analysing, and reporting patterns or themes within the data and is aimed at the search for and identification of common threads that occur across an entire set of textual data such as interview transcripts, providing a purely qualitative and detailed account of the data (Braun & Clarke, 2006). Thematic analysis can thus be defined as *"a method for identifying, analysing and reporting patterns or themes within the data"* (Braun et al. 2006). Although thematic analysis generally prevails as a method of analysis similar to that of content analysis, it provides qualitative researchers with a method of analysing interview transcripts, allowing the researcher to test theoretical issues and enhance understanding of the data (Vaismoradi et al., 2013).

5.4.9.6. Data analysis process

The analytical process for both content and thematic analysis is similar. In both cases, the researcher first becomes familiar with the data prior to coding the data. Thematic and content analysis share several principles and procedures in terms of the conceptualisation of code and theme (Vaismoradi et al., 2013). In both content and thematic analysis, a theme refers to a specific pattern found in the data being analysed and can either refer to the manifest content of data (something directly observable) or to a more latent level (requires more interpretation). In thematic analysis, the data is systematically coded by the researcher and similar codes are organised into larger subthemes and themes while, in content analysis, data is coded and developed into categories and subcategories. Contemporary thinking on the differentiation between content analysis and thematic analysis has been refined and the term 'thematic analysis' has become more associated with a distinctive set of steps used to analyse qualitative data.

The application of both content analysis and thematic analysis is closely associated with two modalities, namely an inductive and deductive approach, which play an important role in the selection of an approach (Vaismoradi et al., 2013). A deductive approach tends to be used if the aim of either the content analysis or thematic analysis is to test previous theory in different circumstances. An inductive approach, on the other hand, is generally selected in cases where there are no previous studies dealing with the phenomenon requiring the coded categories to be derived from the transcripts of the interviews. Notably, both deductive and inductive approaches can commence with a theoretical framework for analysing data. However, this is not indicative of a commitment to remain within a specific theoretical framework (Sandelowski & Leeman, 2012). Both deductive and inductive approaches support qualitative data analysis and can be suitably followed, depending on the purpose of the study.

5.4.9.7. Selecting an appropriate method of analysis

Content analysis and thematic analysis can be seen as one and the same and are only differentiated by the number of steps used and the type of qualitative research design employed. Content analysis and thematic analysis are also similar regarding their philosophical backgrounds, in other words immersion in data, focus on description, interpretation of data analysis, consideration of context during data analysis, and the identification of patterns and themes (Vaismoradi & Snelgrove, 2012). Both methods are applicably used in qualitative research as part of the process of knowledge generation. While content analysis generally involves the study and interpretation of text documents, thematic analysis is more focused on the identification of emerging patterns. Thematic analysis offers the systematic element characteristic of content analysis. It additionally allows the researcher to *"combine analysis of their meaning within their particular context"* (Vaismoradi et al., 2012).

What made the thematic approach appealing to the researcher is that it offers a flexible, practical, and effective model for systematic qualitative analysis with clear procedures that can be used with different research designs. It is an accepted method for exploring patterns across qualitative data collected from participants and is often used to analyse interviews with the goal of providing knowledge and understanding of the phenomenon being studied (Joffe & Yardley, 2004). Theme development requires compliance with a systematic framework of data analysis to demonstrate that a stepwise approach to theme development has taken place from coding through to theme development. What distinguishes thematic analysis from content analysis is the use of a practical six-step framework for conducting a thematic analysis, developed by Braun et al. (2006). This framework provides a systematic approach for the developing of themes from the data, the importance of which is directed at the themes' ability to capture something of importance in relation to the overall research question of the study. Based on the above discussions, the researcher elected to use the six-step thematic analysis approach proposed by Braun et al. (2006) to analyse the data emanating from this research study (see Table 5.3 below).

Thematic Analysis (Braun & Clarke, 2006) – Analysis steps and descriptions		
Step 1	Become familiar with the data	*Transcribing data, reading and re-reading the data, making note of initial ideas.*
Step 2	Generate initial codes	*Coding interesting features of the data systematically across the entire data set, collating data relevant to each code.*
Step 3	Search for themes	*Collating codes into potential themes, gathering all data relevant to each potential theme.*
Step 4	Review themes	*Checking whether the themes work in relation to the coded extracts from the entire data set.*
Step 5	Define and name themes	*Ongoing analysis for refining the specifics of each theme and the overall story that the analysis reveals, generating clear definitions and names for each theme.*
Step 6	Producing the report	*Selection of compelling extract examples, final analysis of selected extracts relating back to the analysis of the research question and literature, producing a report of the analysis.*

Table 5.3: Steps of data analysis in thematic analysis

Source: Vaismoradi, Turunen and Bondas (2013)

The Braun et al. (2006) six-step guide, illustrated in Table 5.3 above, offers a useful framework for conducting a thematic analysis. The following discussion offers a brief overview of the processes within each of the six individual steps that were used by the researcher to analyse the qualitative data in chapter 6 of this study.

Step one in the analysis process was to **become familiar** with the entire body of data collected in the empirical phase of the study before the analysis could commence. This initially entailed the transcription of audio data and repeated reading of the transcripts. Becoming immersed in the data required reading of the data in an active way by the researcher, in other words searching for meanings and patterns in the data and making initial notes in the process.

Step two commenced once the familiarisation process had been completed. This step involved the **development of initial codes**, which allowed for the simplification and focus on specific characteristics of the data. During this coding step, important sections of the text were identified by the researcher, coded, and collated into themes that provided a condensed overview of the main points and common meanings which recur throughout the data.

Once a list of codes had been developed and all the data had been initially coded and collated, **step three, generating themes**, commenced. This step of the process involved the sorting and collating of all potentially relevant coded data extracts into initial themes by the researcher. A theme is a pattern that captures something significant about the data. Themes may be generated deductively from theory or prior research and/or inductively from the raw data. This step concluded with codes having been organised into broader themes by the researcher that say something about the research question of the study.

Step four of the thematic-analysis approach was focused on **reviewing themes** developed in the previous step to ensure that they were accurate representations of the data. The data extracts associated with each theme were read in conjunction with the respective theme by the researcher and due consideration was given to whether the data extracts supported the theme. Consideration was also given to themes in the context of their applicability to the whole data set. Any inadequacies encountered with the initial themes were addressed in this step by splitting them, combining them, modifying them, discarding them, or creating new themes in order to ensure their accuracy and usefulness. Initial themes were then refined by the researcher into themes that were discrete, broad, and meaningful enough to represent a set of opinions contained in the various text segments.

In **step five**, the selected themes were **defined and named** by the researcher. Defining themes involved formulating exactly what was meant by each theme and determining how the themes assisted in understanding the data. Names given to themes needed to be succinct to provide the reader with a sense of what the theme was about. At this point the researcher had to consider how each theme fitted into the overall narrative of the data set in relation to the research. Importantly, in this step themes could not be considered final until the entire data set had been re-read and the coding carefully scrutinised multiple times.

Step six commenced once the themes had been finalised and the researcher was ready to undertake the **final analysis** and write the report. The results or findings section addressed each theme in turn. The thematic analysis report had to provide a concise, logical, and coherent account of the data within and across the themes. Valid arguments were built for the selected themes by adding knowledge to the subject using both practical and theoretical interpretations. The researcher used this opportunity to refer to a reflexive journal to enhance findings and conclusions and reflect on whether the literature researched supported the findings. The final analysis created an overall narrative with respect to what the various themes contributed to the research topic.

5.4.9.8. Reliability, validity and trustworthiness

According to Nowell et al. (2017), assessing qualitative research has proved to be more challenging than quantitative research. As pointed out by Babbie (2016) there are very few general guidelines for the evaluation of the quality of qualitative studies compared to quantitative studies, where clear evaluation guidelines exist. For qualitative research to be accepted as trustworthy it is incumbent on qualitative researchers to demonstrate that the research has been conducted in a rigorous and methodical manner to yield meaningful results. By conducting the research in a precise, consistent, and exhaustive manner through recording, systematizing, and disclosing the methods of analysis with enough detail, will enable to determine process is credibility (Nowell et al., 2017). Although there are numerous examples of how to conduct qualitative research, few sophisticated tools are available to researchers for conducting a rigorous and relevant qualitative research.

The relevance of traditional criteria; ‘Internal and External Validity,’ ‘Reliability’ and ‘Objectivity,’ have been challenged according to Bryman and Bell (2014). According to Guba and Lincoln (1985) these criteria have been deemed to be unsuitable for assessing the quality of qualitative research and proposed four alternative corresponding criteria for judging the trustworthiness of qualitative research.

These four alternative corresponding criteria, (a) **credibility** (vs. internal validity), (b) **transferability** (vs. external validity), **dependability** (vs reliability), and **confirmability** (vs objectivity) for assessing qualitative and quantitative trustworthiness will be elucidated upon in the following sections.

(a) Credibility

According to Lincoln and Guba, (1985), credibility involves demonstrating that the results of qualitative research are believable from the perspective of the research participant. They suggest several techniques to address credibility which include activities such as prolonged engagement, persistent observation and data collection triangulation. Credibility which is the most important criteria in establishing trustworthiness of a qualitative study can be achieved by:

- Making sure that good research practice is applied to the study.
- Describing and understanding the phenomena of interest from the participants point of view.

Two important credibility threats are often associated with qualitative studies: researcher bias and researcher reactivity (Maxwell 2013). Researcher bias is construed as the selection of data that fits the researcher's theory or goals or the selection of data that attracts the attention to the potential subjectivity of the researcher.

In order to overcome this susceptibility to bias, Maxwell (2013) proposed the application of a triangulation strategy within the scope of the validity threats identified in the collection of data.

In the context of this study, bias mitigation was achieved and credibility strengthened within the scope of the credibility (validity) threats identified in the collection of data by:

- Focusing on elements most relevant to the study
- Being aware of potential influences and understanding what the participant is saying, how it is being influenced and how it could affect credibility of inferences drawn from the interview by the researcher.
- Using a triangulation strategy that collected information from a group of diverse individuals to reducing the risk of bias and neutralise risks.

- Extracting data from multiple sources.
- Conducting and recording in-depth personal interviews that were suitably varied and comprehensive.
- Maintaining and reviewing researcher reflexive notes and commentary throughout the interview, coding and theme generation stages to ensure accuracy of processes.

(b) Transferability

Transferability corresponds to external validity (generalizing a study's results), and can be explained as the degree to which the qualitative research can be generalised or transferred from the original research situation to a similar situation. Without knowing the sites to which transferability may be required it remains the responsibility of the researcher to provide thick descriptions (thorough description of the context and underlying assumptions of the research) enabling the transfer of findings to other sites (Lincoln and Guba,1985). Transferability of findings can be achieved by the provision of background data to establish context of the study, detailed (rich, thick) description of the phenomena in question to allow comparisons to be made (Shenton, 2003).

In this study transferability was increased by providing:

- The boundaries of the study.
- The number of participants involved in the fieldwork.
- The data collection methods that were employed.
- The number and length of data collection sessions.
- The time period over which the data was collected.

Ultimately the results of qualitative research study must be understood within the context of the characteristics of the specific industry in which the phenomenon of interest takes place, in this case commoditisation and long-term economic sustainability, to provide a baseline understanding with which the results of subsequent work could be compared (Shenton, 2003).

(c) Dependability

Dependability aims to replace reliability, which requires that when replicating experiments, the same results should be achieved. As this would not be expected to happen in a qualitative setting, alternative criteria are general understandability, flow of arguments, and logic. According to Lincoln and Guba (1985) both the process and the product of the research must be consistent. To address the issue dependability the study must be reported in detail enabling future researchers to repeat the work. According to Shenton (2003 the research design is an important factor as it allows the reader to assess the extent to which proper research practices have been followed and gain an understanding of the methods and their effectiveness). The text should include sections devoted to:

- The research design and its implementation describing what was planned and implemented.
- The operational detail of data gathering describing what was done in the field.
- Reflective appraisal evaluating the effectiveness of the process of enquiry undertaken.

The dependability of the research was increased by using the abovementioned methods and repeated reiterations of the coding process and derivation of themes on both individual interview transcriptions and comparisons between all interview transcriptions.

(d) Confirmability

Confirmability refers to the neutrality and objectivity of the research findings and is focused on ensuring that that the research findings are grounded in data and that the research findings have not been influenced by personal bias, motivation and personal values in any way or form (Shenton, 2004; Bryman and Bell, 2014). Compared to the general objectivity in quantitative research, the researcher's neutrality of research interpretations is of utmost importance in the case of qualitative research. Qualitative research assumes that each researcher brings a unique perspective to the study. The approach to sampling differs significantly in quantitative and qualitative research. Qualitative samples are usually small and are purposefully selected in order to select information-rich cases for in-depth study (Patton, 2002). There may be as few as five (Creswell, 1998, p. 64) or six participants (Morse, 1994, p. 225). Confirmability is therefore concerned with establishing that the researcher's interpretations and findings are clearly derived from the data requiring the researcher to demonstrate how the conclusions and interpretations have been reached (Nowell et al., 2017).

The confirmability of this study was increased by:

- Applying data triangulation.
- Applying in-depth methodological description to allow integrity of research results to be scrutinised.
- Retaining all raw data (interview transcripts) to ensure researcher bias did not occur.
- Keeping a reflexive journal of researcher notes throughout the interview, coding and analysis process.

The four methods discussed above of increasing trustworthiness were applied throughout the research process as far as practicably possible to ensure that the data collected in this qualitative study is reliable and valid. This concludes the overview of measures required to ensure the trustworthiness of the study.

5.4.10. Data analysis (STEP 10)

Analysing qualitative data typically involves the researcher becoming immersed in the data. This allows the researcher to become familiar with the data in order to find patterns and themes in the data. Saunders et al. (2016) pointed out that data can be found in many forms, one form being that of audio recordings obtained from interviews with research participants. They highlight the value and role of audio-recording supplemented by note-taking and the importance of transcribing both to ensure that no data is lost. The data-analysis process can therefore be described as the synthesis of the literature review and empirical research sections of the study. The aim of data analysis is to draw conclusions from the data collected during the empirical phase of the study. According to Cooper et al. (2018), data analysis is a process of reducing the collected data down to a manageable size by summarising and identifying patterns and trends in the data collected. As discussed in Section 5.3.2, an inductive qualitative approach, which is related to exploratory research, was used where data was analysed as it was collected. Although commencing with an inductive approach, some elements of a deductive approach were used initially by the researcher to develop a theoretical position in order to test its relevancy through subsequent data collection and analysis (Saunders et al., 2016).

In this section, the conversion of qualitative data (from recorded in-depth one-on-one interviews with participants) to word-processed text format is briefly discussed as this is the format required to analyse the data with the assistance of computer-assisted qualitative data analysis software (CAQDAS) packages. Saunders et al. (2016) proposed three distinct ways of analysing data, using either inductive or deductive approaches: summarising, categorising, and unitising data collected.

Once the researcher had transcribed the recorded data and written up the supplementary notes taken during the interview, a summary of key points that materialised from this activity were produced. In this summarising process, the researcher was able to identify principal themes that emerged from the interviews, allowing for further exploration of these themes in impending interview sessions.

Categorising data entails two activities, according to Saunders et al. (2016), namely developing categories and attaching meaningful bundles of data. Categories were derived from the theoretical framework and empirical data was collected and took the form of codes under which specific data were grouped. The identification of categories was guided by the purpose of the research as reflected in the research question and objectives (see Section 5.4.2).

The data was then unitised. Relevant pieces of data or units of data, as described by Saunders et al. (2016), were assigned to appropriate categories devised by the researcher and analysed with the assistance of the ATLAS.ti CAQDAS package. Generating categories and reorganising the data collected according to these categories formed part of the overall data analysis process for the researcher to answer the research question and achieve the primary and secondary objectives of the study.

5.4.11. Reporting findings and conclusions (STEP 11)

The final step in the research process followed in this study involved the presentation of the findings and recommendations in a comprehensible manner. For the purposes of this study, the data findings, conclusions, and recommendations were presented in written format as part of this dissertation. The following chapter includes a description of the results of the interviews conducted with the selected automotive chemical industry participants. The literature review and semi-structured interviews conducted with the selected participants provided the inputs for identifying challenges relating to the economic sustainability of automotive chemical suppliers and the impact of commoditisation on automotive chemical supplier's economic sustainability. The conclusions and recommendations are summarised in Chapter 7 of this study.

5.5. TIMEFRAME OF THE STUDY

Saunders et al. (2016) asserted that a research study can either take the form of a snapshot, in other words at a particular point in time, or represent events that have taken place over a period. The time horizon is therefore described as either cross-sectional (snapshot) or longitudinal (over a period). As the primary data collection method for this qualitative study was based on in-depth interviews conducted in a short space of time, the time horizon for this study was categorised as a cross-sectional study.

5.6. ETHICAL CONSIDERATIONS

Cooper et al. (2018) defined ethics as *"norms or standards of behaviour that guide moral choices about our behaviour and our relationships with others"*. Ethical compliance therefore plays an important role in the research process to ensure that no-one is harmed or suffers adverse consequences as a result of the research activities. Saunders et al. (2016) highlighted the importance of guaranteeing confidentiality throughout the process of collecting and reporting data. This pertains specifically to personal data that may identify and/or harm participants in the study. According to Cooper et al. (2018), protecting the rights of participants is of paramount importance and the research therefore must be designed in such a way to ensure that the participants' rights are protected. In order to protect these rights, three guiding principles were adopted in this research process: explaining the purpose of the study, explaining the benefits of the study, and explaining the participants' rights and protection and obtaining informed consent.

The fact that ethical compliance was regarded as being of utmost importance for the purposes of this research, the research process was directed by the ethical standards as set out by UNISA. The ethical clearance process of UNISA was followed whereby the researcher applied for ethical clearance and approval. An ethical clearance certificate was required, which was issued by UNISA to the researcher (see Annexure A) prior to the commencement of interviews and the data-collection process in order to protect the participants. A participant information sheet was provided to each participant, together with a letter explaining the purpose of the study and all the information the participant was required to know before taking part in the study. All participants were provided with, and required to sign, an informed consent form, which disclosed the procedures of the research design (Van Zyl, 2014: 86; Cooper et al., 2018). Following this, the researcher then proceeded to collect data without harming the participants and ensured that the anonymity and confidentiality of the participants was maintained throughout the process (Babbie, 2016:63-65).

The researcher further acknowledged the position and guidelines of UNISA on social distancing with respect to conducting qualitative research during the COVID-19 lockdown period and the Ethics Review Committee requirements for gaining approval to proceed with such research studies during this period.

5.7. SUMMARY

The research methodology outlined in this chapter described the research methodology used for the purpose of this study, which was to explore *"the impact of commoditisation on the long-term economic sustainability of the South African automotive chemical industry."* The research design was formulated around the research question and the objectives of the study, as discussed in Chapter one.
The main purpose of this chapter was to explain the steps taken in the research process and provide considerations and justifications for the selection of methodological approaches in the research design and the research methods used to explore the impact of commoditisation on the economic sustainability of the automotive chemical industry in South Africa. Following an initial discussion on the research philosophy and approach, an explanation of the various components within the research design process (the research process, research design, sampling design, methods of data collection and processing, reliability validity and bias of the study, data analysis, timeframe of the study, and ethical considerations) were explained.

The research design adopted (inclusive of the research strategy, research method, and techniques to be followed for the collection and analysis of data) was elaborated on. Due to the COVID-19 pandemic, the method of face-to-face interviews had to be adapted, in line with the prevailing policies of UNISA and mitigated, as discussed in Section 5.4.8.2 of this chapter. The adoption of a semi-structured, COVID-19-mitigated strategy for in-depth face-to-face interviews to collect qualitative secondary data from selected purposive sampling participants was discussed.

The reliability, validity and trustworthiness of the qualitative secondary data acquired, together with biases emanating from this data collection technique, were addressed along with strategies for mitigating these potential biases. The study adopted a snapshot approach, taken at a particular point in time, and is referred to as a cross-sectional study. This implies that semi-structured interviews took place over a short period of time.

Thematic analysis, a structured method for assessing qualitative data and, more specifically, interview data, was adopted in order to summarise data into meaningful themes. Transcribed recorded interviews were coded and structured to identify themes emanating from the interviews. The coding data from the audio-recorded participant interviews, supplemented by notes in the form of memoranda documented by the researcher during the interviews, was analysed using CAQDAS.

Finally, attention was drawn to the importance of ethical considerations in the context of protecting the rights of participants, which was of paramount importance to this research study. In order to protect these rights, the adoption of three guiding principles in this research process (explaining the purpose of the study, explaining the benefits of the study, and explaining the participants rights and protection and obtaining informed consent) were discussed. The analysis of the data will be discussed in the following chapter.

CHAPTER 6:
RESEARCH FINDINGS AND ANALYSIS

6.1. INTRODUCTION

The findings emanating from the semi-structured in-depth interviews conducted with selected automotive chemical industry experts are presented and analysed in this chapter, using Clarke and Braun's (2013) practical six-step framework approach to conducting a thematic analysis.

The analysis and discussion of the findings are structured into two segments. The first segment provides an overview of the qualitative analytic method selected to conduct an analysis of the data emanating from the participant interviews and a description of the analysis process steps followed. The second segment deals with the analysis of the participant responses in the context of answering the research question.

6.2. SELECTING A QUALITATIVE DATA ANALYSIS APPROACH

As discussed in Chapter 5, the researcher elected to use a thematic data analysis approach to analyse the semi-structured interview transcripts.

According to Clarke et al. (2013), thematic analysis is well-suited to a broad range of research interests and works with a wide range of research questions. Thematic analysis is also seen to be a useful method for examining the perspectives of various research participants (RPs), highlighting similarities and differences of opinion. It is suitable for analysing transcripts of interviews and supports a well-structured approach to the management of large data sets which in turn contributes to a clear and organised final report (Nowell, Norris, White & Moules, 2017).

The thematic analysis process identifies patterns and themes within qualitative data which capture important aspects of the data in relation to the research question (Maguire & Delahunt, 2017). A theme *"… represents some level of patterned response or meaning within the data set"* (Braun et al., 2006). The significance of a theme is determined by the extent to which it contributes something of importance in relation to the overall research question. Themes are described as *"the final products of data analysis in the thematic analysis approach"* (Braun et al., 2006).

According to Braun et al. (2006) themes or patterns within data can be identified in one of two primary ways. An inductive (bottom-up) way where themes are strongly linked to the data or in a deductive (theoretical, top-down) way where the analysis is driven by the researcher's theoretical or analytical interest in the research topic. This was an important aspect of this study as initial codes were generated deductively, based on a theoretical framework developed from literature reviews conducted by the researcher. Following an initial deductive approach allowed the researcher to code for a specific research question, which implied a more theoretical approach, directing the analysis towards aspects of the data which answered the research question.

Braun et al. (2006) differentiated between two levels of themes, that is semantic and latent themes. While the semantic analysis approach is directed only at what the participant has said, thematic analysis at the latent level moves beyond pure description to interpretation and explanation of what has been said and attempts to understand the significance of the themes and their broader meanings (Maguire et al. 2017).

Personal reflexivity is another important aspect of the thematic analysis process where the researcher is encouraged, prior to starting the analysis, to document any particular assumptions held on the research topic or values the researcher may hold that can shape how the data might be read and interpreted (Byrne, 2021).

6.2.1. Research participants

The selection of the six research participants was based on their automotive chemical industry expertise and ability to provide a broad representation of the contemporary automotive chemical industry in South Africa. One participant also had extensive coatings industry experience and was specifically selected to provide an opinion on an alternative allied industry for triangulation purposes. All interviews were conducted remotely via Microsoft Teams due to ongoing COVID-19 restrictions at the time of the research. Specific details (such as individual participant names and company names, industry positions, specific products and technologies, and any other information that could have an impact on the anonymity of the research participants) were precluded from this discussion.

The semi-structured in-depth interviews were targeted at gaining insights into specific issues that could influence ACIS business profit margins and consequently impact the long-term economic sustainability of businesses operating in the automotive chemical industry in South Africa. Particular attention was directed at uncovering the perceptions of the research participants regarding the manifestation of encroaching commoditisation in the automotive chemical industry and its impact on automotive chemical supplier business's profitability and economic sustainability.

6.2.2. Data collection

As indicated in Chapter 5, the empirical data were collected using in-depth semi-structured interviews with open-ended questions in order to provide flexibility to explore the views of the participants and encourage participants to elaborate on their responses to the questions posed. These open-ended questions were further supplemented with targeted questions, providing a basis for gaining a deeper insight into individual opinions and experiences. The data emanating from the interviews were coded within a framework of coding categories representing key business pressures and challenges experienced by the South African automotive chemical industry identified in the literature review phase of the study.

6.3. CONDUCTING THE ANALYSIS

As discussed in Chapter 5 (Section 5.4.9.7), the researcher adopted the Braun et al. (2006) six-step thematic analysis framework for conducting a thematic analysis. The six steps of the thematic analysis process as discussed in Chapter 5 are summarised in Table 6.1 below and described and elucidated upon in detail in section 5.4.9.7 and Table 5.3.

Thematic Analysis (Braun & Clarke, 2006) – Analysis steps and descriptions	
Step 1	Become familiar with the data
Step 2	Generate initial codes
Step 3	Search for themes
Step 4	Review themes
Step 5	Define and name themes
Step 6	Produce the report

Table 6.1: Steps of data analysis in thematic analysis

Source: Braun and Clarke (2006)

It is important to note that, although the Braun et al. (2006) phased six-step method represented in Table 6.1 is depicted as a linear approach, it is an iterative and reflective approach which alternates between the phases.

6.3.1. Data preparation

The goal of a thematic analysis is to identify patterns of data or themes that support the research question and is aimed at validating the empirical research findings and, where possible, extending the theoretical framework.

Before the data could be analysed, it was transformed into written text. All the questions asked by the researcher and answers provided by the participants were transcribed literally, in other words a complete transcript of each participant interview was prepared. The transcripts were annotated using codes and disseminated with the assistance of ATLAS.ti-9. Notes taken by the researcher during the interviews were used to supplement the data in the transcripts.

Using deductive reasoning, theories and concepts emanating from theory (see Chapter 2) and relevant research findings based on published studies (see Chapters 3 and 4) were used to generate an initial set of coding categories and codes. Following a semi-structured or predetermined approach, the researcher used the secondary research to identify key market and business aspects which could potentially contribute to domestic ACIS business profit margin pressure and economic sustainability. These key aspects were used to develop initial coding categories from which codes were developed to code the raw data from the interview transcripts.

These key market and business aspects referred to are broadly reflected in the preliminary theoretical framework developed in Chapter 2 of the study (see Figure 2.12). This theoretical framework provided a preliminary representation of this research study and established a reference point for the examination of the empirical findings.

Thereafter, moving to an inductive approach, further careful examination of the transcripts of data acquired from the participants during the interview process provided the researcher with a further opportunity to see if any further codes and themes would emerge during the data analysis process.

6.3.2. Conducting the thematic analysis using a six-step process

6.3.2.1. Step 1 – Familiarisation with data

The recordings of the interviews were fully transcribed into written form before the thematic analytic process commenced. In order to become familiar with the data, both the transcripts of the individual interviews and the entire data set of all the interviews were actively read and re-read in conjunction with the original voice recordings to ensure accuracy of the transcribed documents. During the reading process, the researcher made numerous notes on the physical transcripts regarding initial ideas, trends, and patterns prior to commencing with the coding step. By constantly reading and re-reading, the researcher was able to become acquainted with the material and thought processes of the participants, which assisted with gaining an understanding of the responses to the questions posed. Some of the participants occasionally digressed from the questions posed in the process of offering background support for their answers and required some intervention by the researcher to refocus the participants on the specific question.

6.3.2.2. Step 2 – Generate initial codes

This phase of the analysis commenced once the data familiarisation step was completed. This phase involved the production of a list of initial codes that could be matched to extracts of data that were of interest to the researcher and that were aligned to answering the research question. The codes selected reflected different sources of impact on ACIS businesses' profitability and economic sustainability. The researcher continuously revisiting the data was indicative of this being a reflexive process, in other words a means of immersing in, interacting with, and thinking about the data.

The theoretical framework depicted in Figure 2.2 (Chapter 2) of this study was used as a basis to develop a list of initial codes which were augmented with codes derived from the data. The coding was approached by the researcher with the research question in mind and with the aim of coding the whole data set. After developing an initial code list reflective of the theoretical framework (see Table 6.2 below), the researcher worked systematically through the complete data set, comparing responses between interviews and reviewing the data set as a whole, searching for data extracts of interest, and matching them with appropriate codes or creating new codes where necessary.

KEY THEORY, MARKET, AND BUSINESS-BASED ASPECTS OF PROFIT PRESSURE USED TO DEVELOP INITIAL DATA CODES
o Globalisation of markets
o Increased global competition
o Development of low-cost labour economies
o Growth of multinational businesses
o Exposure to foreign competition
o Transformation of global value chains
o Maturing demand
o Legislation and regulatory institutions
o Industrial policy
o Power shifts in the value chain
o Industry consolidation
o Diminishing economies of scale
o Deflationary trends
o Increased performance demands
o Increased customer bargaining power
o Increased price competition
o Environmental pressures
o Rising upstream supplier input costs
o Downstream pressure on supplier product prices
o Supply chain complexity/inefficiency
o Global raw material supply base
o complexity of product range
o Adverse supplier/customer business relationships
o Relative position in value chain
o Commoditisation

Table 6.2: Key theory, market, and business-based aspects of profit pressure used to develop initial data codes

Source: Researcher's own depiction

All the data extracts were coded and then sorted and collated together within each code with the aid of CAQDAS (Atlas-ti).

6.3.2.3. Step 3 – Search for themes

Following the guidelines provided by Clarke et al. (2013), Maguire et al. (2017), Nowell et al. (2017), and Byrne (2021), the coded data extracts were analysed, sorted, and collated into potential themes and subthemes. This phase was concluded with a collection of candidate themes, subthemes, and all data extracts that had been coded with respect to the themes and subthemes. At this stage, it was important for the researcher to determine the significance of the individual themes to the research question of the study.

6.3.2.4. Step 4 – Review themes

In this phase, the researcher undertook a review of the candidate themes developed in Step 3 of the process in order to refine the themes. The review was undertaken at two levels. Level one was the review of the coded data extracts, which entailed reading the collated extracts from each individual interview transcript for each theme to ensure they formed logical patterns. Consideration was given to whether the data extracts were an appropriate fit with the relevant themes. Candidate themes that did not fit were analysed from the perspective of either being problematic in themselves or whether some of the data extracts did not fit within the particular themes. Level two involved a similar process to level one except that the process was applied to the whole data set. The entire data set was re-read to confirm whether the themes worked in relation to the complete data set and check if any relevant data were omitted in the initial coding stage. It was then decided which of the candidate themes would be retained and which would be discarded. The outcome of this distillation process in this step is depicted in Figure 6.1 below.

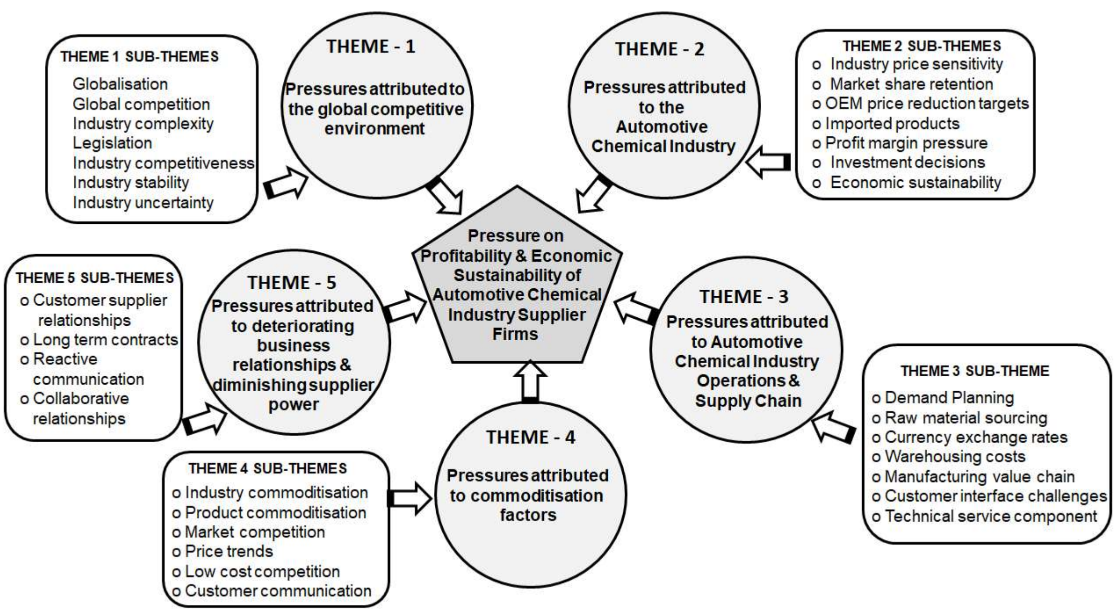

Figure 6.1: Provisional thematic map depicting candidate themes and subthemes

Source: Researcher's own depiction

6.3.2.5. *Step 5 – Define and name themes*

In this phase, the themes depicted in the thematic map depicted in Figure 6.1 were further defined and refined. The process of identifying, refining, and defining can be explained *as "identifying the essence of what each theme is about as well as the themes overall and determining what aspect of the data each theme captures"* (Braun et al., 2006). In order to achieve this, the researcher undertook an analysis of each theme, identifying what aspect of the data each theme captured, what was of interest and why, in relation to the research question. Each theme was considered individually as well as in relation to others. Figure 6.2 below shows the final refinements of the thematic map after condensing themes into succinctly described labels within which the data was analysed.

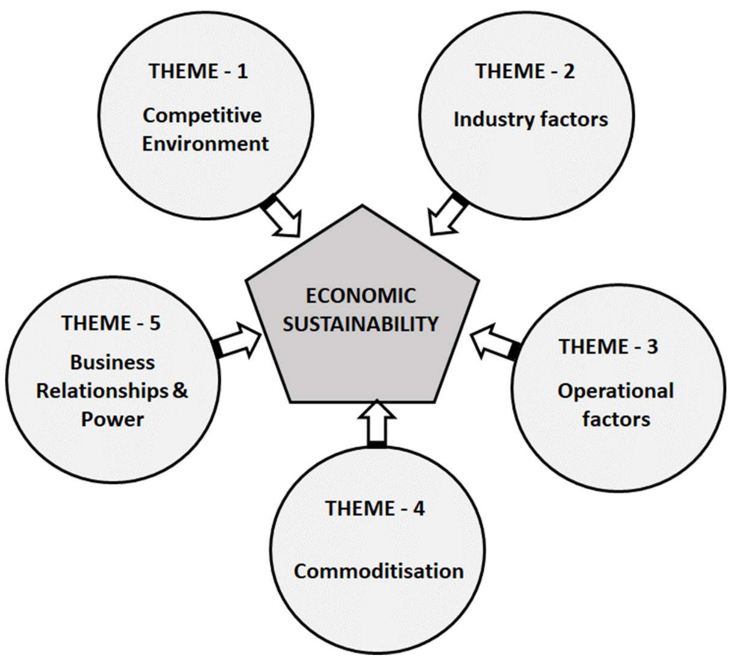

Figure 6.2: Final thematic map depicting five themes

Source: Researcher's own depiction

The outcome of this phase is summarised in Table 6.3 below where each of the five themes depicted in Figure 6.2 are described in terms of the aspects of data captured by each individual theme.

THEME	THEME DESCRIPTION	ASPECTS OF DATA CAPTURED BY THEMES
1.	Pressures attributed to global **'Competitive environment'** factors	*Theme 1 encompassed elements of the competitive environment which can potentially impact the profitability and economic sustainability of automotive chemical suppliers. The subthemes that best described the scope of this theme were the impacts stemming from the globalisation of the industry, increased global competition, industry complexity, industry competitiveness, legislative impacts, and the general stability of and uncertainty in the industry.*
2.	Pressures attributed to automotive chemical **'Industry Factors'**	*Theme 2 addressed the industry factors influencing the profitability and economic sustainability of automotive chemical suppliers. This theme encompassed various elements of the industry such as industry price sensitivity, market share retention, effect of imported products, and original equipment manufacturer (OEM) price-reduction targets which drive input cost increases and product pricing pressure which are considered to have a negative impact on the profitability and economic sustainability of businesses operating in the automotive chemical industry.*
3.	Pressures attributed to '**Operational Factors'**	*Theme 3 addressed various elements of the automotive chemicals supply chain in terms of the various cost challenges which have a detrimental impact on competitive performance, business profitability, and economic sustainability. This theme addressed cost challenges for automotive chemical businesses in the supply chain in areas such as demand planning, raw material sourcing, currency exchange rates, warehousing, and distribution which impact overall business profitability.*
4.	Pressures attributed to '**Commoditisation'** factors	*Theme 4 addressed the phenomenon of commoditisation. Pricing pressures and margin decline within automotive chemical supplier businesses suggested encroaching commoditisation. The theme addressed various elements of the phenomenon such as industry and product commoditisation, market competition, price trends, and low-cost competition in order to establish whether or not the business profitability and economic sustainability is impacted by commoditisation.*
5.	Pressures attributed to deteriorating **'Business relationships &** diminishing supplier **power'**	*Theme 5 encompassed various elements of business relationships between automotive chemical industry businesses and automotive OEMs. This theme addressed various elements of customer-supplier relationships and their potential impact on business profitability and economic sustainability such as the role and importance of collaborative relationships, the current asymmetry of relationships and the extent of collaboration between OEMs and automotive chemical supplier businesses and the ability to secure long terms contracts with OEMs.*

Table 6.3: Aspects of data captured by themes

Source: Researcher's own depiction

6.3.2.6. Step 6 – Analysis and reporting

Step 6 deals with the analysis and discussion of the findings in the context of the themes depicted in Figure 6.2 and the research question of the study. At this point, the researcher identified and selected extracts from the entire data set that illustrated the perspectives of the participants and supported the arguments made by each respective theme.

The interviews were aimed at generating an understanding of automotive chemical industry competitiveness and the economic sustainability of ACIS businesses in South Africa. This was accomplished by exploring issues giving rise to the phenomenon of encroaching commoditisation of automotive process chemical products and exposing various factors contributing to declining profit margins of ACIS businesses.

The findings emanating from the in-depth interviews conducted with industry experts on key aspects impacting the economic sustainability of the South African automotive chemical industry were organised, coded, analysed, and discussed under the following themes:

- **Theme 1:** Competitive environment
- **Theme 2:** Industry factors
- **Theme 3:** Operational factors
- **Theme 4:** Commoditisation
- **Theme 5:** Business relationships and power.

6.4. THEME 1 – COMPETITIVE ENVIRONMENT

Theme 1 explores the automotive chemical industry's competitive environment. Consistent with the rapid internationalisation of South African automotive trade policy, the domestic automotive chemicals industry has been integrated into the global automotive and chemical environments. The challenges facing the automotive chemical industry are therefore manifested in the competitiveness and economic sustainability of the domestic industry in global markets.

6.4.1 Globalisation

The first topic of discussion with the participants was that of globalisation, which was initiated by asking the participants to first characterise the automotive chemical industry business environment from their point of view and then provide their opinion on the impact of globalisation on the automotive chemical industry.

The automotive chemical industry in South Africa was characterised by the participants as being dominated by two major multinational chemical companies and three major automotive coatings companies (which are closely allied to the automotive chemical industry business). These companies operate domestically in South Africa as wholly-owned subsidiaries of MNCs. The majority of automotive chemical products in South Africa are manufactured domestically with a smaller percentage of products being imported from automotive chemical businesses' parent-companies. In contrast, the coating products supplied by domestic coatings companies (allied to the automotive chemical industry) for the domestic OEM market are imported.

With the advent of globalisation in the automotive industry and the extensive export programmes undertaken by domestic OEMs, product/technology sourcing decisions have shifted to the OEM parent-companies. According to the participants, this has resulted in product/technology used on similar vehicles manufactured overseas being specified for use on domestically produced vehicles. This has meant that domestic automotive chemical manufacturers now need to meet international product performance standards or run the risk of OEMs shifting their sourcing decisions from domestically manufactured products to imported products.

Pressures from intensified automotive OEM performance demands in terms of quality, on-time-in-full (OTIF) delivery, and reliability have added costs that have compounded the pressure on automotive chemical industry profit margins were highlighted by the participants. The participants were of the opinion that these pressures, together with the comparatively low volumes of vehicles produced in South Africa, have already resulted in some companies, such as allied coatings companies, deciding to terminate domestic production. After years of domestic manufacturing, coatings companies now import their products in order to reduce costs and to improve their global competitiveness (Anonymous RP Interview 05, 2021). The two domestically-based multinational automotive chemical companies have, however, continued to maintain a large domestic manufacturing presence in South Africa.

What has transpired from a product development perspective as a result of these globalisation pressures is that domestic automotive chemical affiliates have become extremely reliant on their parent-companies to develop products and obtain approvals from OEM parent-companies for domestic manufacture and use. The participants stated that this is a tedious, time-consuming, and costly process as, although the development is conducted overseas, each affiliate is required to carry the costs of development. These costs are subject to foreign currency exchange rates, which add further costs to the domestic affiliate. Opportunities for business with automotive OEMs with new technology/products now requires global approval even though suitable products may be available domestically. One participant stated, *"Even if you have a better product locally which is more suited to local conditions, if it is not globally approved you are unable to successfully secure new business opportunities"* (Anonymous RP Interview 03, 2021).

6.4.2. Global competition

Competitively-priced imported products threaten sales volumes of domestically manufactured products which in turn negatively impact sales revenue and manufacturing-cost recovery. The participants were asked whether, in their opinion, there was a threat to domestically produced products from lower-priced imported products, especially from the Asia Pacific region.

The discussions yielded mixed responses from the participants. One participant was of the view that there was a push by Asia Pacific companies to supply domestic OEMs as well as ACSs. This is specifically evident in the case of domestic OEMs who have parent-OEMs producing the same model vehicles as are produced domestically (Anonymous RP Interview 04, 2021). Another participant indicated that *"there were a few new players that were not there a few years ago supplying imported products through a distribution outlet"* (Anonymous RP Interview 06, 2021). The participants did however point out that, although OEMs used the threat of importation as a lever during price negotiation, this was rarely followed through. The value-added domestic technical service provided by domestic automotive chemical businesses in support of their product offerings is believed to be central to OEMs' decisions to continue to pursue sourcing of domestically manufactured products as far as possible. The participants also mentioned that the high cost of switching ACIS businesses and the potential disruption to production more than likely also has an influence on OEM sourcing decisions.

The participants further mentioned that there are currently chemical products that are being imported from automotive chemical parent-companies. These are generally low-volume products that do not justify the capital investment in plant and machinery to manufacture domestically. These low-volume products are manufactured in larger volumes at one of the parent-company production facilities for global distribution.

The participants were asked if, in their opinion, domestic ACIS businesses would have to improve the competitiveness of their product and service offerings to be able to survive in the global automotive arena going forward. The participants explained that ACIS businesses must constantly redefine themselves. One participant pointed out, *"This is a constant challenge driven through to automotive chemical companies by the automotive OEMs to show efficiencies in their supply chain to optimise the timeous delivery of their products and eliminate wastage"* (Anonymous RP Interview 03, 2021). The general response from the participants was that domestic automotive chemical businesses were sufficiently competitive with respect to product quality and service delivery. Some of the participants were of the opinion that domestic ACIS businesses would be challenged to continuously strive to meet global standards of operation to maintain a competitive position in the automotive value chain and maintain profitability.

6.4.3. Industry complexity

Complexity is often overlooked as a factor that contributes to operational costs. The participants were asked if, in their opinion, the automotive chemical industry can be classified as complex and why this could be the case. The question of homogeneity of automotive chemical products was raised with the participants. They were asked if automotive chemical products supplied to the OEMs were homogeneous, in other words easily transferrable between automotive OEMs.

According to the participants, product specifications are not standardised across the automotive industry. Each OEM has its own individual product specification and application requirements based on their production infrastructure which drives supplier product customisation. The responses indicated that, while different automotive products are designed to provide a specific outcome, they are also customised to fulfil specific customer needs (Anonymous RP Interview 01, 2021; Anonymous RP Interview 02, 2021; Anonymous RP Interview 03, 2021; Anonymous RP Interview 04, 2021; Anonymous RP Interview 05, 2021; Anonymous RP Interview 06, 2021).

Product portfolios can vary significantly from having small differences between industry competitors to being highly specialised, in other words having large differences between industry competitors. The competitive market offerings in the automotive chemical industry were therefore characterised by the participants as being complex. Although customisation provides both ACIS businesses and OEMs with an opportunity to differentiate themselves from their competitors, product proliferation as a result of customisation contributes to complexity in automotive chemical industry production and supply chain processes, which adds cost to the products.

6.4.4. Legislation

The institutional environment within which ACIS businesses operate in South Africa has significance for long-term economic sustainability of the automotive chemical industry. Legislation, regulations, and standards can have a significant effect on the ACIS businesses by increasing production costs while also placing limitations on various aspects of businesses.

The participants were asked whether they were aware of any pieces of legislation that have a significant impact on automotive chemical industry costs. Three pieces of legislation were identified by the participants as being particularly influential on automotive chemical industry costs: labour legislation, B-BBEE legislation, and environmental legislation. The significance and impact of current automotive industrial policy was also raised and perceived not to be particularly accommodating to the automotive chemical industry as it was directed at OEMs and ACSs.

6.4.4.1. Labour Legislation

The first piece of legislation raised by the participants as a particular concern for the automotive chemical industry was labour legislation. The prevalence of economic fluctuations in the South African economy and consequent effects on the domestic automotive industry requires a certain degree of flexibility in automotive chemicals manufacturing, of which labour forms an integral part. The participants were of the view that the rigidity of current labour legislation in South Africa hampers ACIS businesses' ability to easily adjust the size of their labour force in line with OEM demand fluctuations. It was also stated that, because labour wage adjustments in the automotive chemical industry are centrally bargained in the broader chemical, pharmaceutical, and petroleum industry, the probability, bargained wage increase percentages could be higher than what some of the individual companies could necessarily afford, adding to company costs. Another issue raised by the participants was that of protracted labour strikes in the automotive industry, which results in serious ripple effects for automotive chemical manufacturing industry supply chains and a consequent negative impact on business costs. Strike action was viewed as being detrimental to the competitiveness and economic sustainability of the automotive chemical industry. The participants stated that automotive OEMs are better positioned to survive protracted labour strikes than comparatively smaller industries such as the automotive chemical industry.

6.4.4.2. Broad-Based Black Economic Empowerment

The second piece of legislation discussed with the participants was that of B-BBEE. According to the participants, B-BBEE certification is a business imperative for all automotive OEM suppliers. Automotive original equipment manufacturers (OEMs) set B-BBEE minimum certification target levels that all suppliers must meet in order to sustain existing business and gain repeat business with OEMs. Recent amendments to B-BBEE with stricter requirements are of concern to the automotive chemical industry with the expectation of greater pressure on automotive chemical industry profit margins. A participant indicated, "*Achieving the OEM B-BBEE target level under these stricter requirements is going to be a real challenge for the automotive chemical industry due to the increased cost implications of meeting stricter requirements*" (Anonymous RP Interview 03, 2021). According to the participants, it is very difficult for multinational automotive chemical industry companies operating in South Africa to achieve the required OEM B-BBEE level in the priority elements such as ownership, skills development, enterprise, and supplier development. The focus on ownership structure is especially challenging for multinational ACIS businesses. With profit margins under pressure, the extra expenditure required to achieve these levels is most likely unsustainable. A participant stated, *“Automotive chemical industry businesses will be hard pressed to sustain the required OEM B-BBEE rating levels”* (Anonymous RP Interview 02, 2021).

6.4.4.3. Environmental legislation

Environmental legislation, regulations, and standards play an important role in the automotive and automotive chemical industry in terms of overall environmental accountability. To gain a better understanding of the costs and benefits of environmental legislation, the participants were asked to express their opinion on the impact of environmental pressures on profitability of automotive chemical companies.

It was stated that, notwithstanding the added costs, compliance with environmental legislation is of particular importance in the automotive chemical industry. Therefore, compliance with legislation in terms of product safety, manufacturing process safety, raw material and finished product safety, and personal safety is of prime importance in all aspects of the automotive chemical business. Compliance with South African governmental legislation and accreditation to standards such as the ISO 14000 as well as meeting parent-company and customer requirements in this regard is viewed as extremely important. One participant indicated that *“there is a lot of focus on environmental compliance from OEMs”* (Anonymous RP Interview 02, 2021).

The participants explained that the inherent hazardous nature of automotive chemical products requires automotive chemical suppliers to ensure that automotive chemical products supplied to the automotive industry do not contain any harmful or banned substances. This is underpinned by the fact that automotive chemical industry R&D efforts are, for the most part, focused on developing products that are environmentally safe and water and energy efficient. The participants indicated that environmentally-friendly automotive chemical products do, however, tend to be disadvantageous to OEMs from a price perspective as these products generally command comparatively higher prices. One participant stated, *“The cost impact often deters some OEMs from changing to environmentally friendly technology and only do so if and when environmental compliance is enforced”* (Anonymous RP Interview 03, 2021).

According to the participants environmental legislation impacts several areas in automotive chemical manufacturing businesses, such as product development, product/raw material storage, product labelling handling and usage, transportation, spillage management, and product use in the customer manufacturing processes. One participant stated that, although *"the actual cost of environmental compliance is not easily calculable"* (Anonymous RP Interview 02, 2021), environmental legislation does carry a cost premium to automotive chemical industry businesses due to the high cost of specialised raw materials used in the manufacture of these environmentally-friendly chemical products.

6.4.5. Industry competitiveness – uncertainty and stability

The participants were asked whether, in their opinion, there was a link between industry trade uncertainty, industry stability, and economic sustainability in the automotive chemical industry in South Africa.

6.4.5.1. Industry stability

According to the participants, stability in the automotive chemical industry is largely dependent on the automotive industry, in other words the inextricable link between the number of vehicles being manufactured by the OEMs at any point in time and automotive chemical product usage. In their opinion, the amount of chemical product used per vehicle manufactured is relatively stable. However, any increase or reduction in vehicle production creates a corresponding increase or reduction in demand for chemical products with a consequent impact on sales volumes and revenue. The participants pointed out that although vehicle volumes have steadily increased over the last five years, there have been fluctuations caused by the run-out of older vehicle models and the introduction of new models. Adverse global and domestic economic conditions and the advent of the COVID-19 pandemic have had a major impact on vehicle production in 2020 and 2021, with a corresponding reduction in demand for automotive chemical products.

In order to gain an understanding of the stability of the automotive chemical industry environment, the participants were asked about the number of competing businesses within the automotive chemical industry.

It was the opinion of the participants that the industry is relatively stable in terms of the number of ACIS businesses operating in the industry. As they previously mentioned, there are only two major MNCs and one or two minor companies with multinational links currently operating in South Africa. During the discussion, the participants stated that there were no major new entrants over the last five years (Anonymous RP Interview 01, 2021; Anonymous RP Interview 02, 2021; Anonymous RP Interview 03, 2021; Anonymous RP Interview 04, 2021; Anonymous RP Interview 05, 2021; Anonymous RP Interview 06, 2021). Switching ACIS businesses was, according to the participants, not a regular feature in the South African automotive industry because products were customised for particular OEMs, which made benchmarking for OEMs difficult. This adds to a modicum of stability in the industry. According to the participants, unless there is a major technical issue impacting OEM production or a major technology breakthrough from a competitor which has parent-OEM approval and a major cost advantage, switching does not summarily take place.

6.4.5.2. Industry uncertainty

The participants presented some contrasting views regarding uncertainty in the domestic automotive chemical industry. The discussions revealed that, ultimately, growth in the South African automotive chemical industry is inextricably linked to automotive vehicle production. There are no guarantees of certainty in the automotive chemical industry while OEM vehicle production remains uncertain. One participant stated that, *"while there are longer term plans in the industry regarding total vehicle production volumes, the specifics are always uncertain"* (Anonymous RP Interview 04, 2021). Some of the participants pointed out that a lot depends on the ongoing viability of export market destinations, where the cost and quality of domestically produced vehicles for export plays a major role in securing export programmes for domestic OEMs. The participants contended that, although domestic vehicle manufacturing volumes remain relatively stable in the face of the COVID-19 pandemic, lower vehicle demand and lower volumes produced locally could result in a knock-on effect on domestic automotive chemical company's domestic manufacturing operations which may lead to a shift away from domestic production to the importation of products in order to remain globally cost competitive. One participant argued that *"in South Africa there is a lot of reliance on export programmes [to sustain local vehicle production* *volumes] with the majority of exports going to the northern hemisphere who have been heavily impacted by the COVID-19 pandemic, and if their demand goes down the impact of reduced domestic export programmes will consequently filter down to automotive chemical suppliers"* (Anonymous RP Interview 04, 2021). Some of the participants felt that the fact that the South African automotive industry is strategic to the domestic economy and strongly supported by the government in the form of automotive industrial policy provided a modicum of medium-term certainty to the industry. The participants were in agreement that macro factors such as political and economic factors in the country and globally play a significant role in industry uncertainty in South Africa. One participant pointed out that automotive chemical industry uncertainty has a direct impact on investment decisions and corresponding growth in the industry by arguing that *"it's hard to invest without guarantees"* (Anonymous RP Interview 03, 2021). This uncertain view of industry was affirmed in the interview with Anonymous RP Interview 04 (2021) where the participant stated that *"any uncertainty in the industry could therefore strongly influence the automotive chemical industry decision to terminate domestic manufacturing in favour of importation".*

6.5. THEME 2 – INDUSTRY FACTORS

Theme 2 dealt with in the research interviews was that of industry factors influencing the profitability and economic sustainability of the South African automotive chemical industry. Automotive chemical companies in South Africa have been experiencing a gradual decline in profit margins, with a tendency towards the commoditisation of automotive chemical products supplied to automotive OEMs in a challenging present-day automotive business environment. Price and input cost pressures are widely considered to have a negative impact on the profitability of businesses operating in the automotive chemical industry and can negatively impact economic sustainability in the industry.

6.5.1. Industry price sensitivity

The participants were asked to present their views on price sensitivity in the automotive chemical industry.

The participants were of the shared opinion that automotive OEMs can be price sensitive. This opinion was underpinned by the OEM's strategy of continuous pressure on ACIS businesses to reduce product prices. This strategy is predominantly driven by global competition and the fact that OEMs must compete for manufacturing contracts from their global parent-companies. One participant described OEMs as being *"very price sensitive"* (Anonymous RP Interview 05, 2021). It was the view of the participants that automotive chemical suppliers often have to contend with tough price negotiations. It was also the opinion of the participants that this is a tactical approach by OEM purchasing departments to reduce OEM costs. One participant mentioned that *"everyone wants to show their own shareholders that they are profitable, so they squeeze where they can"* (Anonymous RP Interview 05, 2021). The participants indicated that the OEM strategy of pressurising supplier prices places undue pressure on supplier ability to pass through uncontrollable input costs, which ultimately affects profit margins and the ability to reinvest in their manufacturing operations. Original equipment manufacturers (OEMs) can explore the possibility of sourcing cheaper direct imports from suppliers with lower cost bases, which impacts ACIS business revenue streams. One participant pointed out, "*Although this has not as yet materialised the OEMs regularly benchmark product pricing globally*" (Anonymous RP Interview 03, 2021).

6.5.2. Market share retention

The participants were asked if, in their opinion, there was a tendency in the market to reduce prices in order to maintain market share.

It was stated that maintaining market share is vital. It ensures that automotive chemical factories operate at optimum capacity, which in turn enables cost recoveries in the factory to be optimised in order to achieve lower manufacturing costs and protect profit margins. One participant made mention that, although supplier prices are being reduced in the face of competition, reasonable profit margins must still be maintained and contended: *"you cut prices if you can absorb margin loss until you cannot cut anymore, there is a walk away point"* (Anonymous RP Interview 06, 2021). Another participant believed that prices in the automotive chemical industry have steadily declined over the past five years, with OEMs leveraging domestic automotive chemical suppliers with cheaper direct imports. One participant was of the opinion that *"if the*

OEM can import at a lower price they will go back to the supplier and indicate the target price the supplier has to meet" (Anonymous RP Interview 04, 2021). According to the participants the dilemma is that the downward spiral of price pressure and declining profitability could eventually lead to a cessation of domestic automotive chemical product manufacturing operations. This implies that ACIS businesses can convert their manufacturing business model to one of importing finished products and servicing these products domestically.

6.5.3. Original equipment manufacturer price-reduction targets

The participants were asked their opinion on what the response of automotive OEMs would be if ACIS businesses cannot meet OEM product price-reduction targets.

The participants indicated that the fact that OEM purchasing departments tend to manage specialty automotive chemical products as commodities means OEMs have the option of sourcing cheaper products from global suppliers with lower cost bases. The sourcing decision will therefore primarily be product-cost based. One participant was of the opinion that "*the OEM purchasing departments do not acknowledge the actual value of the products to their vehicle production process, they tend to see these specialty chemical products as commodities as opposed to specialised products which provide solutions to their production processes"* (Anonymous RP Interview 03, 2021). Original equipment manufacturers (OEMs) could well decide to manage the importation of automotive chemical products directly, forsaking the specialised chemical expertise required to take on supply logistics responsibility and forgoing any domestic technical service. This, however, may not be a practical option for OEMs for sourcing specialty automotive process chemical products. The participants pointed out that, in their industry experience where this approach has materialised, the OEMs have sustained high wastage levels due to expired product as a result of suboptimum logistic and storage processes with a consequent cost impact. One participant was of the view that any decision by OEMs to switch to imported products as opposed to domestically manufactured products would also depend on the type of product technology, in other words if the technology/product has a high technical service requirement and/or is sensitive to environmental conditions and has a short-term shelf life (Anonymous RP Interview 06, 2021).

6.5.4. Imported products

The participants believed a move away from domestic manufacturing to the importation of specialty automotive chemical products would create a different set of challenges and risks for both ACIS businesses and OEMs in terms of longer, more complex supply chains. They pointed out that any decision to import automotive chemical products could reduce supply chain flexibility, impact supplier's ability to meet OEM stock requirements, and incur additional costs of shipping products from parent plants. On the other hand, it was argued that having the products manufactured in an overseas production facility with high production volumes and EOS, with lower costs per kilogram of product, could offset some of the increases in logistics costs attached to importation.

What has materialised in some instances, according to one participant, is that some of the OEMs are now directly importing low-volume chemical products such as metal-bonding products in their CKD component packs, which provides them with a cost advantage (Anonymous RP Interview 02, 2021). These products are being sourced by OEM parent-companies overseas and are being included in their part CKD packs for distribution to their subsidiary companies in South Africa. This, in effect, leads to a loss of business for the domestic ACIS businesses, with a corresponding loss of sales revenue and profit margins for these products. The participants pointed out that despite creating further risks in terms of inventory management and product wastage, domestic OEMs still expect these products to be fully serviced and technically supported by domestic automotive industry businesses if represented in South Africa.

6.5.5. Profit margin pressure

The question of ACIS business profit margin pressure was put to the participants. They were asked whether, in their opinion, ACIS business profit margins declined, increased, or were stable over the last five years.

It was suggested that margins declined over this period, which would have been expected as this is more or less the lifespan of a vehicle model. According to one participant, vehicle production lifespan is a primary driver of price-reduction pressure from OEMs (Anonymous RP Interview 03, 2021). The participants contended that rising raw material costs, together with pricing pressure from OEMs, have contributed to this margin decline. It was also pointed out that the OEMs expect ACIS businesses to recover profit margins through improved operating efficiencies while discarding the fact that prices of specialty raw materials, of which a large percentage are imported by automotive chemical supplier businesses, are constantly increasing. There are several contributors to product costs of which raw materials make up the largest percentage (between 65% and 80%) (Anonymous RP Interview 06, 2021). Besides raw materials, there are labour and overhead costs to consider. With heavily unionised labour and centralised bargaining labour, costs are not easily controlled. South Africa continues to experience significant increases in energy costs.

6.5.6. Investment decisions

An important aspect of profit margin pressure is its impact on capital investment decisions of automotive chemical businesses in South Africa. The researcher enquired as to whether profit margin pressure, due to OEM price-reduction strategies, would have an impact on capital investment decisions in the automotive chemical industry.

The consensus from the participants was that it would. In order to retain its position as a supplier of automotive chemicals within the framework of demands from the global automotive industry, investment in capital equipment is imperative to maintain operational and technological competitiveness. The participants stated that capital funding in the domestic multinational automotive chemical companies is normally via parent-companies and is based on business/financial motivations from the domestic affiliates. One participant stated that *"the cost of plant and machinery investment for a specific product would normally need to be recouped within the life cycle of the vehicle which is between five to seven years which increases the investment risk"* (Anonymous RP Interview 04, 2021). Another participant indicated that automotive OEMs have been reluctant to offer long-term supply contracts to ACIS businesses and business is managed on a year-to-year basis with no formal long-term contracts (Anonymous RP Interview 02, 2021). Industry certainty and individual business profitability are vital for multinational automotive chemical companies to continue to invest in their domestic operations in South Africa. One participant affirmed the fact that *"if you are not able to get investment it makes it very difficult to improve your quality and supply to the OEMs"* (Anonymous RP Interview 05, 2021). The participants were of the opinion that automotive chemical suppliers will continue with domestic manufacturing provided they can sustain reasonable profit margins. If profit margins were to become too pressurised, there is a high probability that domestic production could be terminated in favour of importation. According to one participant, this is underpinned by the decision of South African based multinational coatings companies several years ago to terminate the domestic production of automotive paints and move to importation (Anonymous RP Interview 03, 2021). The participant further responded, *"There are automotive chemical companies that are considering shutting down particular unprofitable manufacturing facilities which currently accommodate low volume products and importing cheaper finished goods directly from their operations in countries such as India, Middle East and China"* (Anonymous RP Interview 03, 2021).

6.5.7. Economic sustainability

The participants were invited to provide their opinion on the general profitability and economic sustainability position of automotive chemical companies in the industry and their ability to retain profit margins and keep automotive chemical businesses profitable.

The general response from the participants was that, if sustainable profit levels cannot be maintained in the industry as a result of OEM demands, increasing operational costs, and pricing pressure, automotive chemical businesses will not be profitable and economically stable and will have to consider alternatives to current strategies in order to survive. Two scenarios were alluded to by the participants, the first being that of restructuring, which could impact the level of technical service provided to OEMs, and the second being the discontinuation of domestic production of automotive chemical products. The risk to OEMs of restructuring is the possibility that the technical capability of automotive chemical businesses to service the automotive OEMs will be compromised as a result of not being able to retain technical expertise. One participant explained that *"globalisation demands are higher because specifications are higher, so the service levels expected by South African OEMs where production volumes are lower, are the same as those expected at USA, European and Asia Pacific automotive plants"* (Anonymous RP Interview 03, 2021). Although the discontinuation of domestically manufactured automotive chemical products would significantly reduce domestic automotive chemical industry manufacturing overhead costs, as previously mentioned, this would be a distinct disadvantage for the automotive OEMs in terms of flexibility as a result of longer, more complex supply chains. The participants were asked whether companies in the automotive chemical industry have been forced to cut costs in order to remain profitable**.** It was pointed out by one participant that reducing cost was an ongoing focus of automotive chemical companies*.* The participant further explained that *“continuous effort is placed on adjusting formulations or trying to source cheaper raw materials in order to reduce cost and maintain profitability”* (Anonymous RP Interview 05, 2021). The participants affirmed that the retention of profitability is closely linked to economic sustainability in the automotive chemical industry, which is experiencing a stagnation in demand and cyclical challenges such as pricing pressures, increased input and overhead costs, trade uncertainty, and COVID-19-driven structural disruptions in the industry.

6.6. THEME 3 – OPERATIONAL FACTORS

Theme 3 dealt with in the research interviews was that of the importance and contribution of supply chains and the manufacturing value chain to ACIS business profitability and economic sustainability. Within the framework of this theme, market pressures and factors that give rise to cost challenges within various components of the automotive chemical supply chain were explored with the participants.

6.6.1. Supply chain

The participants identified cost pressures and managing the global automotive chemical industry supply chain as the two most important management challenges facing the automotive chemical industry. The participants were in agreement that the chemical supply chain component of the value chain plays a significant role in the company’s ability to improve competitive performance and is a major contributor to automotive chemical industry costs. The participants believed the effective management of the supply chain process was critical to an ACIS business’s profitability and economic sustainability. According to one participant, *“automotive chemical supply chain efficiency provides automotive chemical businesses with a competitive edge especially when supplying into an industry with a continuous manufacturing line where product shortages can lead to the disruption of customer production”* (Anonymous RP Interview 04, 2021). Having an efficient supply chain provides an appreciable opportunity for cost reduction and contributes to ACIS business competitive advantage (Anonymous RP Interview 06, 2021). Therefore, any factors that add cost to various components of the supply chain will inevitably have a negative impact on business and industry profitability, according to the participants. The interviews revealed that there are numerous factors that place significant cost pressures on automotive chemical supply chains, from raw material acquisition through to the delivery of finished products. These cost pressures primarily present themselves in the form of inefficiencies and waste at various points in the automotive chemical supply chain. The participants were asked to highlight specific key areas they deemed to have a major bearing on industry cost and profitability.

6.6.1.1. Demand planning

A specific area of concern raised by the participants for the automotive chemical industry is that of demand planning. The participants described the automotive chemical supply chain as being complex, and within this complexity ACIS businesses must contend with numerous OEM performance demands, one of which is delivery reliability. This was affirmed by one participant, who responded saying that *“the supply chain is complex and time consuming especially from an importation perspective with regard to raw material or finished product”* (Anonymous RP Interview 05, 2021). Contemporary automotive chemical supply chains, according to the participants, have become systematically longer, more expensive, and more complex. It was pointed out that the types of challenges being experienced in the industry are the ability to manage safety and on-time delivery while at the same time maintaining responsiveness and flexibility expectations of the OEMs. The view of a particular participant was that the use of multiple logistics service providers by the automotive chemicals industry adds further complexity, risk, and cost to automotive chemical industry supply chains (Anonymous RP Interview 04, 2021). As contemporary automotive chemical supply chains are global, they are inherently susceptible to an array of potentially disruptive events at source. As an example, one participant indicated that *“some specialty raw materials are only produced by a small number of manufacturers so even in the event of a local plant issue, major disruptions in supply chains can occur globally”* (Anonymous RP Interview 02, 2021).

International lead times associated with the importation of raw materials (and finished products) out of Europe, the USA, and Asia by sea-freight to Africa are relatively poor compared to other international automotive chemical businesses due to South Africa's geographic location. These lead times are impacted by port inefficiencies, both at source and domestically, which have been further exacerbated by the advent of the COVID-19 pandemic. This makes demand planning extremely challenging, resulting in automotive chemical businesses having to increase their inventory holding in order to fulfil OEM on-time in-full delivery requirements. As explained by one participant, *"automotive chemical products generally have a finite shelf life which does not allow for indefinite product (raw material) storage periods which can lead to product expiry and obsolescence"* (Anonymous RP Interview 02, 2021). This inevitably translates into extra inventory cost in terms of stock write-off and expensive chemical disposal costs. Any fluctuations in OEM demand (bullwhip effect) gives rise to a significant knock-on effect throughout the supply chain. The sentiment of three of the participants in this regard was that chemical product shelf life and product availability lead-time challenges in the automotive chemical industry are not well understood by automotive OEMs (Anonymous RP Interview 02, 2021; Anonymous RP Interview 03, 2021; Anonymous RP Interview 04, 2021).

Another important variable in automotive chemical industry demand planning is that of forecast accuracy. Access to predicted OEM vehicle production volumes plays an important role in automotive chemical industry raw material sourcing and product manufacturing planning and scheduling. The participants also pointed out that there is an inherent weakness in OEMs' ability to link vehicle production to automotive chemical product requirements as chemical products do not form part of the OEM BOM. This creates a knock-on effect through the supply chain as ACIS businesses require this information in order to purchase raw materials to produce products for the forecasted vehicle volumes while at the same time controlling costs as effectively as possible. Therefore, ACIS businesses are reliant on the provision of accurate vehicle production information from OEMs (short, medium and long term) which is regularly updated. The participants concluded that growing chemical supply chain complexity has added risk and cost to the automotive chemical industry.

6.6.1.2. Raw material sourcing

Another area of concern raised by the participants was that of cost challenges in the raw material sourcing process and, more specifically, global sourcing. According to the participants, raw materials used to manufacture automotive chemical products are mostly imported (on average, estimated at 80%, depending on the product formulation). These raw materials are sourced globally on the open market. There are some raw materials that are very specialised and are only available from a single source. Availability and cost were highlighted by the participants as the two most challenging issues experienced regarding the sourcing of these raw materials. A large proportion of these input raw materials are deemed to be commodities and are traded on the open market, which implies that the availability of these materials is subject to supply and demand and are subject to regular price fluctuations. Some of the input raw materials are specialty raw materials that command premium prices. From an order volume perspective, the participants stated that it is extremely difficult to secure regular small volumes of imported raw materials to accommodate fluctuating domestic manufacturing volumes as most suppliers work on minimum order quantities. Long lead times further add to the challenge of raw material sourcing. Often, the minimum order quantity requirements of global raw material suppliers create a dilemma for the automotive chemical industry. Large minimum order input raw material volumes translate into increased raw material inventory holding and obsolescence risks for domestic automotive chemical suppliers due to the comparatively low product demand from domestic OEMs. One participant explained that *"if smaller product volumes could be secured it would be at a premium price adding to cost."* (Anonymous RP Interview 02, 2021).

6.6.1.3. Currency exchange rates

A further concern raised by the participants was that of imported raw materials which are subject to volatile currency exchange rates and adds to the cost of raw materials. The inherent weakness and volatility of the South African Rand has a substantial impact on raw material, shipping, and port costs. The participants explained that the automotive OEMs allow for forex relief, normally retroactively at rates of exchange which are established by the various individual OEMs. One participant pointed out, *"Rate of Exchange fluctuations have to be managed through a 12-month period before* *automotive chemical suppliers are provided with an opportunity to adjust prices…you get a bit of relief but not all of it"* (Anonymous RP Interview 03, 2021). Every OEM has a different policy on forex relief. Another participant explained that *"some OEMs will take a historical six-month average and apply it to the next quarter, so it's never truly aligned with the actual cost of the raw material purchases throughout the year … Rates of exchange have a huge impact – especially when the South African Rand experiences a rapid depreciation – this creates a significant price movement on automotive chemical products which becomes extremely difficult to pass through to OEMs, with a consequent negative impact on profit margins"* (Anonymous RP Interview 04, 2021).

Another issue highlighted by the participants was that of shipping delays, which have become more frequent with the advent of the COVID-19 pandemic. Shipping delays often result in multifaceted supply logistic problems and further increased cost. The participants explained that, in emergency situations, non-hazardous chemical raw materials have to be airfreighted at a substantial cost premium. One participant pointed out that airlines have also become much more restrictive with respect to the transportation of hazardous chemical products, so this is not a standard practice in the industry and the costs are prohibitive (Anonymous RP Interview 04, 2021). The advent of the COVID-19 pandemic had also restricted the overall number of flights available at the time. Airfreighted chemical products require expensive specialised packaging and are subject to aviation restrictions on volumes, depending on the severity of the product hazard.

6.6.1.4. Warehousing costs

Another important factor raised by the participants that contributes to cost escalation is that of the storage of raw materials and finished products. According to one participant, *"the storage of chemical raw materials and finished products is complex, costly and risky in terms of products expiring and having to be disposed of at significant cost"* (Anonymous RP Interview 04, 2021). Another participant pointed out that *"OEMs only allow minimal product storage of chemical products on their respective production sites"* (Anonymous RP Interview 06, 2021). The reason provided was that chemical products contribute to numerous product storage and handling complexities, due to their hazardous nature, which require diverse specialised facilities with controlled storage and handling. Original equipment manufacturers (OEMs) are not particularly geared to deal with these requirements and therefore require that chemical product storage on their production sites is minimised. This places pressure on ACIS businesses to maintain high minimum stock levels in order to meet OEM call-off delivery requirements. Consequently, this places pressure on ACIS businesses' inventory holding costs, which impacts the net working capital and cash flow of individual businesses operating in the automotive chemical industry.

6.6.1.5. Manufacturing value chain

The automotive chemical manufacturing value chain is a significant driver of competitiveness and profitability in the domestic automotive chemical industry. To commence the discussion, the participants were asked to provide their viewpoint as to whether automotive chemical manufacturing operations can be a major determinant of company profitability. The participants were asked for their perspectives on factors that could influence costs in the automotive chemical manufacturing process.

Several areas of cost concern were highlighted and some key aspects were addressed. Escalating energy costs was one of the major issues highlighted by the participants. The price of electricity in South Africa has increased significantly in recent years, placing pressure on automotive chemical industry operating costs. Intermittent power outages have increased the risk of wastage and production down-time due to batches of products having to be scrapped and the consequent loss of production. One participant stated that batches in production cannot be stopped once started and any disruptions result in tonnes of work-in-progress batches of chemical product having to be scrapped at significant costs. This places pressure on raw material stocks that must be urgently replaced at extra cost.

The participants were asked to discuss their views on the impact of labour costs on automotive chemical industry profitability. The responses presented a few contrasting views. Some of the participants were of the view that labour costs did not play a significant role in automotive chemical industry profitability as they made up a relatively small proportion of the total product costs. Other participants held the view that labour costs were a limiting factor in overall cost competitiveness. The major concern that was advanced was that of labour market inflexibility and labour unrest in South Africa which, in their opinion, was a greater competitive impediment than pure labour cost.

6.6.1.6. Customer interface challenges

Switching the focus of the discussions to the customer interface challenges of the supply chain in terms of value and pricing, the participants were asked to express their opinions on the effectiveness of product and service pricing strategies in the automotive chemical industry.

According to the participants, passing input cost increases through price increases was not an easy process. It was mentioned that OEM purchasing departments were perceived to put short-term purchasing gain ahead of total costs. There are, however, some OEM purchasing departments who have specialised buyers with engineering backgrounds rather than commodity buyers who will take more of a total-cost approach. One participant was of the view that *"although there are many components which make up the product price and although OEMs require detailed motivations for price adjustment requests, at the end of the day it comes down to overall product price"* (Anonymous RP Interview 03, 2021). According to the participants the dichotomy in OEMs is that manufacturing and engineering departments are more inclined to support a value-added total cost approach to product sourcing but tend to be overruled with final commercial decisions being taken by purchasing departments who more than often do not have direct manufacturing experience. Another participant affirmed the fact that *"decisions are made on pure price by the purchasing department as opposed to a total cost while other parts of the OEM organisation are to a large extent excluded from the supplier sourcing/selection process"* (Anonymous RP Interview 05, 2021). One participant highlighted the fact that *"OEM purchasing departments have globally benchmarked product pricing targets to achieve and have access to product pricing at their various overseas OEM manufacturing plants. They also pressurise domestic suppliers to provide open book costing and profitability disclosure which is not possible without disclosing proprietary product information"* (Anonymous RP Interview 06, 2021). The participants pointed out that, although price negotiation is conducted domestically, prices are generally benchmarked against parent-company operations and pricing targets. One participant explained that *"in some instances, there is some validation with global parent OEM purchasing departments but this may vary depending on the OEM"* (Anonymous RP Interview 03, 2021).

6.6.1.7. Technical service component

The participants were asked to provide an opinion on the importance of the technical service component of their market offering to OEMs.

The general response from the participants was that the service component has become an expectation and is not perceived by the OEMs as value-adding. From a non-price-based activity perspective such as provision of knowledge, advice, and technical service cost recovery, no premium is paid by OEMs as the cost of these services is deemed to be part of the product price, unless otherwise contractually agreed. The participants perceived the service component of the offering to have been commoditised. They further pointed out that business is retained based on an automotive chemical company's record of competency to provide the required service level. One participant explained that *"the product is purchased along with the service"* (Anonymous RP Interview 05, 2021). An interesting view presented regarding the specialty coatings industry, which is closely allied to the specialty chemicals industry, is that the service provided is also not seen by the domestic OEMs as a differentiator but rather as part of the product offering. In other words, technical service is a given. This is apparently unique to South Africa as opposed to Europe and the USA where automotive coatings companies sell their services separately. The participant with coating industry experience explained that *"this was due to the fact that historically for many years the service aspect was provided for free … In addition, European and USA based OEMs have the knowledge within the OEMs where in South Africa the OEMs rely more on their suppliers for that knowledge"* (Anonymous RP Interview 05, 2021).

6.7. THEME 4 – COMMODITISATION

Theme 4 deals with the phenomenon of commoditisation, which was deemed to be an important aspect of this study. The price pressures and margin decline experienced in the automotive chemical industry suggests the phenomenon of encroaching commoditisation in the industry. The aim of the researcher was to establish whether the automotive chemical industry and products supplied to the automotive OEMs, in the opinion of the participants, are susceptible to commoditisation.

6.7.1. Commodity traps: characteristics and effects

In order to establish an understanding of the extent of commoditisation in the automotive chemical industry, the participants were asked to provide their perspective on a number of characteristics that are indicative of industry commoditisation traps.

6.7.1.1. Product commoditisation

The participants were asked if they thought that chemical products sold to the automotive OEMs can be classified as commodity products.

According to the participants, automotive chemical products are specialty products as they provide customised solutions for the customers manufacturing processes. As a result of the domestic vehicle export programmes, domestically produced automotive chemical products require both local and global approvals. One participant was of the opinion that *"the products are definitely specialised as they have to have specific OEM approval"* (Anonymous RP Interview 04, 2021). It was further stated by another participant that *"managing the use of these products in the manufacturing process requires expert understanding of the technology"* (Anonymous RP Interview 03, 2021). The dichotomy is that OEM buyers still tend to define these products as 'raw materials' or 'commodities' and manage them as such. Primary product benefits are being taken for granted as OEMs continuously look for new benefits. Another participant postulated, *"I think that the problem is that there is a disconnect between people in purchasing and engineering, as they [engineering] know what is [technically] required of the product, but when it comes to purchasing, chemical products are treated as a commodity"* (Anonymous RP Interview 02, 2021).

The participants were asked whether automotive chemical product pricing reflected the value addition of the product to the OEM manufacturing process. One participant was of the view that *"they [automotive buyers] tend to steer away from value add and focus on price only"* (Anonymous RP Interview 04, 2021). The participants suggested that it would also depend on whether alternative competitively priced products that have gone through the OEM approval process are available. In many instances, once ACIS businesses start to compete for volume and/or market share, any value-add in pricing disappears and competition is based on price only.

6.7.1.2. *Industry commoditisation*

Indicators that signal impending commoditisation in the automotive chemical industry were discussed to elicit the views of the research participants. An important indicator of commoditisation to be considered is that of production capacity. Product volume demand from OEMs and the domestic automotive chemical industry's capacity to fill the required demand plays a significant role in OEMs' ability to pressurise ACIS business prices.

The participants were asked whether they believed the contemporary automotive chemical industry has spare production capacity. The opinion of the participants was that the industry does have spare capacity. One participant explained that this was primarily due to lower demand from automotive OEMs, which emanated from extended production closures as a result of the recent COVID-19 pandemic as well as lower consumer demand (Anonymous RP Interview 04, 2021). Most of the domestic automotive chemical industry can increase manufacturing capacity to fill increased demand. The participants were of the view that this can be achieved by increasing the number of shifts worked, provided sufficient input raw material can be timeously sourced. The dilemma with lower demand is that automotive chemical plants must scale down their production with an associated cost and even shut down parts of their production operation as production becomes economically unfeasible.

6.7.1.3. *Market competition and price trends*

The participants were asked whether there was a prevalence of competitors in the automotive chemical industry offering products with more benefits at lower prices.

Based on the interview discussions, it was concluded that this was not the case. This was presumably since there are only two major MNC ACIS businesses competing in the domestic market. Although the recent downturn in the automotive industry has contributed to a lower demand, switching costs have remained relatively high with not many new technologies/products being introduced into the market.

As market price trends in the industry can be an indicator of encroaching commoditisation, the participants were asked if, in their opinion, product prices were on the decline in the automotive chemical industry despite endeavours to raise them.

The participants indicated that there was a lot of pressure to cut prices and in many instances, prices were declining. This was, however, very dependent on product/technology and competition. One participant explained that products/technologies that are not easily interchangeable tend to maintain their price structure whereas, if products are homogeneous within the industry, these products come under significant price pressure (Anonymous RP Interview 05, 2021). Another participant added that *"there is no guarantee that whatever works in plant A will work in plant B"* (Anonymous RP Interview 02, 2021). As a result of the automotive and automotive chemical industries being globalised, price setting has become global. According to one participant, *"the biggest effect (on pricing trends) is that there is now what is referred to as global parenting pricing"* (Anonymous RP Interview 03, 2021). This implies that OEM parent-companies drive pricing targets for domestic OEMs, which in turn further exacerbates downward pressure on domestic product pricing.

6.7.1.4. Low-cost competition

The advent of new competitors entering the industry with low-cost, imported, finished products is another important indicator of encroaching commoditisation raised by the participants as a concern for domestic manufacturing. One participant stated that *"competitors are coming in with finished goods, it may be a factory in Thailand where OEMs source finished products more cost effectively"* (Anonymous RP Interview 03, 2021). With the globalisation of the automotive industry, domestic OEMs are well-positioned to access products globally. The participant further indicated that OEMs are treating these products as *"another part, using their CKD supply lines"* (Anonymous RP Interview 03, 2021). Some of the domestic OEMs (especially Japanese-based OEMs) import products from Asia Pacific-based companies that have global approvals for products used in domestically manufactured vehicles. Domestically manufactured products, however, still dominate in the domestic automotive market. As previously discussed, the participants deem this to be largely due to the technical service support provided by the domestic automotive chemical industry.

6.7.1.5. Technology advancement

Exploring the current trends in technology/product innovation in the automotive chemical industry, the participants were asked whether, in their opinion, there have been any major technology developments in the last five years.

Some of the participants were of the view that there have been developments but automotive OEMs, being risk averse, are hesitant when it comes to implementing new technology. As an example, Thin-Film metal pre-treatment technology that does not contain heavy metals and is environmentally friendly has been developed for OEMs. One participant mentioned that operationalising this technology remains a challenge due to the domestic OEMs *"not being ready for it"* (Anonymous RP Interview 02, 2021). In other words, the technology is not approved by OEM parent-companies for use in South African OEMs. Although the two major ACIS businesses in the industry have the technology available, the challenge with this new technology is to make the technology operational and as risk free to OEMs as possible. Automotive original equipment manufacturers (OEMs) are traditionally risk averse and do not easily switch existing technology to new technology. This, together with the capital investment required to change or upgrade their production facilities to accommodate the new technology and the risk of loss of production time, weighs heavily on the OEM technology change decision-making process. One participant noted that *"there is a lot pressure from the automotive industry to develop 'environmentally friendly' technology"* (Anonymous RP Interview 06, 2021). A large proportion of the technology development is being focused on environment-friendly and light-weight products in the automotive chemical industry. These technologies do, however, attract premium prices in the market, so domestic OEMs tend not to implement these technologies unless they have pressure to do so from their parent-companies and provided that the technology has been approved and is in operation at a parent OEM vehicle manufacturing plant. It is apparent from the discussions that most contemporary automotive chemical industry development efforts are being focused on internal efficiency improvement in manufacturing and in product application processes to reduce product cost.

6.7.1.6. Level of customer contact and communication

The participants were asked to provide their opinion on the focus of automotive chemical industry communication with OEMs.

The opinions emanating from the discussions with the research participants were that the purchasing department was the communication window for automotive chemical industry. This is where the commercial negotiations take place and new business is decided. The participants also indicated that, because of the technical nature of the service provided to the OEMs, there is a lot of daily contact with process engineering and production departments of OEMs. There is also contact with the OEM product engineering department with respect to specifications and environmental approval of products. These departments do not, however, have much input into business allocation and commercial negotiation, which is primarily in the hands of domestic purchasing departments and, in some instances, OEM parent-company purchasing departments.

The commoditisation indicators discussed with the participants are not exhaustive and represent examples of a few key indicators that could signal commoditisation. The discussions called attention to the fact that there is no single measure that can distinguish between more or less commoditisation in the automotive chemical business. Monitoring the industry on a regular basis can identify further potential indicators of encroaching commoditisation.

6.8. THEME 5 – BUSINESS RELATIONSHIPS AND POWER

Theme 5 dealt with in the research interviews is that of business relationships, power, and their impact on long-term supplier economic sustainability. Within this framework, the researcher invited the participants to present their views on the role and importance of relationship management in achieving economic sustainability and improving relationship asymmetries in current relationships. The participants were asked to describe the relationships that currently exist between OEMs and companies in the domestic automotive chemical industry.

The view of the participants was that the relationships between OEMs and ACIS businesses tend to be asymmetric with OEMs wielding high bargaining power. An observation by one participant was that *“they [OEMs] get involved in discussions and* *negotiations with [automotive chemical supplier businesses] but they hold the higher ground, I don't think it is really collaborative"* (Anonymous RP Interview 03, 2021). Further to this, the participant also pointed out that an important aspect of relationships is that they are personal and trust is key in establishing any relationship. Establishing a high level of trust with OEMs is not easy for ACIS businesses to achieve. The participant explained that "*you are often not dealing with the same person [in purchasing] for any length of time … I think it is a strategic action by OEMs to break down any relationships that may have formed with buyers so that negotiations are conducted purely on price … relationships have become less important for OEMs over time in my opinion."* (Anonymous RP Interview 03, 2021).

Interestingly, the participants were of the view that, for ACIS businesses to foster a collaborative relationship with OEMs, they need to be considered to be a strategic supplier by OEMs. Whether ACIS businesses are strategic or not can be argued based on automotive supplier tier classification by OEMs. According to the participants, although ACIS businesses are in most cases deemed to be Tier 1 suppliers, comparatively speaking, they do not hold the same relational status to OEMs as Tier 1 ACSs do. However, it was established from the discussions that this approach seems to vary between OEMs. Automotive chemical industry supplier (ACIS) business contact with OEM executive management is limited, with most of the communication being at purchasing and operational level, except when there is a serious supply or technical problem with a disruption to OEM production. This was affirmed by one participant stating that *"communication was predominantly at operational and purchasing level."* The participant further stated that *"this was a weakness in the automotive chemical industry"* (Anonymous RP Interview 06, 2021). Another important factor in relationship management raised by the participants is that of supply contracts. While Tier 1 ACSs secure long-term supply contracts (lifetime of the vehicle model), the OEMs are reluctant to enter into long-term contractual supply agreements with ACIS businesses.

The participants described communication between OEMs and ACIS businesses as being reactive as opposed to proactive. Total OEM spend with the automotive chemical industry is low when compared to ACSs and this seems to play a significant role in OEM relationships with OEM suppliers. According to one participant, *"OEM executives would not generally take the time to get proactively involved with* *automotive chemical suppliers, while being deemed to be 'strategic' suppliers and a key component of their manufacturing process, [automotive chemical suppliers] are a relatively small percentage of their total cost"* (Anonymous RP Interview 03, 2021). The interview responses indicated that OEM executives only get involved when difficulties that present risks to their vehicle production arise. Supply issues, product quality issues, and product application issues generally get the attention of OEM executives.

The interview discussions further revealed that mutual orientation plays an important role in managing business relationships, in other words gaining an understanding of each other's businesses and looking after each other's interests. It was pointed out by one participant, *"If you understand what drives their businesses and how their businesses are run you gain a lot of [proactive] insights which allows supplier companies to support them"* (Anonymous RP Interview 04, 2021). This clearly requires a lot of trust between ACIS businesses and OEM management. One participant was of the opinion that *"it is easier to build relationships with OEM Process Engineering and Production department than Purchasing Department as people do not change that often"* (Anonymous RP Interview 06, 2021).

The importance of collaborative relationships between automotive OEMs and the automotive chemical industry is manifested in the ability of both parties to maintain fairness in bidding processes and price negotiations. The participants believed that supplier relationships have economic significance, which is crucial for profitability and long-term economic sustainability of businesses in the automotive chemical industry. This was the last of the five themes discussed.

6.9. SUMMARY

The purpose of this chapter was to analyse the participant responses and present the results of the empirical section of this study. The participant responses were analysed to establish the diverse factors which lead to commoditisation, the impact on profitability, and ultimately the economic sustainability of the South African automotive chemical industry. As a result of a lack of pre-existing literature pertaining to the commoditisation of the automotive chemical industry, the findings emanating from this study provided a novel perspective of the key factors of the price and cost pre-cursors of the phenomenon of commoditisation in the context of the previously unresearched automotive chemical industry in South Africa, thus creating distinct understanding of the drivers of commoditisation and their impact on economic sustainability in this industry. The response from the anonymous research participants ratified the key aspects, which were broadly reflected in the preliminary theoretical framework developed in Chapter 2 of this study, to establish a reference point for the examination of the empirical findings. The results of the findings in this chapter were used to draft the conclusions and recommend appropriate strategies for the automotive chemical industry going forward, which are published in the following chapter.

CHAPTER 7:
CONCLUSIONS AND RECOMMENDATIONS

7.1. INTRODUCTION

This research study comprised of seven chapters with each chapter addressing aspects of the study. Chapter 1 provided a background and orientation for the study, a theoretical basis for the research, a statement of the problem, and research objectives. Chapter 2 examined and discussed theories and constructs that describe the environmental factors that give rise to the phenomenon of commoditisation. Chapters 3 and 4 served as literature review chapters, providing an overview and synthesis of the global and South African automotive industry and the South African automotive chemical industry respectively. The global automotive industry was examined in terms of its changing external environment and consequent impact on the automotive value chain. The South African automotive chemical industry was addressed in terms of its position within the broader context of the specialty chemical industry and its relevance and importance to the South African automotive manufacturing industry. Chapter 5 provided a detailed explanation of the research methodology employed in this study: a qualitative research approach using a thematic analysis methodology. Chapter 6 provided an in-depth analysis and discussion of the results based on the empirical component of the study.

The main purpose of Chapter 7 is to comprehensively summarise the research results and draw purposeful conclusions that form the basis for the recommendations. The conclusions are derived from the major themes presented in the previous chapter and integrated with secondary data extracted from the literature reviews in Chapters 2, 3, and 4 with respect to the research question.

The synthesis and concluding discussions are limited to major aspects of the themes that are relevant to answering the research question and presented within the framework of the five individual themes identified in the previous chapter. To end this chapter, managerial recommendations, suggestions for further research, and limitations are presented.

7.2. SUMMARY OF FINDINGS.

Automotive chemical industry supplier (ACIS) businesses face significant challenges in their operating environment. These challenges have been brought on by pressures arising from the competitive automotive business environment in which they operate.

Five major themes, representing key underlying environmental factors that contribute to profit margin pressure and a consequent long-term negative impact on the economic sustainability of domestic automotive chemical businesses, have evolved from this study. Figure 7.1 below depicts a summary of the five themes and supporting subthemes emanating from the study that have an impact on ACIS business economic sustainability.

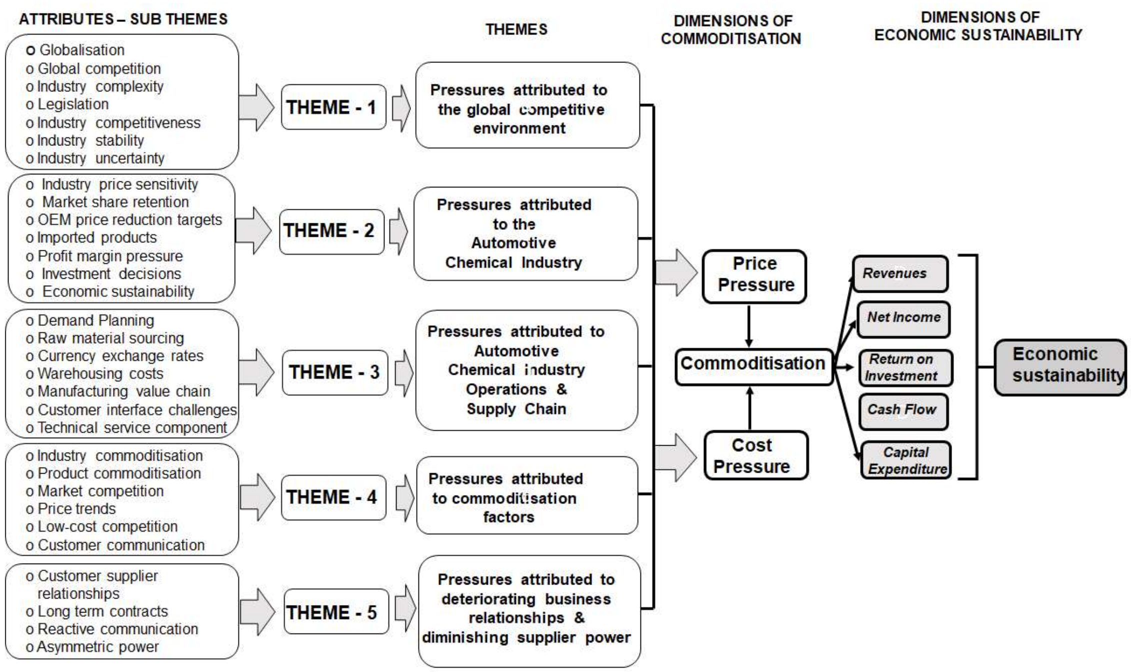

Figure 7.1: Themes and supporting subthemes identifying elements contributing to price and cost components of commoditisation and its impact on business economic sustainability

Source: Researcher’s own illustration (2022)

The concluding discussions below are restricted to major aspects that are relevant to the research question and summarised within the framework of the five individual themes identified in the previous chapter and diagrammatically depicted in Figure 7.1.

The literature findings, empirical findings, conclusions, and recommendations of each individual theme are discussed in the sections below.

7.2.1. Concluding discussion: Theme 1 – Competitive environment

Theme 1 addresses the pressures derived from the competitive environment that can have an impact on the profitability and economic sustainability of automotive chemical suppliers.

7.2.1.1. Literature findings: Theme 1

Within the competitive automotive environment, globalisation and specific aspects of globalisation have been identified as key influencers of competitive pressure in the domestic automotive chemical industry.

- Literature studies support the fact that globalisation creates direct implications for industries and companies and can be either positive or negative, changing the way businesses conduct business (Sections 2.6.1 and 2.6.2).
- Intense global competition emanating from globalisation creates new risks for companies and industries operating in a global environment and is a significant contributor to intensified international competition.
- Of theoretical importance is the link between globalisation and competitiveness theory, which is commonly acknowledged for its impact on the sustainability of positions of advantage and consequently business economic sustainability and survival.
- Globalisation has brought about structural changes to the global automotive industry and more specifically to the global automotive value chain (Section 3.2 and 3.2.2).
- Changes in business ownership, intensified competition, and value chain adjustments are some of the more important changes that have exerted pressure on domestic ACIS business profitability and economic sustainability (Sections 3.2, 3.2.1, and 3.2.2 and Section 4.7.2).

7.2.1.2. Empirical findings: *Theme 1*

As a result of globalisation, South African automotive OEMs have become fully incorporated into their respective parent-companies and, as such, have been fully integrated into the global automotive value chain. This means that domestic automotive chemical companies have consequently also been integrated into the global automotive supply chain (Section 6.4.1).

This study has shown that the integration into the global automotive value chain has impacted domestic ACIS businesses in some key operating areas, increasing business costs. These key operating areas are indicated below.

- Escalating domestic OEM vehicle export programmes have raised OEM expectations in terms of product quality, delivery, and performance have obligated domestic ACIS businesses to comply with global standards and specifications (Section 6.4.1).
- Supplier sourcing decisions have shifted to OEM parent-companies' central purchasing departments, which requires domestic ACIS businesses to have an affiliation with an MNC or at least have a technology licensing agreement with a globally relevant MNC.
- ACIS businesses parent-companies have become more directly involved with domestic ACIS business operations, shifting more responsibility to ACIS business parent-companies with respect to securing new business opportunities for domestic ACIS businesses with globally approved technology.
- These structural value-chain changes have had a direct impact on domestic ACIS business cost structures as parent ACIS businesses recover these costs of new business development from domestic businesses in foreign currency.

In terms of global competition, competitively priced import products sourced from Asian automotive chemical companies pose a significant threat to domestically manufactured products in terms of downward product price pressure (Section 6.4.2).

From an institutional perspective, compliance with legislation (both globally and domestically) has a cost implication for domestic ACIS businesses (Section 6.4.4). These key areas of legislative compliance are listed below.

- ❖ Although legislation, regulations, and standards play an important role in the automotive chemical industry due to the inherently hazardous nature of the industry, there are cost implications attached to compliance.
- ❖ Legislation, regulations, and standards significantly influence ACIS businesses by increasing production costs and placing limitations on various aspects of ACIS business operations (Section 6.4.4).
- ❖ Compliance with environmental legislation has a significant impact on a business's cost structure. It is an industry imperative and compliance is of prime importance in all aspects of the domestic automotive chemical business.
- ❖ On the positive side, compliance with environmental standards and regulations reduces risks associated with cost in the long term (Section 6.4.4).

The study further identified the inflexibility of labour legislation in South Africa as a particular concern regarding its impact on business competitiveness (Section 6.4.4.1).

- ❖ The perceived rigidity of current labour legislation in South Africa hinders an ACIS business's ability to adjust the size of its labour force in line with OEM demand fluctuations.
- ❖ Recent stricter amendments to B-BBEE legislation and the fact that OEMs set minimum certification target levels, which ACIS businesses must achieve to sustain and secure repeat business, place further pressure on ACIS business cost structures and profitability (Section 6.4.4.2).

The study argued that elements of industry uncertainty and stability have an appreciable influence on the competitiveness and profitability of ACIS businesses (Section 6.4.5). Aspects of industry uncertainty and stability are indicated below.

- ❖ Contemporary market competition in the domestic automotive industry is relatively low with only two significant MNC ACIS businesses presently participating in the domestic market and no recent new major entrants.
- ❖ The contemporary state of the domestic automotive chemical industry is deemed to be relatively stable from a competitive perspective.

- ❖ Of concern is any decisions by domestic OEMs to directly import cheaper automotive chemical products will have a destabilising effect on the profitability of the domestic automotive chemical industry.

The study also referred to the fact that ACIS businesses are inextricably linked to OEM vehicle production volumes, thereby bringing a modicum of uncertainty to the industry, which further threatens ACIS business revenue streams and long-term economic sustainability.

7.2.1.3. Conclusions: Theme 1

Although domestic ACIS businesses are currently deemed to be relatively competitive, the findings revealed that efficiency and cost containment are the greatest challenges for the automotive chemical industry to overcome in order to remain globally competitive and economically sustainable. Uncertainty has a direct impact on investment and continued domestic automotive chemical product manufacturing.

7.2.1.4. Recommendations: Theme 1

The key underlying competitive environmental factors that have been identified under this theme have an impact on the competitiveness, cost, revenue streams, profitability, and long-term economic sustainability of South African ACIS businesses to varying degrees*. It is recommended that the impact of these factors be monitored by ACIS businesses on a regular basis as part of ACIS businesses' strategic management processes.* The businesses can then adapt their strategies to keep track of developments and therefore enhance the sustainability of the ACIS businesses.

7.2.2. Concluding discussion: Theme 2 – Industry factors

Theme 2 deals with various industry factors that have an influence on business profitability and economic sustainability. This theme emphasises various industry aspects that contribute to a decline in ACIS business profit margins and include industry price sensitivity, market share retention, the impact of OEM price-reduction pressure, and the impact of cheaper imported automotive products.

7.2.2.1. Literature findings: *Theme 2*

Section 4.3.3 of the literature review revealed that specialty chemical industries such as the automotive chemical industry have a unique set of challenges that are independent of the competitive pressure of factors in the industry sectors in which they operate. This implies that specialty chemical businesses such as South African ACIS businesses must deal with unique challenges emanating from their own specific chemical business environments and simultaneously find ways to provide profitable products and services to their customers (Section 4.6.1).

In addition to automotive industry influences such as intense price-reduction pressures and threats of direct imports, ACIS businesses face further challenges such as:

- raw material cost and availability;
- operational competitive performance with respect to inefficiencies;
- quality and reliability of products manufactured.

Escalating input costs, in conjunction with price-reduction pressure from OEMs, impair the ability of these businesses to sustain healthy profit margins (Section 4.7.3). Capital-intensive businesses such as ACIS businesses need to have continuous investment to remain competitive (Section 4.7.4). As business profitability is marginalised, less investment in business improvements is likely. Flexibility and the adoption of world-class manufacturing standards are typical manufacturing challenges faced by ACIS businesses (Section 4.9).

7.2.2.2. Empirical findings: *Theme 2*

The study uncovered several important industry factors that can be considered impactful on ACIS business profitability and long-term economic sustainability (Section 4.6.1). The study findings suggest that domestic OEMs are extremely price sensitive, thereby concluding that product pricing is an important contributing factor to domestic ACIS business profitability and long-term economic sustainability (Section 6.5.1).

The gradual decline in ACIS business profitability over the last five years is largely attributed to the inability of ACIS businesses to pass escalating input cost increases through to domestic OEMs in the form of price increases. The situation is exacerbated by the continuous pressure by OEMs on ACIS businesses to reduce product prices (Section 6.5.5).

Although these price-reduction pressures can be explained as being driven by global competition in the automotive industry, it is also largely a tactical approach used by OEM purchasing departments to reduce the cost base of OEMs. Domestic OEM purchasing departments benchmark pricing globally through their parent OEM companies and continuously explore sources of cheaper imported automotive chemical products globally to save costs, consequently placing domestic ACIS revenue streams and domestic manufacturing operations at risk.

A further important factor that emanated from the study is that there is a tendency of businesses in the automotive chemical industry to reduce product prices in order to gain or retain market share (Section 6.5.2). The retention of market share is important to ACIS businesses as it directly impacts the businesses' domestic manufacturing operations in terms of throughput and cost of manufacturing.

To retain ACIS businesses' market share, profitability, and economic sustainability, ongoing downward price pressure and declining profitability of domestic ACIS businesses may ultimately culminate in a cessation of domestic ACIS business manufacturing operations with a consequent shift to the importation of automotive chemical products from parent-company manufacturing operations (Section 6.5.3).

A switch to the importation of specialty automotive chemical products will engender a different set of challenges and risks to both domestic OEMs and ACIS businesses, such as:

- increased supply chain length and complexity;
- less flexibility;
- additional costs of shipping;
- escalated risks in terms of inventory management and product redundancy.

The study findings suggested that, although OEMs may benefit in the short term by importing automotive chemical products, the loss of flexibility, the unknown total cost, and the loss of domestic technical expertise and support will have a detrimental impact on domestic OEM operations in the longer term.

> *"OEM purchasing departments do not acknowledge the actual value of the products to their production process, they tend to see these specialty chemical products as commodities as opposed to specialised products that provide solutions for their production processes"* (Anonymous RP Interview 03, 2021 (Section 6.5.3).

Steadily declining profit margins over the last five years in the automotive chemical industry are closely associated to two key factors in the ACIS operating environment, namely price-reduction pressure from OEMs and escalating input raw material costs (Section 6.5.5). The combination of these two factors is deemed to be the primary cause of ACIS business profit margin decline. Original equipment manufacturers (OEMs) expect ACIS businesses to recover their margins through improved operating efficiencies. However, this is an extremely difficult proposition for the automotive chemical industry as raw materials make up 80% of product costs while labour and overhead cost make up the balance.

Investment in plant and equipment is another key factor identified by the study that plays an important role in maintaining operational and technological competitiveness in domestic ACIS business manufacturing plants (Section 6.5.6). The study revealed that domestic ACIS businesses acquire capital funding, based on business and financial motivations provided by domestic affiliates, to parent-companies. Factors such as declining profitability, industry uncertainty, and ACIS businesses' inability to secure long-term business contracts with domestic OEMs have an adverse effect on multinational parent automotive chemical companies' willingness to invest in their domestic affiliates.

7.2.2.3. Conclusion: Theme 2

In the face of stagnation of demand, cyclical pressures, industry uncertainty, and unabated increases in operational costs emanating from various aspects of the automotive chemical industry value chain, further compounded by ongoing OEM pricing pressure, it is fair to conclude that domestic ACIS business profit levels will not be easily sustainable.

7.2.2.4. Recommendations: Theme 2

Alternative strategies such as the discontinuation of domestic manufacturing in favour of the importation of automotive chemical products or divestment in unprofitable product lines can be considered by domestic ACIS businesses in order to secure long-term economic sustainability.

7.2.3. Concluding discussion: Theme 3 – Operational factors

Theme 3 addresses the impact and contribution of the automotive chemical supply chain and the manufacturing value chain to automotive chemical industry profitability and economic sustainability. Market pressures and specific factors that give rise to cost challenges within the various components of the automotive chemical supply chain are identified and explored.

7.2.3.1. Literature findings: Theme 3

The supply chain has been recognised as being strategically relevant to both internal and external business activities (Section 2.10). This section alluded to the fact that, although supply chains are not specifically focused on financial improvements, they have a significant influence on business profitability through the control of costs. Aspects of the supply chain that impact profitability through cost are listed below.

- Flows of business supply chains are synchronised with flows of value from customers to maximise business value and consequent profitability.
- As value is derived from customer needs, businesses must ensure that the processes that deliver products and services that customers value are efficient and effective.
- Elimination of waste and continuous improvement within business supply chains ensure that the margin between customer value and the cost of delivery process systematically increases consequently improving business profit margins.
- Improvement in business supply chain efficiency and effectiveness can therefore make a significant difference to business financial performance, providing a competitive advantage for the business.

An examination of these unique challenges provides an insight into the constraints and challenges experienced by businesses in containing costs and integrating into a globalised supply chain (Section 4.8.4).

7.2.3.2. Empirical findings: *Theme 3*

Within the scope of the theme 'operational factors,' the study examined the impact of factors from the micro-environment which directly impact domestic ACIS businesses' overall operational costs and highlighted the significance of domestic ACIS business supply chains in terms of their contribution to ACIS businesses' total costs.

Micro-environmental forces impact day-to-day ACIS business performance and add cost to various components in the supply chain process from the acquisition of input raw materials to the delivery of finished products. The study revealed that these forces generally present as inefficiencies and waste at various stages in the supply chain (Section 6.6.1). Although the study identified numerous areas in which inefficiencies occur in ACIS business supply chains, key areas which are considered to have a significant impact on cost and profitability have been selected for the concluding discussion under this theme. These key areas are listed and discussed below.

- *Demand planning*

  One of the main challenges identified is in the area of demand planning (Section 6.6.1.1). Since 80% of input raw materials purchased are imported, ACIS businesses contend with the long, complex supply chains associated with the importation of raw material as a result of South Africa's geographic location and the unavailability of raw materials in South Africa. Lengthy lead times are exacerbated by port inefficiencies and, more recently, as a result of the COVID-19 pandemic. The challenge for ACIS businesses is to manage cost, safety, and on-time delivery while at the same time maintaining the required level of responsiveness and flexibility expectations of the OEMs.

  A key process in ACIS business supply chains is demand planning and the ability to forecast OEM demand accurately. The study suggests that there is an inherent weakness in the ability of OEMs to link chemical product usage requirements to vehicle production volumes. Automotive chemical products do not form part of an

OEM’s BOM. As a result, ACIS businesses take on the responsibility for chemical product usage determination for the OEMs based on vehicle-build forecasts provided by the OEMs.

To carry out this task, ACIS businesses require accurate, regularly updated short-term, medium-term, and long-term vehicle production forecasts from OEMs. An automotive OEM’s weakness is their inability to accurately predict how many vehicles will be built in a given timeframe. This weakness is consequently amplified throughout the supply chain, with suppliers purchasing raw materials to fulfil the highest forecast and then attempting to control costs when original forecasts are lowered.

- *Product obsolescence*

The majority of automotive chemical products and input raw materials have a finite shelf life, which plays an important role in determining stock-holding levels. Fluctuations in demand result in a knock-on effect throughout the supply chain, which ultimately translates into higher inventory-holding costs, product obsolescence, stock write-off costs, and expensive disposal costs. It can therefore be concluded that the demand planning function within ACIS business supply chains can have a significant impact on business cost.

- *Raw material sourcing*

The study further established that raw material sourcing is a key function within the ACIS business supply chain, which can have a significant impact on business cost (Section 6.6.1.2). Availability and cost of input raw materials are the two most pressing issues experienced by ACIS businesses in this process.

The study revealed that a large proportion of the raw materials used in the production of domestic automotive chemical products (approximately 80%) are commodities and are sourced globally on the open market. These raw materials are therefore subject to supply and demand and regular price fluctuations. The study further pointed out that some of the raw materials used are very specialised, not widely available, and command premium prices (Section 6.6.1.2).

A further significant aspect in the sourcing process, revealed by the study, is the difficulty in being able to source regular small volumes of imported raw materials to accommodate fluctuations in OEM vehicle production. Where it is possible to secure small volumes of raw material, it is at a price premium. Large economic order quantities translate into increased inventories and the short shelf life associated with chemical raw materials leads to increased obsolescence risks with further cost to domestic ACIS businesses.

An important aspect to be considered in the procurement process is that of shipping delays, which became more frequent with the advent of the COVID-19 pandemic, and results in multifaceted supply logistic problems with an associated increase in cost.

- *<u>Currency exchange rate fluctuations</u>*

The study established that volatile currency exchange rates, due to the inherent weakness of the South African Rand, add further costs to imported raw materials (section 6.6.1.3). Although ACIS businesses can secure some retroactive 'forex relief' from OEMs in lieu of uncontrollable input costs such as currency depreciation, they are not able to fully recover actual losses due to currency depreciation.

- *<u>Manufacturing value chain</u>*

The study established that the automotive chemical industry manufacturing value chain is a significant contributor to business cost and profitability. Escalating energy costs were highlighted as a specific area of cost concern in the automotive chemical industry (Section 6.6.1.5). Intermittent power outages and escalating electricity costs have placed considerable pressure on automotive chemical industry operating costs. Intermittent power outages increase the risk of producing partially completed batches of product which results in the scrapping of the incomplete batch of product at significant cost, the consequent loss of production time, and pressure on raw material stocks that have to be urgently replaced at extra cost.

- *<u>Labour cost</u>*

The study found that escalating labour cost is a limiting factor in overall cost competitiveness (Section 6.6.1.5). A counter-argument suggests that, as labour costs make up a comparatively small proportion of the total product costs, they have a relatively insignificant impact on overall product cost. The study findings, however, suggested that labour market inflexibility and labour unrest in South Africa was a greater competitive impediment than pure labour cost (Section 6.6.1.5).

*7.2.3.3. **Conclusion**: **Theme 3***

It can be concluded that operational inefficiency in ACIS business supply chains and manufacturing operations can contribute significantly to an escalation in ACIS business costs and a decline in profitability. Pressures emanating from raw material cost and availability and operational inefficiencies contribute significantly to escalating business costs and consequent profit margin pressure. Although the issues reflected in the empirical study are considered key in terms of their impact on business profitability, they are not all-encompassing.

*7.2.3.4. **Recommendations**: **Theme 3***

It is evident from the study findings that low levels of profitability can, to a large extent, be ascribed to a lack of operational competitiveness, which is compounded by ongoing OEM product price-reduction pressures. *It is therefore recommended that ACIS businesses should have a strategic focus on improving operational competitiveness in key areas of manufacturing and supply chain for ACIS businesses to maintain long-term economic sustainability.*

7.2.4. Concluding discussion: Theme 4 – Commoditisation

Theme 4 deals with the phenomenon of encroaching commoditisation and explores its impact on business profitability and long-term economic sustainability. Commoditisation in specialty chemical industries has gained momentum as innovative specialty process products have tended towards becoming standard or ‘commodity’ products over time.

Businesses such as ACIS businesses find it more and more difficult to develop innovative products that add significant value to automotive OEMs while at the same time differentiating their product offerings from their competitors. It is therefore important for domestic ACIS businesses to be acutely aware of the phenomenon of product commoditisation and its causes and consequences.

7.2.4.1. Literature findings: Theme 4

In the process of examining the causes and consequences of commoditisation, the literature conclusively suggested that increased commoditisation leads to lower profitability (Section 2.5). Profit margin pressure or the erosion of margins has been described as a function of increasing input costs which cannot be recovered by supplier businesses in product pricing and price-reduction pressure from customers, in this case automotive OEMs.

Counter actions, such as cutting supplier business costs and increasing efficiency levels, may only provide temporary relief in terms of preventing profit margin erosion in a global operating environment, such as in the case of the automotive chemical industry (Section 2.5). As a result of the volatility and rivalry in business markets such as the automotive industry where ACIS businesses compete, the automotive chemicals supplier industry is increasingly being confronted with the phenomenon of commoditisation.

- *Commoditisation process*

  Figure 2.6 depicted the process of commoditisation where supplier businesses move from a superior market position to a competitive environment in which there is a lack of competitive differentiation. In other words, products and services are no longer perceived by customers as being unique, leading to an increase in customer bargaining power. This consequently leads to a business environment in which supplier businesses begin to experience a decline in financial performance together with increased rivalry and powerful customer bargaining positions driving prices down (Section 2.5.1).

- *Commodity traps*

When businesses find themselves in a situation in which there is little to distinguish between competing businesses' products and price becomes the principal basis for allocating business, the situation is referred to as a commodity trap. The commodity trap, depicted diagrammatically in Figure 2.7, identifies the root causes and elements of a commodity trap. It also identifies ways in which businesses can fall into a commodity trap. Specialty products are downgraded to commodity status and the suppliers with the most cost-effective offerings survive. Supplier businesses find themselves in a position of increasing costs, profit margin pressure, and a downward spiral of purely price-based competition with limited opportunities to differentiate their offerings using traditional means (Section 2.5.2).

In Section 2.5.3, three different types of root causes of the commodity trap were identified: escalation, deterioration, and proliferation. Figure 2.8 depicts these three categories. Businesses can find themselves trapped in either one, or all simultaneously, of these categories of traps simultaneously. The three categories are listed and discussed below.

- **Escalation** occurs when businesses are challenged by competitors offering more product benefits at the same price, at the expense of eroding supplier profit margins. This occurs when customer buyers possess excessive buying power and suppliers attempt to augment their offerings but are unable to charge premium prices for the augmentation (Section 2.5.3.1).
- **Deterioration** occurs when new competitors with lower costs and significant EOS capture a large portion of the market and disrupt the market position of other competing businesses.
- **Proliferation** occurs when the market is attacked by competitors with new value propositions that offer both price and value benefits.

These commodity traps tend to drive suppliers to reduce prices to retain customers, encouraging customers to switch to suppliers with more cost-effective offerings. Suppliers who are unable to recover fixed and production costs by means of increased sales prices find themselves in a position of declining sales volumes and diminishing profit margins (Section 2.5.4).

7.2.4.2. Empirical findings: *Theme 4*

The study advocated that the price pressure and profit margin decline experienced in the automotive chemical industry can be perceived as indicators of encroaching commoditisation of automotive chemical products and in the industry. The study established that automotive chemical products supplied to the domestic automotive industry are specialty products as they are functional products that provide customised solutions for OEM vehicle manufacturing processes. The contradiction in terms of the definition is that OEM buyers tend to view and treat specialty automotive chemical products as commodities or raw materials, as reflected in the quote below.

> *"I think the problem is that there is a disconnect between [OEM] people in purchasing and engineering as [engineering] know what is [technically] required of the product…when it comes to purchasing, chemical products are treated as commodities" (*Anonymous Interview 02, 2021).

- *OEM pricing strategy.*

The study findings revealed that the focus of OEM buyers is on price per kilogram of product, making it easier for buyers to compare and benchmark product prices in the market and discount value addition during the price negotiation process. The study findings further established that products that have been in use for a long time have a high probability of the value-added benefits of these specialty chemical products being overlooked as OEMs continue to anticipate new benefits (Section 6.7.1.1). The innovation of one generation becomes a standard for the next generation. The study findings further established that competition for volume and/or market share in the automotive chemical industry has dissipated ACIS business value-add pricing strategies, which has allowed price-based competition to escalate.

- *Price-reduction pressure*

An important aspect emanating from the study findings was the fact that price-reduction pressure by OEMs can be construed to be more of a tactic as opposed to being a result of commoditisation. In other words, OEMs understand the value addition of automotive chemical products but still seek to secure products at the lowest possible price.

- *Industry commoditisation*

Industry commoditisation is signified by the presence of several indicators in the industry. In the case of the automotive chemical industry, the study found that spare production capacity is an important indicator of encroaching commoditisation (Section 6.7.1.2). The findings affirmed that domestic ACIS businesses currently do possess spare capacity. The spare capacity has primarily been as a consequence of a reduction in demand attributed to extended OEM production closures as a result of lower customer demand and the COVID-19 pandemic.

- *Price competition*

It was determined in Section 6.7.1.3 that price competition in the domestic automotive chemical industry is an important indicator of encroaching commoditisation. Because there are only two major domestic multinational automotive chemical companies competing in the automotive industry in South Africa, inter-business price competition is not currently a major influencing factor. On the other hand, ongoing price-reduction pressure from domestic OEMs on ACIS businesses does tend to precipitate inter-business price competition. If inter-business price competition prevails, it is likely that pricing competition will escalate and vary according to product/technology.

- *Switching costs*

It was further revealed in Section 6.7.1.3 that switching costs remain relatively high in the automotive chemical industry as a result of very few new products being introduced into the market. Automotive chemical products tend to be heterogeneous as a result of customisation and are therefore not easily interchangeable between OEMs. This permits ACIS businesses to maintain their price structure in particular technologies. The study findings further established that global parent-company target-price setting is the predominant challenge for domestic ACIS businesses (Section 6.7.1.3). Parent ACIS companies could set lower market/product target prices as a result of higher volumes and superior EOS, which creates lower benchmark pricing and exacerbates downward pressure on domestic businesses' pricing strategies.

- *New entrants*

New entrants importing low-cost finished products remain a threat to the domestic automotive chemical industry and can be regarded as an important indicator of encroaching commoditisation (Section 6.7.1.4). The threat of direct imports from low-cost international competitors is also considered to be a real threat to automotive chemical industry pricing as it is used by OEM purchasing departments to leverage product price reductions.

Although domestic products still dominate in the domestic automotive market, some OEMs have considered and, in some instances, are importing cheaper products from Asia Pacific-based automotive chemical companies. The study findings affirmed that the technical service provided by domestic ACIS businesses for domestically produced products remains beneficial for domestic OEMs and advantageous for ACIS businesses and remains a prevalent factor in OEM sourcing decisions (Section 6.7.1.4).

- *Introduction of new technology*

From a technology perspective, the study established that the number of new automotive chemical products being offered to domestic OEMs is another important indicator of commoditisation (Section 6.7.1.5). The study results suggested that, although there have been new technology developments on offer to domestic OEMs, none have recently been operationalised/commercialised.

According to the study results, the impediments encountered are threefold: OEMs are hesitant when it comes to implementing new technology due to the risk to current operations; these new technologies must be approved and operationalised in a corresponding parent OEM plant; and many of the new technologies require OEM plant modifications which require significant capital investment and production downtime to implement.

Most of the contemporary automotive chemical industry development is focused on internal manufacturing efficiency improvement and product application process improvement to reduce total process cost.

- *Communication*

The level and quality of communication between OEMs and ACIS businesses has been identified as another important indicator of industry commoditisation. Contemporary OEM purchasing departments remain the primary communication window for ACIS businesses as this is where commercial negotiations take place. Because of the technical nature of the products and services provided, a large proportion of daily inter-company operational communication is at OEM process engineering, product engineering, and production department level. These departments do not have decision-making input on business allocation as this remains with the domestic and parent OEM purchasing departments.

7.2.4.3. Conclusions: Theme 4

Although the study results aligned the automotive chemical industry in South Africa with several indicators of both industry and product commoditisation, it could not definitively be concluded that either automotive chemical products or the automotive chemical industry itself have succumbed to the phenomenon of commoditisation at the time of this study.

An important aspect to consider is that, although there are a number of indicators that signal encroaching commoditisation, there is no single measure that can determine the level of industry or product commoditisation in the automotive chemical business. The various aspects of commoditisation highlighted and discussed in this section can have a significant impact on the cost, revenue, and economic sustainability of ACIS businesses and vary according to their severity and occurrence in the industry. The indicators discussed in this section are some of the more important indicators that can signal encroaching commoditisation.

7.2.4.4. Recommendations: Theme 4

The findings emphasise that commoditisation assessments should form a critical part of ACIS businesses’ efforts to address evolving market competition in the form of commoditisation. *Therefore, the industry should be regularly monitored for signs of encroaching commoditisation, using the key indicators referred to in this discussion.*

7.2.5. Concluding discussion: Theme 5 – Business relationships and power

Theme 5 deals with the impact of business and power relationships between ACIS businesses and OEMs on ACIS business profitability and long-term economic sustainability. This theme explores the role and importance of relationship management in achieving long-term economic sustainability.

7.2.5.1. Literature findings: Theme 5

Increased competitiveness amongst global industries and globalised supply chains, as in the global automotive industry, raises the question of how inter-business relationships can contribute to the long-term economic sustainability of automotive supplier businesses. Studies have shown that supply chain integration contributes to value addition in both customer and supplier supply chains by reducing cost and improving the quality, flexibility, and speed of supply, which leads to superior business performance. Various key aspects of business relationships and power are discussed below.

- *Collaboration in customer supplier relationships*

  The success of the concept of supply chain integration between customer and supplier businesses is dependent on the degree of collaboration in customer supplier relationships (Section 2.11). Literature studies have asserted that an important aspect of customer-supplier relationships is its link to the economic dimension of sustainability (Section 2.11.1). Taking a dyadic view of customer-supplier relationships provides a broader perspective of B2B business relationships in which both customers and suppliers work towards creating and capturing value providing a competitive advantage and long-term economic sustainability for both customers and suppliers, which is referred to as mutual orientation.

- *Mutual orientation*

According to the literature, an important element of mutual orientation that underpins aspects of profitability and economic sustainability of suppliers is the ability to apply joint consideration to cost to provide positive economic outcomes to both suppliers and customers.

The literature recognises the economic significance of collaborative customer-supplier relationships in terms of its positive impact on supplier profitability and long-term economic sustainability (Section 2.11.1).

7.2.5.2. Empirical findings: *Theme 5*

Buyer-supplier relationships range from being closely collaborative to being exclusively transactional. From an ACIS business perspective, the incentive for ACIS businesses to establish close collaborative relationships with OEMs is driven by business growth, product sales volume, and product price as these operational factors are significantly correlated to business profitability and economic sustainability. Key findings are discussed below.

- *Contemporary ACIS-OEM relationships*

The study findings established that there is currently a distinct absence of collaborative business relationships between domestic OEMs and ACIS businesses. The findings suggested that, although contemporary business relationships between domestic OEMs and ACIS businesses are generally good, these relationships tend to be transactional by nature. This is underpinned by a distinct absence of long-term contracts offered to ACIS businesses. The importance of and benefit to ACIS businesses securing long-term contracts is that they have a stabilising effect on demand and prices over an extended period.

Although the level of collaboration and closeness of ACIS business relationships with domestic OEMs vary, the study findings indicated that these relationships are mostly adversarial, non-collaborative, and asymmetric, with OEMs wielding a greater power to influence the intentions and actions of ACIS businesses. As previously mentioned, the most significant problem ACIS businesses face, as identified by the research, is the pressure by OEMs on ACIS businesses to reduce prices. This is indicative of the presence of an asymmetric relationship where there is an expectation from more powerful OEMs that ACIS businesses consistently make a substantial contribution to the relationship.

- *Key factors inhibiting collaborative business relationships*

The study identified several key factors that hamper the development of closer collaborative business relationships between ACIS businesses and OEMs (Section 6.8). The study findings in Section 6.8 showed that the basis for the type of relationship and extent of collaboration in the relationship between ACIS businesses and OEMs is an OEM's inability to distinguish between commodity and specialty chemicals and the value offerings that respective ACIS businesses provide. In addition, the tier status of automotive suppliers plays a significant role in defining the relationship between ACIS businesses and OEMs, where the value of OEM spend with suppliers remains a key criterion for tier classification for the domestic automotive industry.

ACIS businesses are theoretically classified as Tier 1 suppliers by OEMs. However, this classification can differ from OEM to OEM. It is evident from the study that ACIS businesses do not fit into the standard definition of Tier 1 automotive suppliers and therefore do not command the same relational status as OEMs as, for example, Tier 1 ACSs. Consequently, ACIS business access to and regular communication with OEM executive management and OEM support is limited, with the bulk of the inter-business communication taking place at purchasing and operational levels.

> *"Communication predominantly takes place at operational and purchasing level which is indicative of a weakness in [customer-supplier relationships] the automotive chemical industry"* (Anonymous RP Interview 06, 2021) (section 6.8).
>
> *"OEM executive management do not generally take the time to get proactively involved with automotive chemical suppliers except when there is a serious quality or supply problem"* (Anonymous RP Interview 03, 2021) (section 6.8).
>
> *"You are often not dealing with the same person [in purchasing] for any length of time," "I think it is a strategic action by OEMs to break down any relationship*

that may have been formed with buyers so that negotiations are conducted purely on price" (Anonymous RP Interview 03, 2021) (section 6.8).

"Relationships have become less important for OEMs over time" (Anonymous RP Interview 03, 2021) (section 6.8).

Contrary to the strategically important role of automotive chemical products in the OEM vehicle manufacturing process, ACIS businesses are not managed by OEM purchasing departments as strategic suppliers. Automotive chemical industry supplier (ACIS) businesses are also not regarded as dedicated automotive suppliers by OEM purchasing departments, which could conceivably be attributed to the fact that domestic ACIS businesses are not limited to the supply of chemical products exclusively to automotive OEMs.

7.2.5.3. Conclusions: Theme 5

To conclude, it was apparent from the study findings that there are several obstacles that impede the establishment of closer, more co-operative relationships between domestic ACIS firms and OEMs. Power asymmetry was found to be a major obstacle to developing more intimate collaborative business relationships between domestic ACIS businesses and automotive OEMs. This power asymmetry can largely be attributed to the respective size and positions held by ACIS businesses and automotive OEMs in the automotive supply chain, with OEMs being much larger and therefore commanding more power in the negotiation process. This higher position held by automotive OEMs in the automotive supply chain is directly proportional to the power held by OEMs. Traditionally, the automotive industry has been seen as a highly hierarchical industry, making efficient communication between ACIS and OEM businesses difficult and causing communicational problems, especially at higher levels, for ACIS businesses. The inability of automotive OEMs to recognise the difference between specialty and commodity chemical products plays a role in defining the relationship between ACIS businesses and OEMs, as does the tier status of ACIS businesses. It can therefore be concluded that mutual orientation (in other words, understanding each other's businesses, trust, and economic performance) is an important consideration in the process of increasing relational strength. Improved customer-supplier relationships with OEMs hold a definitive economic significance for

ACIS firms, which is pivotal for ACIS firm profitability and long-term economic sustainability.

7.2.5.4. Recommendations: Theme 5

ACIS businesses' domestic and parent-company executive management should direct company resources and increase efforts to develop close, collaborative relationships with OEMs as it is strategically beneficial for the long-term economic sustainability of domestic ACIS businesses.

7.3. OVERALL STUDY CONCLUSION

The concluding discussions in the previous section highlighted the fact that there are numerous factors that have brought about changes and pressures to the automotive business environment in which ACIS businesses operate. Many of these changes exert pressure on domestic automotive chemical industry businesses' profit margins, to varying degrees, with a consequent impact on ACIS businesses' long-term economic sustainability. To conclude, the main observations flowing from the study have been deliberated upon in the following sections.

7.3.1. Sources of profit margin pressure

Sources of contemporary environmental factors associated with ACIS business product price-reduction pressure and input cost increases which give rise to diminishing profit margins were identified by the study, some more significant than others. Amongst the factors emanating from the macro-, meso-, and micro-environments that give rise to ACIS business profit pressure, the combination of OEM price-reduction pressure and escalating input raw material costs are key factors contributing to domestic ACIS business profit margin pressure.

7.3.2. Supply chain management

From a micro-environmental operational perspective, the study highlighted the significant contribution of the supply chain and SCM to the cost structure of ACIS businesses. Automotive chemical industry supplier (ACIS) businesses are generally exposed to high logistics and inventory costs, largely related to the high volumes of imported raw materials and demand variability of domestic OEMs. The study findings emphasised supply chain performance as a significant driver of ACIS business cost, with a consequent adverse impact on profitability.

7.3.3. Customer-supplier business relationships

The research study emphasised the potential impact of adversarial supplier-customer relations between ACIS businesses and OEMs on ACIS business revenue and profitability. The findings called attention to the contemporary adversarial win-lose nature of ACIS-OEM business relationships and the difficulty ACIS businesses experience in establishing close collaborative relations with OEM purchasing functions with the aim of achieving lower costs and sustainable business for both ACIS businesses and OEMs. The study findings indicated that a stronger focus on customer intimacy by ACIS businesses is needed.

7.3.4. Encroaching commoditisation

A concern to the domestic automotive chemical industry identified by the study is the phenomenon of encroaching commoditisation. Encroaching commoditisation is a prevailing concern in the automotive chemical industry as a consequence of the globalisation of the automotive chemical industry.

The study identified several factors that could signal encroaching commoditisation that ACIS businesses should be aware of, such as:

- automotive chemical industry capacity exceeding demand;
- steadily declining prices;
- OEM pressure to reduce prices;
- OEM purchasing focus on price differentiation only;
- high OEM price sensitivity and the threat of low-cost imported automotive chemical products;
- absence of new major commecialisable technology developments;
- reduced accessibility to executive-level customer contact.

The continued presence of these factors in the industry will progressively exert more pressure on business revenues and costs over time, consequently leading to diminishing profit margins and negatively impacting automotive chemical industry businesses’ economic sustainability in the automotive industry.

7.3.5. Input cost increases and declining product prices

Input cost increases and steadily declining product prices are two significant dimensions of commoditisation that can be interpreted as significant signals of encroaching commoditisation. The complexity and interaction of interconnected variables that impact the price and cost elements of commoditisation significantly contribute to profit margin pressure, which will ultimately result in a negative effect on the long-term economic sustainability of domestic ACIS businesses. Declining prices in the domestic automotive chemical industry on some product technologies are largely a result of OEM negotiation power and price-reduction pressure as well as changing distribution channel dynamics. This is, however, deemed by the industry to be more of a tactical strategy by OEMs to improve their own profit margins than as a result of market-driven price pressure.

7.3.6. Technology developments

From a technology perspective, although new technologies have been developed by the industry, no new major developments have been commercialised by the domestic automotive chemical industry recently. The risk averseness, cost of implementing new technologies, potential loss of production, risk to export quality, and requirement of parent-OEM approvals for the implementation of new technologies in domestic OEM production processes to a large extent discourages the implementation of new technologies by domestic ACIS businesses.

7.3.7. Overall conclusion summary

It was apparent from the study findings that, despite the presence of cost and price pressure elements of commoditisation in the industry, ACIS businesses are still able to maintain a differentiated product portfolio. Assessing the level of commoditisation in the industry, however, proved to be difficult. There is no single indicator or measure that could be used to determine the level of industry or product commoditisation. It cannot, therefore, be definitively concluded that the domestic ACIS industry has been commoditised to any great extent at the time of this study.

The findings of the study suggested that ACIS businesses can respond to environmental business challenges and pressures by employing strategies that enhance competitive performance such as operational excellence and customer intimacy. In an environment where factors such as encroaching commoditisation, input cost challenges, and price pressure are omnipresent, a stronger focus on customer intimacy between OEMs by ACIS businesses and a focus on supply chain performance would have a significant positive impact on ACIS business performance, profitability, and long-term economic sustainability.

7.4. ADDRESSING THE RESEARCH OBJECTIVES

The primary and secondary objectives that were formulated in Chapter 1, Section 1.5 of the study to assist in answering the research questions are summarised and presented in Table 7.1 below. Each individual research objective has been synthesised regarding the findings and conclusions associated with each secondary objective and the primary objective of the study.

Research Objectives	Findings	Conclusions
Secondary research objective 1 *To explore and outline the contemporary environmental challenges in the automotive chemical industry that can potentially negatively impact industry profitability and long-term economic sustainability.*	• The South African automotive industry is going through a dynamic transformation process significantly impacting automotive chemical industry (ACIS) businesses. • ACIS businesses have difficulty in operating profitably in an increasingly challenging business environment. • The domestic environment is characterised by globalisation, increasing complexity, supply chain challenges, competitive pressures, imposed product price reductions and the threat of encroaching commoditisation. • The challenges confronting ACIS businesses are reflected in their competitiveness and ability to compete with imported products while sustaining a competitive position in the automotive supply chain.	• Healthy profitability remains a critical component of ACIS business economic sustainability. • ACIS businesses play a strategic role in the South African automotive industry. • Survival and growth of domestic automotive chemical industry businesses with domestic manufacturing capabilities businesses in a hyper-competitive automotive market are of utmost importance. • Collaborative customer-supplier relationships are an inherent weakness of ACI businesses. • ACIS business supply chains are significant contributors to overall business costs requiring a strategic focus on reducing supply chain costs and supply chain excellence.

Research Objectives	Findings	Conclusions
Secondary research objective 2 *To empirically explore the opinions and insights of selected automotive chemical industry experts with respect to the sources of key underlying environmental challenges that could engender commoditisation and negatively impact profitability and economic sustainability of the industry.*	Five major themes identifying sources of business challenges and their impact on ACIS business profitability and economic sustainability emerged from the semi-structured in-depth interviews conducted with selected automotive chemical industry experts in the empirical phase of the study. • Theme 1 relates to the impact of factors originating from the competitive environment. • Theme 2 relates the impact of industry factors originating from the industry in which ACIS businesses operate. • Theme 3 relates to the impact of ACIS business operational factors. • Theme 4 relates to the extent and impact of commoditisation. • Theme 5 relates to the impact of business relationships, the nature of these relationships, and the power within these business relationships.	The participant responses revealed that several contemporary factors impacted the profitability and the economic sustainability of ACIS businesses, some more critical than others. • The response received from the research participants ratified the key attributes which are broadly depicted in the preliminary theoretical framework developed in chapter 2 on which the empirical study questions were based. • It was established that two key elements of commoditisation, product price pressure, and input cost escalation, were present in the industry. The third element of commoditisation, product and service differentiation, was not seen to be a major concern at the time of this study. • Although the dimensions of commoditisation, input cost increases, and price reduction pressure are evident, the level of commoditisation in the industry could not be specifically established as there is no single measure that could be used to determine the extent of industry and product commoditisation. • Business relationships are deemed to be an important contributor to maintaining long-term economic sustainability.
Secondary research objective 3 *To establish the key underlying environmental attributes that are manifested in the phenomenon of commoditisation in the automotive chemical industry.*	• Two key dimensions of commoditisation manifested in the automotive chemical industry were established; input cost increases and product price reduction pressure. • The attributes of these two key dimensions are depicted in Figure 2.12, demonstrating the complexity and interaction of the interconnected factors contributing to the price and cost components of commoditisation.	• Attributes of input cost and products price-reduction pressure originating from macro-, meso-, and micro-environments of both the global automotive and specialty chemical industry have a potentially varying negative influence on ACIS business revenues, net income, return on investment, cash flow, and capital expenditure decisions which are precursors of economic sustainability.
Secondary research objective 4 *To explore the level of commoditisation that exists in the automotive chemical industry by reviewing the South African automotive and automotive chemical*	A literature review of the global and domestic automotive and automotive chemical industry was conducted in Chapters 3 and 4 of this research study. The literature review in Chapter 3 was aimed at providing an outline of common features of the globalised automotive industry and specifically	• The competitive position of domestic OEMs is characterised by a decrease in domestic demand and an increase in demand for export production. • South African governmental policies play an important role in supporting domestic vehicle production to remain a sustainable market share contender.

<table>
<tr><th>Research Objectives</th><th>Findings</th><th>Conclusions</th></tr>
<tr><td>industries in the context of the impact of globalisation and exposure to international competition.</td><td>the distinctive features that differentiate the automotive sector.
There are numerous key challenges facing the South African automotive industry.
The domestic automotive industry has been fully integrated into the global automotive industry.
The domestic automotive industry is driven to improve its competitiveness by raising manufacturing standards to world-class levels.
The size of the South African automotive market within the global automotive industry is small.
Chapter 4 examined the South African automotive chemical industry and presented contemporary insights into the business environment.

Specific emphasis was placed on the factors that could negatively impact the economic sustainability of ACIS businesses.
The automotive chemical industry is facing numerous contemporary challenges because of globalisation.
The automotive chemical industry faces challenges that are unique to the industry.
Additionally, the domestic automotive chemical industry faces pressure exerted by the automotive environment in which it operates.</td><td>South African OEMs and supplier businesses have been forced to become more competitive in order to compete in international markets.
Low levels of profitability experienced by domestic automotive chemical industry businesses are closely linked to operational competitiveness which has been compounded by increasing input costs and ongoing OEM product price reduction pressure on automotive chemical products.
It is important to appreciate the inter-relatedness of the factors identified and their collective potential impact on automotive chemical industry businesses' cost structure and profitability.</td></tr>
<tr><td>Secondary research objective 5

To recommend strategies that would enhance the profitability and long-term economic sustainability of the automotive chemical industry in South Africa.</td><td>Ongoing product price-reduction pressure from domestic OEM is a significant factor contributing to profit margin squeeze.
Input raw material costs have presented as being a dominant factor in contribution to profit margin pressure.
ACIS supply chains are exposed to high logistics and inventory costs related to significant volumes of imported input raw materials and demand variability</td><td>Alternative pricing strategies should be considered by ACIS businesses.
Competitive sourcing of smaller quantities of raw materials with assistance of parent companies would provide input cost relief for domestic ACIS businesses.
Improved business relationships with domestic and parent OEMs would improve competitiveness of domestic ACIS businesses.</td></tr>
</table>

Research Objectives	Findings	Conclusions
	from OEMs and long supply chains.	
Primary research objective *To explore the impact of commoditisation on the long-term economic sustainability of the South African automotive chemical industry.*	• The theoretical framework (Figure 2.12) illustrated that economic sustainability is influenced by commoditisation which is in turn affected by independent variables originating at macro-, meso-, and microsystem levels. • The presence of the price and cost dimension of commoditisation in the theoretical framework (Figure 2.12) originates from factors present in the macro-, meso-, and micro-environment which were to a large extent confirmed in the empirical phase of the study. • The combination of OEM price reduction pressure and escalating raw material input costs are key factors contributing to ACIS business profit margin pressure. • Supply chain performance is a significant driver of ACIS business cost with a consequent adverse impact on profitability. • ACIS businesses have difficulty in establishing collaborative relationships (price negotiation) with domestic OEMs which has a negative effect on the ability of ACIS businesses to sustain revenue and maintain profitability. • Several factors that could signal encroaching commoditisation of the automotive chemical industry were identified, the continued presence of which would progressively exert more pressure on ACIS business revenues and costs over time. Two of the more important factors are escalating ACIS business input costs and declining product prices.	• Cost and price aspects of commoditisation from both a product and industry perspective were confirmed in the empirical stage of the study. • Important attributes of the price and cost dimensions of commoditisation and their potential impact on automotive chemical industry business profitability were confirmed in the empirical phase of the study. • The factors manifested in the cost and price dimensions of commoditisation were confirmed to have a direct impact on the dimensions of economic sustainability of ACIS businesses.

Table 7. 1: Summary of research objectives, empirical findings, and conclusions

Source: Researcher’s own illustration.

7.5. MANAGERIAL RECOMMENDATIONS

Although the study could not definitively determine the level of commoditisation in the automotive chemical industry, encroaching commoditisation remains an inevitable challenge for ACIS businesses. The study presented the elements of cost, product price pressure, and profitability squeeze as being particularly challenging. The study findings therefore suggested four specific areas in which actions can be taken by domestic automotive chemical businesses to improve their competitive position in the globalised domestic automotive value chain, namely customer intimacy, supply chain excellence, moving away from tradition, and recognition of signs of commoditisation.

The first recommendation is that a stronger focus on customer intimacy is required between automotive chemical businesses and automotive OEMs in South Africa with the aim of forming collaborative relationships. Current relationships between OEMs and ACIS businesses are not providing significant supply chain gains for ACIS businesses and OEMs. Improved customer intimacy may well be a crucial driver of improved competitive performance for ACIS businesses. As OEMs tend to play a dominant role in determining how they engage with ACIS businesses, ACIS businesses need to examine ways in which they can play a more proactive role in relationship management with OEMs. Automotive chemical industry supplier (ACIS) businesses need to take the lead and consider implementing customer relationship management (CRM) systems and processes that are directed at building collaborative customer relationships as early as possible before the industry begins to show significant signs of commoditisation.

An important aspect of customer relationship management by ACIS businesses to consider is the involvement of a business's executive management (domestic and parent-company executive management) in this process. As pointed out in the study, this is a weakness of ACIS businesses and needs to be remedied. Regular communication with OEM executive management will inevitably raise the profile of ACIS businesses with OEMs and expose the strategic importance of the automotive chemical industry to OEM executive management. Customer relationships will significantly improve ACIS business performance, profitability, and consequently long-term economic sustainability.

A second recommendation for focused action that arose from this research study is that ACIS businesses adopt a more strategic focus on supply chain excellence. As revealed in the study findings, costs of raw materials have become more volatile, pricing pressure on automotive chemical products is increasing, and OEMs are demanding better service driven by service improvement gains from ACSs. Automotive chemical industry supplier (ACIS) businesses must find ways of making their supply chains more cost-efficient in the face of input and operational cost increases and product price reduction demands from OEMs to protect profit margins. The study showed that there is still room for improvement in ACIS business supply chains and supply chain excellence can be a particularly important differentiator for ACIS businesses. The researcher believes that there is room for domestic and global parent ACIS businesses to gain a more in-depth understanding of OEM perspectives in terms of lead times and delivery service. Competitive sourcing of smaller quantities of raw materials with assistance of parent companies should be considered.

The challenge for ACIS businesses is to introduce lean processes, improve forecasting and planning, and significantly improve their supply chain costs. Cost-efficient supply chains assist greatly in supporting growth in the automotive chemical industry business by meeting customer expectations with strong customer service and short lead times. The process of sales and operational planning requires special attention as it is critical to automotive chemical businesses because of the combination of long lead and process times and fluctuations in OEM demand. This implies the consideration of the importance of demand forecasts, supply constraints, and the maintenance of required levels of inventory (raw material and finished product) in the desired locations.

A third recommendation is that ACIS businesses should consider moving away from traditional price per kilogram of product sold to generating revenue from the processing of vehicles (price per vehicle processed). Dedicated ACIS business on-site process engineers control the process and product usage in return for a fixed management fee. This will provide OEMs with a fixed processing cost per vehicle, offering ACIS businesses an opportunity to improve margins by reducing product usage (reduction of wastage) while maintaining a targeted process quality output specification.

Lastly, it is recommended that a periodic assessment of the important elements of commoditisation that negatively impact business cost, revenue, and profitability become an important aspect of ACIS business endeavours to address evolving market competition in the automotive chemical industry.

7.6. POTENTIAL AREAS OF FUTURE RESEARCH

The research study provided some insights into environmental factors that impact the economic sustainability of South African-based ACIS businesses. The study established that increased domestic competition resulting from the threat of international competition has led to the rapid internationalisation of the domestic automotive chemical industry.

The findings of this study alluded to the fact that factors of price-reduction pressure, the extent of commoditisation, and business relationships, for example, may well differ from OEM to OEM. As this dissertation was based on a case study of the domestic automotive chemical industry in South Africa from the perspective of six expert representatives of the automotive chemical industry, it is suggested that the scope of the research be expanded to a more comprehensive dyadic study in order to incorporate the views and opinions of representatives of various functions within domestic ACIS businesses and OEMs. This will facilitate the elucidation of views from a larger sample of participants representing domestic OEMs and ACIS businesses and advance a wider and perhaps alternative perspective regarding factors that impact the economic sustainability of domestic automotive chemical industry businesses.

A broadened empirical research approach may supplement and develop the explorative research findings of this study and refine or further develop the theoretical framework used in this study. The research can be further supplemented by including suppliers of functional products other than specialty process chemicals to the automotive industry, such as coating products supplied by automotive paint suppliers.

The fact that there is still much uncertainty as to the strategic importance of ACIS businesses in South Africa from an OEM perspective, the inclusion of the views and opinions of domestic automotive OEMs may well clarify this aspect of the study and potentially lead to improved customer intimacy between OEMs and ACIS businesses in the future.

7.7. LIMITATIONS OF THE STUDY

There were several limitations associated with this explorative research study that needed to be considered when deliberating the findings. The following is a list of limitations applicable to this study.

- This study was limited to domestic ACIS businesses supplying automotive chemicals to South African-based light-vehicle OEMs and ACSs.
- As the scope of this study was restricted to the South African automotive chemical industry, the findings of this study cannot be used to determine trends and form opinions on other automotive supplier industries.
- The limited number of automotive chemical role players in this industry placed a limitation on the number of participants.
- The cross-sectional nature of the study limited the findings to a specific point in time and may therefore differ from the findings of a longitudinal study.
- The data collected through in-depth interviews with selected industry experts were representative of the views of the individual participants in the automotive chemical industry in general and do not in any way represent the view of any particular automotive chemical industry business.

7.8. CONTRIBUTION OF THE STUDY

The commoditisation of products and markets has become a consideration for businesses operating in the globalised South African automotive value chain. This exploratory research study was directed at the concern of the phenomenon of encroaching commoditisation in the automotive chemical industry in South Africa, with a particular emphasis on its potential effect on the profitability and, ultimately, the long-term economic sustainability of domestic ACIS businesses.

The research study contributes to the knowledge of the commoditisation of industries by providing an understanding of the phenomenon of commoditisation in the context of its impact on ACIS businesses' profitability and by identifying sources of profit margin pressure emanating from the automotive and automotive chemical industry environments.

A relevant literature review of contemporary trends and developments in the automotive value chain in which domestic automotive chemical industry businesses operate and unique pressures emanating from the specialty chemical industry, in conjunction with the findings from the empirical component of the study, identified several key factors that have a significant impact on the competitiveness and profitability of ACIS businesses.

A further contribution of the research study lies in the empirically rich opinions, insights, and viewpoints provided by the selected automotive chemical industry experts through one-on-one, in-depth, semi-structured interviews. The empirical studies were conducted in the context of the domestic automotive chemical industry and the results were analysed based on the theoretical perspectives and central constructs introduced in Chapter 2 of the study. The use of a six-step thematic approach for the analysis of the transcribed data resulted in the development of five major themes representing sources of profitability pressure, one of these being commoditisation.

Key aspects of the findings were selected as a basis for providing recommendations for domestic ACIS businesses to improve their profitability and competitive position and ultimately secure long-term economic sustainability.

7.9. CONCLUSION

The purpose of this chapter was to comprehensively summarise the research results, draw purposeful conclusions, and provide managerial recommendations for automotive chemical industry stakeholders to improve business competitiveness.

The primary research objective of this study was to explore the impact of commoditisation on the economic sustainability of South African automotive chemical industry businesses. The primary research objective was supported by five secondary research objectives. A summary of the synthesis of the primary and secondary research objectives regarding the main findings and conclusions associated with each individual objective was provided in Table 7.1. The conclusions were derived from the major themes emanating from the findings in the previous chapter and secondary data extracted from the literature studies in Chapters 2, 3, and 4 with respect to the research questions. The synthesis and concluding discussions presented in Section 7.2 of this chapter were limited to major aspects of the five themes that were relevant to answering the research question. The discussions in Section 7.2 were presented within the framework of the five major themes identified in the previous chapter and formed the basis of the managerial recommendations and suggestions for further research. The five themes drew attention to factors emanating from the macro-, meso-, and micro-environments which contributed to business profit margin pressure and economic sustainability. Figure 7.1 depicted the five themes and major attributes (subthemes) associated with business profit margin pressure.

This explorative research study emphasised the complexity and unique challenges experienced by the South African automotive chemical industry. Amongst the numerous factors that impact ACIS business profitability exposed in the study, encroaching commoditisation was identified as a key factor that could negatively impact ACIS business competitiveness and long-term economic sustainability significantly in the globalised domestic automotive value chain.

Despite the abovementioned limitations of this research study, the researcher is of the opinion that the primary and secondary objectives of this qualitative explorative study were accomplished. This study has significant relevance with respect to South African automotive chemical industry businesses and their role and strategic importance in the South African automotive value chain, their contemporary level of competitiveness, and their prospects of long-term economic sustainability.

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APPENDIX A: ETHICAL CLEARANCE CERTIFICATE

UNISA ETHICS REVIEW COMMITTEE

Date 11 March 2021

NHREC Registration # : N/A
ERC Reference # 2021_CEMS_BM_112
Name : Mr CG Bowles
Student #6845452
Staff #N/A

Dear Mr CG Bowles

Decision: Ethics Approval from March 2021 to March 2025

Researcher(s): Name:	Dear Mr CG Bowles E-mail address: 6845452@mylife.unisa.ac.za Telephone # 083 625 5992
Supervisor (s): Name:	Prof S Rudansky-Kloppers E-mail address # rudans@unisa.ac.za Telephone # (012) 429-4689

Working title of research:

Commoditisation's Impact on the Economic Sustainability of Primary Automotive Suppliers in South Africa: The Case of the Automotive Chemicals Industry

Qualification: M Com

Thank you for the application for research ethics clearance by the Unisa Ethics Review Committee for the above-mentioned research. Ethics approval is granted for 3 years.

*The **low risk application** was **reviewed** by a Sub-committee (Department of Business Management Ethics Review Committee) of URERC on 11 March 2021 of receiving all reviewer reports or decision in compliance with the Unisa Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment. The decision was approved on 11 March 2021.*

The proposed research may now commence with the provisions that:

1. The researcher(s) will ensure that the research project adheres to the relevant guidelines set out in the Unisa Covid-19 position statement on research ethics attached.
2. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.

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3. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the ethics Committee.
4. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
5. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing, accompanied by a progress report.
6. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
7. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data require additional ethics clearance.
8. No field work activities may continue after the expiry date 11 March 2025. Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

Note:

The reference number 2021_CEMS_BM_112 *should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.*

Yours sincerely,

Signature

Signature

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APPENDIX B: INTERVIEW GUIDE

COMMODITISATION'S IMPACT ON THE ECONOMIC SUSTAINABILITY OF PRIMARY AUTOMOTIVE SUPPLIERS IN SOUTH AFRICA: THE CASE OF THE AUTOMOTIVE CHEMICALS INDUSTRY.

DATA COLLECTION

INTERVIEW GUIDELINE QUESTIONS

- What is your opinion on the **global competitiveness** of domestic automotive chemical industry supplier firms operating in the domestic automotive industry?
- What is your opinion of **ACIS firms position** in the domestic automotive value chain?
- In your opinion which tier position should ACIS firms occupy in the automotive value chain and why?
- In the current automotive business environment, do you think ACIS firms can maintain a **competitive advantage** relative to global competitors?
- Are you aware of any **low cost ACIS competitors** domestic or global recently entered the domestic automotive market?
- Are automotive **process chemical products** in your opinion **strategic** to automotive OEMs and if so, why?
- What in your opinion are the contemporary **key factors** emanating from the macro (government) meso (market/industry) and micro (corporate/business) environment of the automotive industry and specialty automotive chemical industry that contribute to **input cost pressure** of domestic ACIS firms?
- What in your opinion are the **competitive conditions** that domestic ACIS firms are having to endure?
- What in your opinion, are the increased **performance demands** that have been placed on ACIS firms by the automotive industry?
- Are current domestic **automobile production volumes** sufficient to provide ACIS firms with long term economic sustainability?
- In your opinion how difficult is it for ACIS firms to **set prices** for products supplied to OEMs that provide for **acceptable firm profit margins** in the current business climate?
- What in your opinion are the **factors** that make **price setting** difficult for domestic ACIS firms?

- How often are ACIS firms forced to **reduce prices** in order to retain existing business?
- In your opinion are domestic ACIS firms able to sustain profitability under **OEM price reduction pressure?**
- What in your opinion are the areas of concern in ACIS businesses which are impacting on **product pricing and product cost**?
- What is your opinion of **OEM bargaining power**, price negotiation and price reduction requests with respect of ACIS firms?
- Have you perceived there to be any signs that domestic ACIS firms have been **commoditised**?
- In your opinion would you deem ACIS firm **product ranges** to be **complex** and why?
- How often are **new product offerings** introduced into the automotive manufacturing industry by ACIS firms?
- In your opinion has **demand** for **automotive specialty chemicals** reached maturity?
- In your opinion, what **strategies** are used by ACIS firms to **counter price reduction offers** by competitors?
- What is your opinion of **buyer / supplier relationships** between domestic ACIS firms and South African OEMs?
- Are **collaborative buyer supplier relationships** between OEMs and domestic ACIS firms significant to the achievement of **economic sustainability** of domestic ACIS firms?
- What in your opinion are the factors associated with **cost challenges** related to domestic ACIS firms?
- How well do you think **domestic ACIS firm supply chains** are **integrated** into the automotive supply chain?
- Compared to the automotive supply chain would you deem **ACIS firm supply chain** to be more **complex** and why?
- Which **areas of ACIS supply chains** are in your opinion most difficult to **integrate** into the **automotive supply chain**?
- What in your opinion are the major **supply chain problems** domestic ACIS firms face?
- Which areas of **ACIS supply chains** are under the most cost pressure?
- In your opinion what part of **ACIS firms supply chain** do you feel improvement is possible?
- In your opinion what are the **environmental cost pressures** domestic ACIS firms being confronted with?

- In your opinion does **Rate of Exchange** have an impact on ACIS **firm profitability**?
- In your opinion what has been the impact of **Government Industrial Policies** on **ACIS firm profitability**?
- Does **B-BBEE legislation** in, your opinion, have an impact on ACIS **firm profitability**?
- In your opinion is there a **relationship** between domestic ACIS firm **profit margins** and the willingness of ACIS firms to invest in domestic manufacturing operations?
- What **strategy** would you advise domestic ACIS firms to follow to preserve profitable economically sustainable position going forward?

APPENDIX C: DECLARATION OF PROFESSIONAL EDIT

NIKANN

*Service
*Quality
*Excellence

Transcription and Typing Solutions

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Language Editing Certificate

for

COLIN GRAHAM BOWLES

for the study

COMMODITISATION'S IMPACT ON THE ECONOMIC SUSTAINABILITY OF PRIMARY AUTOMOTIVE SUPPLIERS IN SOUTH AFRICA: THE CASE OF THE AUTOMOTIVE CHEMICALS INDUSTRY

A dissertation submitted in fulfilment of the requirements for the Degree:

MASTER OF COMMERCE IN BUSINESS MANAGEMENT

at the

UNIVERSITY OF SOUTH AFRICA

This is to certify that Nikki Solomon provided full language editing for this dissertation

Nikki Solomon
09 November 2022

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