The Quest for Survival in the South African Automotive Industry: A Supply Chain Perspective

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Abstract

The South African automotive industry has been adversely affected by the recent global economic recession and credit crunch. This has had a negative impact on role players within the automotive industry; as such companies within the industry downsized, are operating on a four day week and a number of them closed down.

The aim of this article was to determine supply chain issues experienced by South African original equipment manufacturers (OEMs) from their supply side. As interviews took place prior to the economic crisis and credit crunch, subsequent discussions with role players took place after the occurrence. The results are compared to what was 'then' and what is 'now'. In addition, because of the current global environment, this article explores Maxton & Wormald's message that the automotive industry is at the edge of another potentially great change – the possibility of a 'fourth automotive revolution'.

This study is based on a preliminary study of a descriptive and explorative nature. Interviews were conducted with various managers at both senior and executive level at two leading South African (OEMs). Questions that were asked related to supply chain issues faced in the industry.

The findings from the empirical study suggest that the industry is mature with the role players well established. From a supply chain perspective, the issues that OEMs are facing are categorised into 'Macro' and 'Micro' issues. These include: a lack of local supplier base, the geographic location of suppliers, cost of the South African ports, reduction

of core suppliers, supplier sustainability, interconnectivity with regards to MRPs and delivery commitments. The study further indicates that it appears that the industry is ready for a fourth major change as OEMs struggle globally to maintain their share in this shrinking market and measures are needed to restore confidence among consumers.

This research is original in terms of that it explores the possibility that the automotive industry not just in South Africa but globally is ready for a model change, namely the 'Fourth Automotive Revolution'. Furthermore, there is limited published research on the South African automotive industry particularly addressing supply chain issues[1].

Keywords: Original Equipment Manufacturers (OEMs), four major automotive revolutions, Porter's Value Chain, supply chain management, global economic crisis and credit crunch

Introduction

Maxton and Wormald (2004:xiii) state that the automotive industry is both an important and complex one, as businesses within the sector are closely linked to the manufacture of a wide range of components and the extraction of raw materials. As such, the industry ranks significantly in business and despite the global economic crisis and credit crunch, remains vitally important.

The South African automotive industry is experiencing many challenges because of numerous pressures. These pressures include among others: saturation of demand and intense competition; more demanding customers with increased preferences, reducing profit margins and increasing fixed costs; and developments in information and communication technologies (Buzzavo 2008:105; Ambe & Badenhorst-Weiss 2010:2110).

In this article the state of the literature with regard to categories of businesses, the four automotive revolutions, a brief overview of the South African automotive industry, the scope of supply chain management and

[1] An earlier version of this paper was presented at the Business Management 2009 Conference at the University of KwaZulu-Natal, Westville Campus.

Porter's value chain will initially be reviewed. The research methodology stipulating the research undertaken, the findings, analysis of the findings, summary, recommendations, caveats and suggestions for further research will then be dealt with.

Literature Review

The global automotive industry consists of four distinct categories, namely:

1. **original equipment manufacturers** (OEM) or automotive assemblers. This category comprises manufacturers of passenger and commercial vehicles.
2. **original equipment suppliers** (OES). This category comprises both automotive parts and accessory sales through the OEMs.
3. the **automotive component manufacturers (ACMs)**. ACMs supply components to OEMs, OESs and the independent aftermarket and retailers.
4. the **automotive retail aftermarket**, which comprises of automotive parts and accessory sales, the larger retail groups, the independent retailers and repair shops (adapted from Barnes & Morris 2008:34).

The automotive industry consists of supply and physical distribution management. The industry supply chain spans from the producers of raw materials through the assembly of motor cars (Ambe & Badenhorst Weiss 2010:2111).

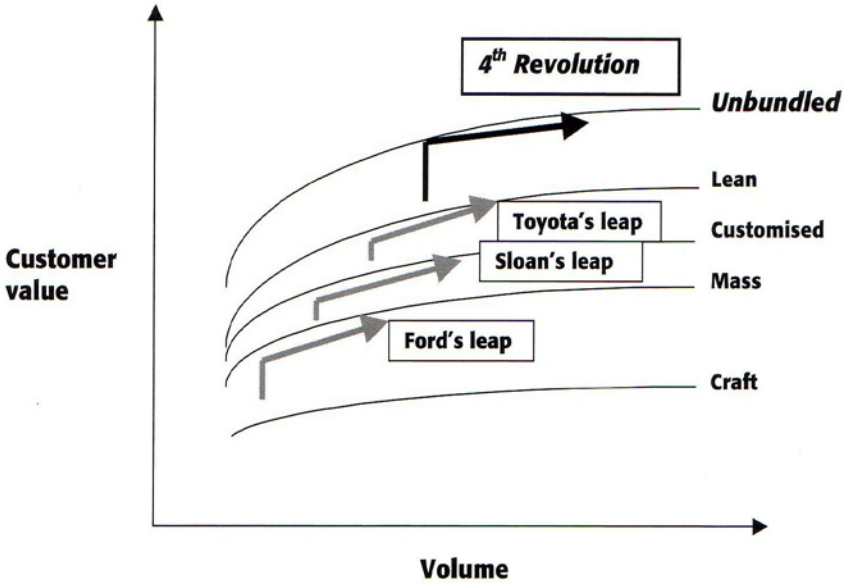
Structural Changes in the Automotive Industry

Maxton and Wormald, (2004:257) indicate that in the last century, since the automotive industry began, there have been three major changes. Each of these changes was a revolution in that it allowed for a leap forward in productivity and cost and in each instance, the manufacturer that brought about the change benefited enormously from it. This is because each change, shifted the rules of the game, upset the competitive equilibrium and overtook the manufacturer – who initiated the change – ahead of their less enlightened and innovative competitors. These flows are indicated in figure 1.

As can be seen from figure 1, the first major change was initiated through the work of Henry Ford. He overtook all his craft-based competitors by applying mass production techniques with the outcome being the total standardisation of the product. The second change initiated by Sloan moved past Ford's model by reintroducing a controlled level of customization, with an emphasis on divisionalisation. Then the third step of the revolution came about when Toyota overtook their competitors by introducing a focus on customized mass production, using lean production processes.

The fourth major change which Maxton and Wormald (2004:257) propose is that businesses take an entirely different look at their businesses in that these will have to be redefined along new and more economically attractive lines. The industry needs to unbundle and reconstitute itself in order to achieve the optimal balance between economies of scale and variety at each stage of the supply chain (from raw materials through the OEM to the distributor to the service garage and ultimately recycling).

Figure 1: The Major Automotive Revolutions



Source: Maxton and Wormald (2004:257)

As indicated by Philips (2009:6) the current state of the global automotive industry is undergoing a shift, as changes are required by the main role players to survive. It is acknowledged that this change is not only required in the way business is conducted but also in their product offering – the kinds of products offered to global markets.

Overview of the South African Automotive Industry

The automotive industry is often described as one of the most global of all industries. Its products are spread around the world and are dominated by a small number of companies with global recognition (Humphrey & Memodovic 2003:2). Morris, Donnelly and Donnelly (2004:129) acknowledge that the automotive industry experienced great structural and other changes in the last 20 years. The influences of globalisation, the implementation of lean production and the development of modularisation had great influences on the relationships between original equipment manufacturers (OEMs) and their suppliers, particularly those in the first tier, known as automotive component manufacturers (ACMs).

South Africa has a number of original equipment manufacturers, namely, BMW, Ford, Volkswagen, Daimler-Chrysler and Toyota who all have assembly plants in various parts in the country. Vehicles are assembled for both the local and international market (Tera 2003:1). In addition, South Africa has a vibrant automotive component manufacturing industry which supplies these original equipment manufacturers (OEM's) (Trade & Investment South Africa (TISA 2003:27).

The South African automotive industry was adversely affected by the recent global economic recession and credit crunch. Car sales dropped significantly, for example in February 2009 only 29 471 motor cars were purchased compared to the previous year 2008 where 46 285 motor cars were purchased in February (NAAMSA 2009). This impacted negatively on role players within the automotive industry and as such companies within this industry downsized, some operated on a four day week and others closed down.

As is evidenced from table 1, the number of employees employed in the total automotive industry in South Africa in 2008 was 324 500. The majority of employees in this industry are employed in the Motor Trade, Distribution and Servicing sector.

Table 1: Employees in the Domestic Automotive Industry, June 2003-2008

SECTOR	2003 ('000)	2004 ('000)	2005 ('000)	2006 ('000)	2007 ('000)	2008 ('000)
Automotive Assemblers (OEMs)	31.6	31.8	34.3	37.9	38.4	36.0
Component Manufacturers (ACMs)	75.0	75.0	78.0	78.0	81.0	81.5
Tyre Industry	6.0	7.2	6.8	6.5	6.9	7.0
Motor Trade, Distribution & Servicing	191.0	194.0	198.0	198.0	200.0	200.0

Source: Adapted from Automotive Yearbook 2009, Section 9:1 and 9.2.

The Scope of Supply Chain Management

Hugo, Badenhorst-Weiss and van Biljon (2004:275) indicate that supply chain management is an integrative approach that considers both the inbound (upstream) and outbound (downstream) flow of materials in business. Distribution management includes the management of downstream processes and activities that deliver the product or service to the end customer.

Grant, Lambert, Stock and Ellram (2006:14) define supply chain management as encompassing the planning and management of all activities involved in procuring, transforming goods and services and all logistics activities. It also includes the collaboration with channel partners, namely suppliers, intermediaries, third-party service providers and customers.

Simchi-Levi, Kaminsky and Simchi-Levi (2000:1) state that supply chain management is a series of approaches used to efficiently integrate suppliers, manufacturers, warehouses and stores. This will guarantee that goods are manufactured and distributed at the right quantities, to the right place, at the right time and cost, in order to minimise system wide costs while satisfying service level requirements.

In terms of the afore-mentioned definitions of supply chain management, supply chain management in the manufacturing of motor cars includes the integration of activities taking place among a network of facilities that purchase the inputs needed on each level of the supply chain, to

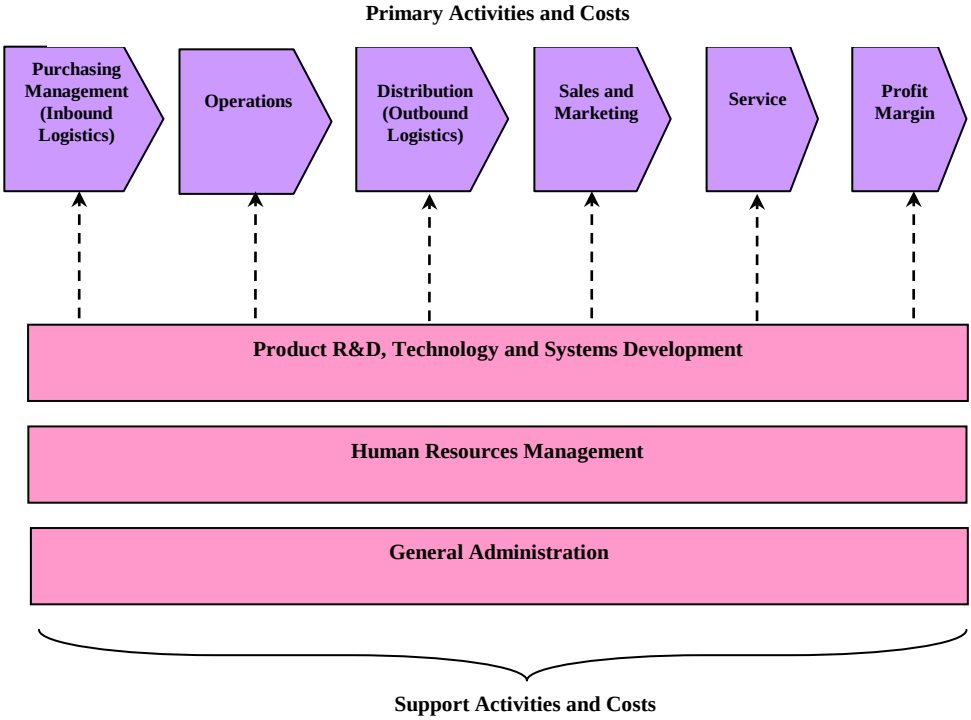
be transformed into finished automotive motor cars, and deliver these to customers through a dealership.

Porter's Value Chain

Michael Porter's value chain analysis disaggregates a business into nine value-creating and strategic activities in either primary and support activities (Grant *et al.* 2006:14) (see figure 2).

Primary activities include the activities in a business of those involved in the physical creation of the product, marketing and transfer to the buyer and after-sale support. The goal of primary activities is to increase profit

Figure 2: Porter's Value Chain



Source: Adapted from Thompson, Gamble and Strickland (2006:96).

margins by creating value that exceeds the cost of these activities. Support activities in a business are seen as non-value creating. However, the goal of these activities is to assist the business as a whole, by providing inputs that allow the primary activities that create competitive advantage to take place on an ongoing basis (Pearce *et al.* 2007:159; Grant *et al.* 2006:14).

In the automotive industry for example, in order to sustain a competitive advantage, inbound logistics, operations and outbound logistics are critical. Barnes (1999:8) emphasises that globally, overproduction in the automotive industry has reached critical proportions. The situation is unlikely to improve in the short term, hence OEMs are under tremendous pressure to improve the competitiveness of their products by way of price, quality, reliability and innovative designs in order to increase sales and thus generate profits. Some mechanisms have been put in place such as lean or just-in-time production, rationalisation of suppliers, consolidating their supply chains, strategic partnerships and merging of operations in order to generate greater economies of scale.

Research Methodology

The study which forms the basis of this article was descriptive and exploratory and qualitative in nature. Data was collected through semi-structured interviews using an interview guide with five staff members at both executive and senior level at two leading OEMs in South Africa.

Research Question

'Is the automotive industry in view of the supply chain issues identified and subsequent global economic crisis, at the edge of another potentially major change?'

Research Objectives

In order to answer the research question the main objectives of this article are to (1) explore supply chain issues facing OEMs from their supply side; and (2) to determine whether the automotive industry is at the edge of another major change – a fourth revolution.

The secondary objectives of the article are:

1. to give a brief description of the major changes that occurred in the automotive industry;
2. to give an overview of the scope of supply chain management with an emphasis on inbound logistics, operations and outbound logistics;
3. to determine the main supply chain issues faced by OEMs from their supply side; and
4. to determine whether the automotive industry is at the edge of another major change.

Data Collection

Data was collected by way of semi-structured interviews using an interview guide with five staff members at both executive and senior level at two leading OEMs in South Africa. Open ended questions were found to be most suitable for this research study as Saunders, Lewis and Thornhill (2003:293) indicate that these are used widely in in-depth and semi-structured interviews. A limitation of the study is that only two South African OEMs and a limited number of participants (five) were included in the study.

Participants

Initial telephonic contact was made with management at Executive level in order to solicit assistance to conduct the study at two OEMs. Permission was granted by both assembly plants, and after submitting a copy of the interview guide, relevant participants were assigned to assist with the study. In total five participants were interviewed**.**

Data Analysis

Each interview was recorded and then transcribed in report form, after which it became possible to summarise, compare and consolidate the findings of each participant. The results are of a descriptive and qualitative nature and are dealt with under the analysis and interpretation of the findings.

Validity and Reliability

According to Saunders *et al.* (2003:101) in terms of validity, the concern is whether the 'findings are really about what they appear to be about'. Cavana, Delahaye & Sekaran (2000:212) note that numerous types of validity tests are utilised to test the goodness of measures. Validity tests can be classified under four broad headings, namely face validity, content validity; criterion related validity and construct validity. In this research study, both *face validity* and *content validity tests* were tested.

Reliability was another important aspect to consider in this study. Cavana *et al.* (2000:210) observe that the reliability of a measure indicates the stability and consistency with which the instrument measures the concept that helps assess the 'goodness' of a measure.

In order to achieve this, participants were contacted to clarify certain information that was not clear to the researcher to ensure that the findings were accurate and indicated what the participant really meant. Furthermore, certain issues identified by the participants called for the researcher to carry out further research with the aim of getting a clearer understanding of the facts. This meant that informal discussions with role players in the industry had to be conducted, which made sure that the data was both valid and reliable.

Limitations

The study has the following limitations:

- only two South African OEMs were included in the study;
- a limited number of participants were interviewed; and
- the main issues and not all identified issues are dealt with in this study.

Way Forward

An exploratory study could be undertaken at a later stage to include all role players to determine the way forward in the industry. The study could focus on how role players could address current issues in the industry – particularly as indicated by Fujimura (2009:17) when vehicle sales recover, it is predicted that buyers will be more selective.

Analysis and Interpretation of the Findings

The aim of the empirical research was to determine from the participants what they perceived to be the main supply chain issues they face from the supply side. Their responses are dealt with accordingly. The findings are categorised in two sections, namely issues identified from a macro and micro viewpoint. Only key issues are dealt with. These are outlined in the next section.

Issues Identified from a Macro Perspective

Lack of Local Core Supplier Base

There are deficiencies within the local supplier base and therefore OEMs need to import too many of their parts requirements. These deficiencies relate to the component manufacturers' lack of technology, global supply capability and cost competitiveness. The problem herein is that parts are imported, used to manufacture motor cars and then a significant percentage of locally manufactured cars are exported. The result thereof is additional cost.

The findings indicate that when dealing with international suppliers some problems besides that of additional cost are (1) communication (language); (2) an increase in transit time; (3) dealing with corrupt port authorities in certain countries; and (4) the poor interior road infrastructure of certain countries, which means that OEMs have to allow for increased packaging in order to protect parts which translates into increased costs.

Geographic Location of Suppliers

Core suppliers to OEMs within South Africa are spread across the country – Port Elizabeth, Eastern Cape, Gauteng and KwaZulu-Natal. Ideally suppliers should be located around OEMs' assembly plants (a supplier park concept) as it would be easier to manage the supply chains of OEMs. However, OEMs cannot expect their core suppliers to set up small plants all over South Africa adjacent to the OEM's as this would affect their viability. As a result, in terms of the logistics supply chain OEMs have to increase their stock holdings which impacts on overall costs. A longer supply chain also impacts on time compression, costs and the JIT process.

South Africa's Ports

South Africa's ports are considered to be the most expensive in the world – high port costs and cargo dues are levied to all vessels which berth in the ports of South Africa. This was confirmed in an international port benchmarking study undertaken by the Automotive Industry Development Centre and the Technical Action Group Logistics. Demont (2007:v) notes that the results of the research conducted by this task group revealed that (1) South Africa's SAPO and NPA container tariffs are exceeded only by the North American Port Authority; and (2) South Africa is the only country where ports still charge cargo dues, adding additional cost to imported goods. These issues impact on a company's competitiveness and increase the costs to import and export goods.

Broad Based Black Economic Empowerment (BBBEE)

BBBEE is a core requirement of the South African business environment and both OEMs who partook of this study support the initiative. Simply put, the BBBEE philosophy states that '*if you want to sell you must comply with the BBBEE requirements, but also you must buy from those who comply with the BBBEE requirements*'. However, even though this concept is not easy to achieve it is vital if a stable social environment is to be created in South Africa.

A key element is the BBBEE rating of suppliers according to the BEE scorecard. OEMs' suppliers are struggling to meet their BEE requirements. The main challenge appears to be that no company can achieve the BEE scorecard overnight. Achieving BBBEE targets as per the laid down codes will be particularly difficult for OEMs globalising their supplier base which is in conflict with the BBBEE legislation.

Load Shedding

Both OEMs did not experience load-shedding as they had been exempted from the load shedding process. However, this did not extend to their suppliers who experienced load shedding. This impacted negatively on their core suppliers as they had to change shipping patterns and had to build in safety stocks because load shedding schedules were unreliable.

Issues Identified from a Micro Perspective

Reduction of Supplier Database

The global trend is the consolidation of one's supplier data base. In terms of core suppliers, it was found that both OEMs already reduced their core supplier database. However it was indicated that local independent suppliers to OEMs are declining and as more and more OEMs consolidate their supplier database, local suppliers' sales to OEMs will deteriorate.

Supplier Sustainability

Maxton & Wormald (2004:227) observe that financial viability of a supplier is vital to automotive manufacturers. An OEM being let down by a bankrupted supplier can bring the production system to a standstill. Both OEMs acknowledged that the sustainability of a core supplier is important in that (1) the core supplier is a viable business; and (2) the business will survive into the future. Should a supplier become insolvent this would in the short-term impact on the production of motor cars whilst an alternate supplier is found.

Interconnectivity with Regard to MRPs

OEMs and their core suppliers run off completely different ERP systems. The development of a common platform (Collaborative Xchange) for the MRP interface between the OEMs and their core suppliers is used. Collaborative Xchange is an interpretation database that interprets all the different OEMs' ERP systems/data into supplier recognised releases. In terms of material supply, all releases, advanced shipping notices, data, requirements and packaging through all the various MRPs that OEMs use are submitted by OEMs through this common platform. This is a challenge as: (1) a number of suppliers do not understand the releases; and (2) the suppliers need to share the release data with their Tier 2, 3 and 4 suppliers via this platform.

Delivery Commitments

Another issue identified by participants was that of suppliers not meeting delivery commitments. Some of the causes identified by participants among

others were suppliers not shipping to releases, delays in shipping and in rail transport, delays in off-loading of vessels, port delays, and road delays.

Subsequent Global Economic Crisis

As indicated, interviews took place prior to the global economic crisis. Subsequent informal discussions were held with players in the automotive component industry during the economic crisis and the issues identified prior to the economic crisis are compared what they are now – during the economic crisis.

This concludes the section on the supply chain issues experienced by OEMs from their supply side. The next section deals with the impact of the global economic crisis and credit crunch on the automotive industry.

Impact of the Global Economic Crisis and Credit Crunch on the Automotive Industry

The global economic crisis has severely impacted the automotive industry not just globally, but also in South Africa. As indicated by Davie (2009:15) the industry experienced a severe slump in new vehicle sales both globally and locally. Subsequently South African OEMs were forced to reduce working weeks to four days, work shorter shifts and retrench staff (Robertson 2009:17). The author cites some examples which are as follows: Volkswagen who because of an expected decline in sales overseas closed down production in the last week of February and the company offered voluntary retrenchment packages. Toyota expected exports to decline by 25% to 30% from last year and considered the possibility of working shorter shifts. Ford operated on a four-day week since the end of January 2009. General Motors offered voluntary retrenchments packages to 1000 employees. Mercedes-Benz offered an employee restructuring programme for salaried staff and operated on four-day week from May 2009 onwards.

In South Africa car sales declined significantly not only because of the global economic crisis but also because it has become more difficult for potential buyers to secure loans (Tlelima Online 2009: para 4).

This slump in new vehicle sales has had a knock on effect on core suppliers to OEMs and in turn their sales volumes declined. Subsequent informal discussions took place with participants in the automotive

component industry to determine how they had been affected by the crisis, in relation to the identified issues by OEMs. These are dealt with hereunder.

Issues Identified from a Macro Perspective

Lack of Local Core Supplier Base

Automotive component manufacturers supply components to OEMs, OESs and the independent aftermarket and retailers. However not all component manufacturers supply all four markets. There are those who only supply OEMs, for example catalytic converters and harnesses and those who supply OEMs and the aftermarket, for example spark plugs and filters. Those manufacturers who purely supply OEMs have been the worst affected as in line with motor car sales, sales volumes decreased significantly, customers cancelled orders and hold excess stock which is slow moving. This resulted in some of these manufacturers working a four-day week, retrenching staff and in some instances closing down. The manufacturers who supply the OEMs and aftermarket also experienced a decrease in sales volumes, but not to the extent of pure OEM suppliers.

As motor car sales slumped globally, international component manufacturers were also affected. Because these manufacturers are set up for high production runs, they were not achieving economies of scale which negatively impacts on costs. Therefore from the South African OEMs' perspective as they are also not sourcing the volumes of components as previously, the question then arises whether it is still viable for them to purchase from international suppliers taking into consideration logistics costs.

Geographic Location of Suppliers

Solutions to the above noted issue are complex as this has to do with how the industry developed historically. The supply and the manufacturing volumes in South Africa prior to the crisis were small, and one cannot expect local component manufacturers to set up small plants all over the country. As indicated sales volumes decreased which had a knock-on effect on component manufacturers and certainly at this time the creation of a supplier parks around OEMs' plants is not a viable option.

South African Ports

As indicated by Bondareff (Online 2009: para 6), the shipping industry was adversely affected by the recent economic crisis - companies laid up container ships and retrenched workers around the world. Bulk carriers were also affected as exports of dry bulk goods declined. This is confirmed by Sexton (Online 2009: para 5) in that the global economic crisis resulted in severe declines in containerised trade volumes globally. Tlelima (Online 2009: para 4) further highlights that the US credit crunch adversely impacted on Africa's export and import industries. For example, the continent relies heavily on exports of its raw materials such as oil and coal and most countries that purchase Africa's exports were unable to access credit. This caused a sharp decline in exports.

OEMs in South Africa were also adversely affected by the recent economic crisis and their exports motor cars and therefore imports of components declined. Therefore in terms of the automotive industry less freight is going through the South African Ports.

The findings further indicated that compared to Asia and Europe, in addition to costs, South African ports are inefficient both in terms of congestion at the ports and a poor work ethic.

Issues Identified from a Micro Perspective

Supplier Sustainability

Prior to the crisis, supplier sustainability was identified as an issue. Subsequently, OEMs car sales declined and this resulted in the cancelation of orders with their component suppliers. These suppliers were left with extra stock, which is essentially slow moving. In addition, because of a decline in sales volumes component manufacturers are struggling to survive. As a direct result, a component manufacturer who was financially stable and a viable business prior to the economic crisis may not be so now and this may pose a threat to the OEM.

Delivery Commitments

The findings indicate that volumes are contracted a year in advance so on-time delivery and availability now are not an issue. In addition, participants

indicated that because volumes declined, transport costs increased because they are not achieving economies of scale and transport.

In conclusion, this section of the study dealt with the findings of the empirical research prior to the global economic crisis, a brief discussion of the global economic crisis and credit crunch in South Africa and the impact of thereof on the automotive industry. The next section deals with the generalisations from the study and attempts to answer the problem question.

Generalisations from the Study

Because of the global economic crisis and credit crunch, this article explores Maxton & Wormald's message that the industry is at the edge of another potentially great change. More precisely, a fourth major change in the automotive industry. As indicated in the previous section, the impact of the current global economic crisis on the global automotive industry was significant and all major automakers were affected. OEMs globally struggle to maintain their share in this shrinking market and measures are needed to restore confidence among consumers.

Through the discussion of the supply chain issues and the effect of the global economic crisis and credit crunch, the assumption is made that it appears that in order to survive role players in the automotive industry may have to change their current strategies – what worked in the past may not work in the future. This anticipated change could be any change, but the anticipated fourth major change as indicated by Maxton and Wormald (2004:257) could be the one from a logical and financial perspective.

Conclusion

As indicated in the abstract, the South African automotive industry was adversely affected by the recent global economic recession and credit crunch. This impacted negatively on role players in the industry. Companies within the industry downsized, operated on a four day week and a number of them closed down. The aim of this article was twofold: (1) to determine supply chain issues experienced by South African original equipment manufacturers (OEMs) from their supply side; and (2) to explore Maxton and Wormald's

message that the automotive industry is at the edge of another potentially great change – the possibility of a 'fourth automotive revolution'.

This article includes an introduction and theoretical background, the research methodology, the limitations of the study and way forward.

The findings from the empirical study suggest that the industry is mature with the role players well established. From a supply chain perspective, the issues that OEMs are facing include a lack of local supplier base, the geographic location of suppliers, cost of the South African ports, reduction of core suppliers, supplier sustainability, interconnectivity with regards to MRPs and delivery commitments.

The limitation of the study is that only two local OEMs were included in the study and five participants interviewed.

To answer the research question:

Is the automotive industry in view of the supply chain issues identified and subsequent global economic crisis, at the edge of another potentially major change?

Through the discussion of the supply chain issues and the effect of the global economic crisis and credit crunch, the assumption is made that in order to survive role players in the automotive industry may have to change their current strategies. It is clear that what has worked in the past may not work in the future and therefore the indications are that the industry is at the edge of a major change.

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