

**Interrogating the Impact of Industrial Clustering on Firm-Level Employment
Growth: A Case Study of the Durban Automotive Cluster (DAC)**

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Abstract

More than a decade since the democratic transition in 1994, South Africa still grapples with incredibly high levels of unemployment. An underperforming manufacturing sector has hampered economic growth and job creation in a country with a large pool of low and semi-skilled labour. In response to these challenges the South African government has initiated a guiding framework (NIPF) and action plan (IPAP) spearheaded by a sectoral and geographic focus to place the country on a more labour-intensive industrial growth path.

Given this context, it is instructive to note that industrial clustering has been identified as critical to the sustainable development of industry in both developed and developing economies. Whilst the role of industrial clustering in assisting industrial development is well documented, this paper aims to further interrogate the impact of industrial clustering on another critical developmental issue, *employment*. Using the Durban Automotive Cluster (DAC) as a case study, the primary objective of this research is to interrogate the impact of industrial clustering on firm-level employment.

A mixed-method methodology is utilised in the study, collecting both primary and secondary data from face-to-face interviews conducted with nineteen firm-level representatives and two DAC representatives.

The research findings and analysis conclude that on average, the impact of the DAC on firm-level employment is positive, although largely indirect. In particular, small or firms with low degrees of production-related technological intensity on their production perceive the impact of the DAC on their firm-level employment most positively. The majority of member firms believe the DAC has either helped *sustain* or in some cases *grow* their firms' employment levels. The only variable that has had a more positive impact on firm-level employment is the MIDP, with labour market policies perceived to have had the most negative impact on employment.

The study suggests that greater communication between the DAC and local and national governments to ensure each stakeholder's objectives are better aligned to ensure growth of the industry (to stimulate job creation). This process will not be simple and will depend

heavily on the country's ability to address critical macro-constraints that the study has shown to hinder employment growth amongst the DAC firms.

Whilst the findings relate specifically to the automotive industry in KwaZulu-Natal, the relevance of the findings extends well beyond the automotive sector. The study provides key lessons for South Africa's sectoral and geographically focused industrial policy focus that aims to achieve industrial development and employment growth in South Africa.

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DECLARATION

Submitted in fulfilment / partial fulfilment of the requirements for the degree of Masters in Development Studies, in the Graduate Programme in the School of Development Studies, University of KwaZulu-Natal,
Durban, South Africa.

I declare that this dissertation is my own unaided work. All citations, references and borrowed ideas have been duly acknowledged. I confirm that an external editor was/was not used and that my Supervisor was informed of the identity and details of my editor. It is being submitted for the degree of Masters in Development Studies in the Faculty of Humanities, Development and Social Science, University of KwaZulu-Natal, Durban, South Africa. None of the present work has been submitted previously for any degree or examination in any other University.

Student signature

Date

Editor name and surname (*if applicable*)

Abbreviations and Acronyms

APDP	Automotive Production and Development Programme
BEE	Black Economic Empowerment
B-BEE	Broad-Based Black Economic Empowerment
BMA	Benchmarking & Manufacturing Analysts
BoP	Balance of Payments
DAC	Durban Automotive Cluster
DTI	Department of Trade and Industry
FNB	First National Bank
FTE	Full time equivalents
GEAR	Growth, Employment and Redistribution
GDP	Gross Domestic Product
GM	General Motors
IPAP	Industrial Policy Action Plan
KZN	KwaZulu-Natal
MIDP	Motor Industry Development Programme
n.d.	No date
NIPF	National Industrial Policy Framework
NUMSA	National Union of Metalworkers of South Africa
OEM	Original equipment manufacturer
RDP	Reconstruction and Development Programme
RSA	Republic of South Africa
SME	Small and medium sized enterprises
Std. Dev.	Standard deviation
VW	Volkswagen
WCM	World Class Manufacturing
WTO	World Trade Organisation

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Chapter One

Introduction

1.1 Background and Motivation for Study

More than a decade since democratic transition in 1994, South Africa still grapples with incredibly high levels of unemployment with a rate of 24% (strict definition) in 2010 (Statistics South Africa 2011, VI). An underperforming manufacturing sector has hampered economic growth and job creation in a country with a large pool of low and semi-skilled labour (see Banerjee et al [2008], Rodrik [2008] & Barnes [2009]). In response to these challenges the South African government has initiated a guiding framework (National Industrial Policy Framework¹) and action plan (Industrial Policy Action Plan²) spearheaded by a sectoral and geographic focus to place the country on a more labour-intensive industrial growth path. At a more localised level, KwaZulu-Natal is home to some key manufacturing sectors and overall the province is the second largest (Gauteng is the largest) in terms of percentage contribution to South Africa's national GDP (KZN Provincial Planning Commission 2011, 59). A driving force in the KZN economy is the automotive sector, contributing R4.6 billion to the KZN provincial GDP in 2010 (Deloitte 2011, 26).

Given this context, it is instructive to note that industrial clustering has been identified as critical to the sustainable development of industry in both developed and developing economies (See Porter [1998] and Nadvi & Schmitz [1999]). Specifically, industrial clustering has been shown to be beneficial to industries in various stages of industrial development. It is on the back of this understanding that a purposive cluster was established in the KZN automotive industry in 2002. Established as a public-private partnership between the eThekweni municipality and local firm-level industry stakeholders, the Durban Automotive Cluster (DAC) lays claim to having meaningfully contributed to the success of the regional automotive industry in KwaZulu-Natal that strives towards a long-term strategic objective of doubling its size by 2020.

¹ From here on, NIPF

² From here on, IPAP

1.2 Objectives of the Study and Key Research Questions

Main research objective

Whilst the role of industrial clustering in assisting industrial development is well documented, this paper aims to interrogate the impact of industrial clustering on a narrower critical developmental issue, *employment*. Using the DAC as a case study, the primary objective of this research is to interrogate the impact of industrial clustering on firm-level employment.

To unpack this issue the study uses a number of key questions that attempt to link the impact of industrial clustering on firm-level employment to actual employment data of the firms in the sample, providing a foundation from which further analysis is conducted:

Key questions

1. What were the DAC firms' employment levels over each of the years 2006 to 2010, on the 31st of December each year?
2. How do the firms rate the impact of various relevant variables (including the activities of the DAC) on employment levels for the period being reviewed? Critically, has the DAC impacted on their employment profile to a greater or lesser extent than a range of other variables identified as critical to employment in the industry?
3. Does the relative impact of the DAC vary by the types of firms that participate in its various activities? Principally, does industrial clustering foster a more/less positive employment dynamic in larger or smaller firms, independent or mutually owned firms or higher versus lower technology firms?
4. Based on the answers from the aforementioned questions, what activities/attributes of the DAC have supported employment at both a firm and regional industry level over the period 2006-2010?
5. Does the agglomeration effect of the DAC have an impact on the firms' employment levels? The question on the agglomeration effect is used to address a

notion at the very core of the cluster literature: the existence of external economies gained by firms due to their special proximity. Essentially this questions aims to expand on this notion by interrogating whether firms' believe the agglomeration effect has impacted on employment levels.

6. More importantly for studies of industrial development, what are the lessons for national and regional government in respect of the potential employment impact of industrial clusters in important municipal areas of South Africa?

1.3 Structure of the Dissertation

The remainder of the dissertation is structured as follows:

Chapter Two covers the theoretical framework and literature review pertaining to industrial clustering. Firstly the evolution of the industrial cluster discourse is mapped from the passive gains achieved by sectorally homogenous firms (see Marshall 1890) to the notion of collective efficiency (as described by Schmitz [1995]). The collective efficiency framework is then applied to review the role of industrial clustering on industrial development. Here the role of industrial clustering for industries in both incipient and more advanced stages of production is unpacked, highlighting the opportunities and challenges for clustered firms in each. The link between global value chains and industrial clustering is briefly introduced and the importance of value chain analysis as a heuristic tool is illustrated.

Chapter Three discusses industrial development in South Africa, specifically focusing on the characteristics of South Africa's post-apartheid industrial growth path. Linking persistent, high unemployment rates with the structural change of the economy during this time, the need for a more labour-intensive industrial growth path is explained. Government's response to these challenges is then introduced. Given its contextual significance to the study, the impact of the 2008-2009 global financial crisis had on the South African economy is illustrated using key economic indicators.

The paper then shifts focus to the automotive industry in South Africa. As the leading manufacturing sector in the country, the automotive industry is a large employer contributing roughly 9.2% of manufacturing sector employment. The paper mentions the significant role

of the Motor Industry Development Programme in initially ensuring the survival and then facilitating the growth of the local automotive industry amidst high levels of international competition. The final part of Chapter Three covers the role of the DAC in facilitating the competitiveness and growth of the local automotive industry in KwaZulu-Natal given its strategic importance.

Chapter Four, discusses the study's key methodological considerations. Starting with a motivation for a mixed methods research design the chapter describes the sampling process, data collection and compilation of data whilst acknowledging the critical limitations of the study where necessary.

Following the sequence of the questions in the questionnaire, Chapter Five provides a thorough, purely descriptive account of the research findings captured during the interviewing and associated surveying process. Based on these findings Chapter Six then provides a focused and deeper analysis of the impact of the DAC on employment levels within the regional automotive industry. Trends among the firm-level responses are unpacked using a system of stratification and analysis that links key findings back to the relevant literature covered in Chapters Two and Three. Chapter Six then finishes with recommendations for local and national government based on the analysis provided in Chapter Five. Finally, Chapter Seven provides concluding remarks on the study.

Chapter Two

Theoretical Component and Literature Review

2.1 Industrial Cluster Discourse

2.1.1 Analytical and theoretical origins: Marshall's industrial districts

The theoretical roots of industrial clustering originate from the seminal work of Alfred Marshall, the *Principle of Economics* (1st edition 1890), that looked at industrial districts in the United Kingdom in the nineteenth century. Looking at the industrial organisation of firms, Marshall (8th edition 1920, 221) made the distinction between the ‘internal’ and ‘external’ economies accrued by firms through an increase in the scale of their production. Whilst a firm’s ability to secure *internal* economies is dependent on its individual capacities, a firm’s ability to secure *external* economies is dependent on the collective development of the industry. Specifically, Marshall (8th edition 1920, 221) argued that external economies, or passive advantages, were gained by sectorally homogenous firms due to their *spatial proximity*, and this notion provided a foundation for theories of inter-firm cooperation.

In his paper, *Collective Efficiency: Growth Path for Small-Scale Industry*, Schmitz (1995) discusses the important contribution made by Marshall with regard to the concept of external economies, but argues the concept alone is insufficient to explain the competitive advantage demonstrated by industrial districts studied at the time. Schmitz (1995, 535) argues that Marshall’s ‘loose definition’ of external economies does *not* specifically make mention of geographical proximity, but rather that they emerge when specialised industries concentrate in particular localities³. Thus Marshall’s explanation of external economies implies an existence of *incidental* gains (or losses) accrued by firms that are generated as a by-product or outcome of other activities.

Focusing on the growth processes that arise from the sectoral and geographical concentration of (small) firms, Schmitz (1995) argued the clustering of firms opens up efficiency gains that individually these firms would otherwise rarely attain. Expanding on Marshall’s notion of ‘external economies’, Schmitz’s (1995, 530) described the concept of ‘collective efficiency’ which is defined as the competitive advantage derived from local external economies – as

³ Marshall referred to these concentrations of industry ‘industrial districts’.

described by Marshall – and joint action. The concept of collective efficiency emerged from the need for an “integrated concept” that acknowledges economic viability can neither be understood nor enhanced by focusing on the individual firm (Schmitz 1995, 536). Crucially, the concept of collective efficiency includes both a passive (external economies) and active (joint action) component to industrial clustering, which can be used to help theorise and explain differences in cluster performance (Schmitz & Nadvi 1999, 1505).

2.1.2 *External economies: Opportunity for passive gains*

There are several benefits that could be attained by a firm that experiences positive external economies. Five of the most prominent benefits are discussed below.

First and foremost the most universal external economy for clustered firms is *market access*. Clusters of similar firms attract both *customers* (local and distant) who are attracted to a region by an established agglomeration of suppliers as well as, additional *suppliers* who may either compete or cooperate with each other to service –or secure new– customer demands. Secondly there is the *pooling of skilled labour*, where a concentration of specialised –and in some cases very industry specific – skills sets agglomerate within a region. The concentration of skills occur both as a result of skills upgrading that occurs at firms in the region, as well as the influx of skilled labour being attracted to the region from other places to seek job opportunities. As McCormick (1999, 1533) highlights this provides clear benefits for both labour with the relevant skills to supply, and to the firms that demand these skills. Thirdly, and related to the previous two benefits, is the *intermediate input effects* which are externalities that are associated with the emergence of specialised suppliers of inputs and services. McCormick (1999, 1533) explains, these arise as a result of the internal process of specialisation and differentiation (firms change from manufacturing to service for example), or when firms are attracted from outside the cluster (the concentration of firms attracts outside suppliers as mentioned previously). Fourthly there is the *dissemination of knowledge and information*, which include sharing sector or industry-related knowledge as well as broader relevant macro issues. The dissemination of knowledge and information occurs both formally (through formal institutional forums) and informally (through informal communications which arise through strengthened relationships among firms). Finally *technological spill-overs* include the diffusion of technological “know-how”, ideas and actual

technologies or machinery. Spatial proximity encourages the flow of information among the firms (McCormick 1999, 1533), both customers and suppliers, facilitating these spill-overs.

2.1.3 Joint action: Opportunity for active advantages

As McCormick (1999, 1533) suggests, external economies will exist when social (or collective) benefits are higher than private (or individual) benefits for agglomerated firms. This point is crucial to the notion of joint action as firms need an incentive to cooperate with one another. Crucially, the notion of joint action highlights the importance of inter-firm linkages and networks.

Schmitz (1997) describes four categories of joint action in clusters, based on two dimensions: The first dimension pertains to the *number* of co-operators, where joint action can be either bilateral (two firms working together) or multilateral (groups of firms join together, often as an association or other organisation, for a common purpose). The second dimension pertains to the *direction* of cooperation, where joint action can be either vertical, where firms involved in different stages in the supply chain work together or horizontal, where firms in the same level of the supply chain cooperate. The latter is a pertinent example of cooperation among firms producing parts and components in the automotive industry.

The notions of collective efficiency and the possible gains that can be accrued by positive external economies and joint action have provided researchers with very useful analytical tools. The following section discuss the empirical studies conducted using various case studies from around the world. Specific focus will be given to mapping the trajectory of focus on cluster analysis from the developed and the developing world.

2.1.4 An empirical trajectory of industrial clustering analysis: Shifting focus from scale economies to the nature of competition

The emerging interest in the empirical investigation of industrial clusters stemmed from studies conducted on small-firm industrial districts in Europe that were successfully breaking into developing markets during the 1970's and 1980's. Specifically, interest in industrial clustering was fuelled by the success of what was termed the 'Third Italy' by Arnaldo Bagnasco in the 1970's. The term was coined after industries in the Northeast and Central

regions of Italy (Third Italy) experienced rapid growth whilst the traditionally richer Northwest region (First Italy) faced massive industrial crisis in the 1970's (Schmitz 1995, 537). The work of Piore and Sabel (1984) on the 'Third Italy' provided a platform from which the case study received international attention, which led to research being conducted on industrial districts in numerous developed-country regions⁴. The ensuing international debates that emerged during this time produced some key defining attributes of industrial districts (Schmitz 1995, 537): geographical proximity, specific sectoral specialisation, a dominance of small and medium-sized firms, a degree of inter-firm collaboration, inter-firm competition driven by innovation, a socio-cultural identity that harnesses trust among firms, active self-help organisations, and support from regional and municipal government.

Initial academic research used the terms 'industrial districts' and 'clusters' were often used interchangeably. However this paper will make use of the following distinction. Schmitz (1995, 536) explains whilst an industrial district is always a cluster the reverse is not always true. When using the term 'industrial districts' contemporary analysts imply the existence of a 'deep inter-firm specialisation of labour' and the existence of inter-firm cooperation. The term cluster merely describes the sectoral and geographic concentration of firms where specialisation and cooperation are not necessarily subsumed in the definition (Schmitz 1995, 536).

The simple definition of clusters as "sectoral and geographic concentrations of firms", received more attention in the 1990's from business⁵ and geographic⁶ economists with particular focus on the local factors required for competing in global markets. Today more comprehensive definitions of clusters are commonly used, although there is no one standard definition. A definition provided by the World Bank (2009, 1) is an example of one such definition and provides a suitable fit for the purpose of this paper,

An industrial cluster is an agglomeration of companies, suppliers, service providers, and associated institutions in a particular field... entities are linked by externalities and complementarities of different types and are usually located near each other.

⁴ See Pyke et al (1990); Pyke & Sengenberger (1992); Garofoli (1991); and Garofoli (1992).

⁵ See Porter (1990).

⁶ See Krugman (1991) and Scott (1996).

Porter's (1998) *Clusters and the New Economics of Competition*, was one of the founding works describing *why* clustering is critical to competition and discussing the resulting implications for firms.

A cluster of independent and informally linked companies and institutions represents a robust organisational form that offers advantages in efficiency, effectiveness, and flexibility (Porter 1998, 78).

Porter's (1998, 78) argument on the nature of modern competition suggests a shift away from Marshallian focus on scale economies and access to inputs towards a specific focus on productivity and *how* firms choose to compete –rather than the particular fields they compete in. Porter (1998, 78) speaks of the inherent paradox that describes the environment firms face in an era of globalisation, where the ability to sustain competitive advantage in a global economy increasingly lies in local factors (knowledge and relationships for example) that rivals cannot match. Essentially, Porter (1998) argues clustering affects competition in three broad ways: Firstly, clustering increasing the productivity of firms situated in the cluster. Specifically, Porter (1998, 81) suggests firms are better able to source inputs, access information and technology and coordinate with related companies. Secondly, clustering assists firms drive the ‘direction and pace’ of innovation that will underpin their future productivity growth. For example, Porter (1998, 83) argues that not only does clustering make opportunities for innovation more visible, through firms’ proximity to a major buyer or OEM in the cluster, but they provide the capacity and flexibility to act rapidly on the need to innovate through their proximity to suppliers. Finally Porter (1998) suggests clusters stimulate the formation of new business which in turn expands and strengthens the cluster itself. It is important to note, Porter (1998, 90) attributes these benefits of clustering on firm-level competition not only to their geographical, but also to their *cultural* (“social glue” keeps actors together) and *institutional* (ensures functionality of relationships among actors) proximity. Cultural and institutional proximity are important determinants for fostering joint action among firms in a cluster.

Porter's (1998) paper provides a business economic approach to clustering, and draws examples from very developed and technologically intensive clusters in the United States of

America. The question is how do the empirical lessons from Europe and the seminal work of Porter bare relevance to the rest of the developing world?

Whilst research on clusters in developing countries acknowledged the importance of small firms acting collectively to increase their capacity to compete in global markets (as described by Porter [1990], Krugman [1991] and Scott [1996] above), it had a different trajectory. As Schmitz (1995, 539) explains, the earlier empirical work conducted on the European experiences –especially that of Italy– stimulated a growing research agenda on small-scale industry in developing counties which led to a small body of empirical studies on small-firm clusters in developing countries. These studies emerged as a continuation of research conducted in the late 1980's, that was “kept alive” by the failure of large firms to create employment, rather than emerging as a new set of theoretical or policy approaches (Schmitz and Nadvi 1999, 1503). Specifically, the majority of recent research on industrial clustering in developing countries has a strong developmental focus, promoting the role of industrial clustering in assisting industrial growth and economic development.

2.2 The Role of Industrial Clustering in Industrial Development

Over the past two decades research on industrial clusters have shown that industrial clustering assists firms –particularly small firms– overcome constraints to growth and compete in global markets; however it is not an ‘automatic outcome’ (Schmitz & Nadvi 1999, 1503). Drawing from a collection of case material (see Nadvi & Schmitz [1999], special issue in *World Development*) the role of industrial clustering in industrial development will be discussed in the context of developing countries. Having acknowledged that industrial clustering assists industrial development and competitiveness, it is critical to determine the circumstances in which it does so. Schmitz & Nadvi (1999, 1503, emphasis added) state, in order to do so it is crucial to distinguish between *incipient* and *advanced* stage of industrialisation. The set of challenges faced and thus the benefits (that may or may not be) accrued by clustered firms will vary depending on the stage of industrialisation. Looking at case studies conducted in Indonesia (see Weijland [1999]) and Africa (see McCormick [1999]) the challenges faced by firms trying to cluster in the incipient stage of industrialisation are unpacked. Following this, the bulk of the discussion will shift focus shift to the issues faced by more mature industries, where case studies from Mexico (see Rabellotti

[1999]), India (see Knorringa [1999] & Tewari [1999]), Pakistan (see Nadvi [1999]) and Brazil (see Schmitz [1999]) will be examined.

2.2.1 Clustering in the Incipient Stage of Industrialisation

Research examining the significance of industrial clustering for industries in the incipient stages of industrialisation, was stimulated by the success of small-firm industrial districts in the ‘Third Italy’ (Schmitz & Nadvi 1999, 1505). For regions at very low stages of industrialisation Schmitz and Nadvi (1999, 1505) highlight two key factors that need to occur: First is the mobilisation of unused local resources (financial and human), and second is ensuring the effective use of these resources. They argue in the early stage, both the *mobilisation* and *use* of resources occur in small amounts at a time therefore, clustering can play a significant role in facilitating specialisation and effective investment in ‘small steps’.

2.2.2 From ‘clustering for survival’ to ‘setting the foundations’ for industrial growth

To begin, Weijland (1999) describes the importance of clustering on the early stages of industrial development, when clustering is a largely rural phenomenon serving primarily as a survival strategy. Altenburg & Meyer-Stamer (1999) refer to these types of clusters as *survival clusters*. Characteristically, survival clusters consist of firms in poor areas, usually in small towns or rural areas where unemployment is high and majority of the producers are restricted to the lower end of the market characterised by low value-added products with low product quality (Altenburg & Meyer-Stamer 1999, 1695-1696). Examining microenterprise clusters in rural Indonesia, Weijland (1999) argues that incredibly poor, but clustered rural microenterprises may have a “seedbed” function for industrial development. The data collected for the study illustrated that in rural areas with dense trade networks cottage industries⁷ had been incorporated into the wider regional economy. By grouping villages to gain *critical mass* they were able to overcome disadvantages of small-size and isolation that had previously resulted in high transaction costs and technological indivisibility problems (Weijland 1999, 1527).

⁷ These cottage industries were generally the smallest and poorest enterprises.

However, successes among the microenterprises were not experienced uniformly. In fact the successful clustering of firms at this level of industrialisation faces significant challenges.

Whilst in some cases external economies arose from specialisation and technical indivisibility, Weijland (1999, 1527) found that few clusters prospered in remote, sparsely populated areas that lacked transport and trade facilities. Altenburg & Meyer-Stamer (1999, 1697) found that the combination of a culture of imitation and a lack of trust among firms in survival clusters (in Latin America) resulted in low levels of inter-firm cooperation, severely diminishing opportunities for cluster firms to achieve the benefits of collective efficiency.

McCormick (1999) identified three specific ways in which clustering enables firms to overcome obstacles to growth: First, clustering promotes collective efficiency which enhances firms' competitive advantage; second, clustering facilitates "growth in small steps"; and third, clustering makes it easier to respond to opportunities and crises. Using six case studies (four from Kenya, One from Ghana and One from South Africa) McCormick's (1999) work concluded that clusters can and do further industrialisation, however they do so in different ways depending on the *type* of cluster (McCormick 1999, 1538).

The six clusters were divided into the following three groups (type of clusters): "*groundwork*" clusters that are much like the survival clusters discussed above; "*industrialising*" clusters which are clusters that have begun the process of specialisation, differentiation and technological development (also see Altenburg & Meyer-Stammer [1999] for clusters of more advanced and differentiated mass producers); and "*complex industrial clusters*" which are clusters that produce competitively for wider markets (examples of which will be addressed later in the paper). McCormick (1999) begins by revealing important differences among them, and then shows that each group plays its own part in the process of industrialisation. Firstly, the groundwork clusters were important for laying the foundations for the process of industrialisation. In congruence with Weijland (1999), McCormick (1999, 1538) found the major external economy was market access, whilst other potential external economies (technological spill-overs, bilateral and multilateral cooperation) were weak. Those grouped under "*industrialising clusters*" showed evidence of much clearer signs of collective efficiency: strong bilateral production linkages and overall higher efficiency, benefits from market access and positive technological spill-overs, whilst the availability of labour market pooling and intermediate input effects varied among the case study example (McCormick 1999, 1540). Theoretically, McCormick's (1999) study underscored the strength

of the collective efficiency framework, but found that certain anomalies could only be explained by other contextual variables. This is a pertinent consideration as each and every industrial cluster faces a unique set of opportunities as well as challenges that will strongly influence the success or failure of the cluster initiatives.

These examples demonstrate the role of industrial clustering in ‘setting the foundations’ in small, where firms in under-developed industries can pool resources to achieve better scale economies and gain access to new markets. However, there are considerable challenges to the clustering process itself, specifically low-levels of inter-firm cooperation, which negatively impact on ability of industrial clustering to achieve developmental outcomes. The paper will now discuss the challenges and opportunities for clustering in more advanced industries.

2.2.3 Clustering in More Advanced Stages of Production

Schmitz & Nadvi (1999, 1507) state that focusing on a key turning point can help determine a cluster’s growth path: The twin challenges of liberalisation and globalisation have presented a set of key challenges to firms around the world, but particularly those in developing countries. The following sentiments by an Indian producer summarises the magnitude of these challenges, “We are expected to produce at Third World prices to First World standards” (Schmitz 1999, 1). Schmitz and Nadvi (1999, 1507) elaborate whilst the nature and specificity of the challenges firms face may differ there is an overarching similarity,

Local firms are increasingly forced to perform to global standards not just in matters of costs but also quality, speed of response, and flexibility.

Firms in relatively mature clusters benefit from strong positive external economies, however this alone is not enough. Empirical evidence suggests the necessary upgrading required for firms to respond to the pressures caused by liberalisation and globalisation require greater *joint action* from local firms (Schmitz & Nadvi 1999, 1507). Herein lies the paradox, as Porter (1998, 90 emphasis added) explains, competitive advantages in a *global* economy are often secured *locally*, emerging from concentrations of highly specialised skills and knowledge, institutions, competitors and related firms, and highly sophisticated customers.

2.2.4 “Shifting gears” to compete in new market environment: “forced cooperation”

Looking at the footwear cluster in Guadalajara, Mexico Rabellotti (1999) investigated the ability of clustered firms to “shift gears” in the face of the challenges presented by trade liberalisation. The research proposed that increasing cooperation among cluster member-firms is integral to their ability to successfully compete in “new market environment” (Rabellotti 1999, 1571). Years of closure of the domestic footwear market to international competition had discouraged the growth of a competitive industry of suppliers which hampered price, quality and service in the local industry (Rabellotti 1999, 1575). The effects of liberalisation had a major impact on the supplier-manufacturer system: export manufacturers were forced to meet demanding price, quality and delivery standards which required rapid access to specific inputs and suppliers needed quick response capabilities. Essentially, trade liberalisation forced increased cooperation where suppliers and footwear manufacturers began to “think and act” as an integrated system in order to compete in open, highly competitive markets (Rabellotti 1999, 1576). In this case market liberalisation resulted in a need to re-orientate inter-firm cooperation to meet the stringent requirements to shift the local industry towards export orientation. The “forced” inter-firm cooperation provided positive externalities to the firms located in the cluster as they competed in new markets.

2.2.5 Embracing intra-cluster heterogeneity by collectively confronting a common threat

The increased integration of suppliers and manufacturers in the Guadalajara footwear cluster resulted in both an increased heterogeneity *in* firm size in the cluster, as well as heterogeneity in performance *by* firm size⁸ (Rabellotti 1999, 1581). Examining how producers in the ‘traditional’ footwear cluster in Agra, India responded to major recent changes in internal and external markets Knorringa (1999) explained that the difference in firm success could be explained by the heterogeneity of the cluster (also see Kennedy [1999] for explanations of how heterogeneity of clustered firms can be either positive or negative depending on inter-firm relations), and more specifically, by analysing the different market channel in which the various cluster-firms are situated. Knorringa (1999, 1588) argues that larger clusters in developing countries usually consist of a variety of market channels that provide different

⁸ In this example, large and medium sized firms performed better than small firms after trade liberalization.

growth opportunities for small producers. In Agra, the challenges of increased liberalisation in the 1990s altered both, the cluster composition and the extent of cooperation in inter-firm relationships, where specific groups of producers in particular market channels prospered while many other producers have either closed down or face ever more desperate conditions in the “market channel of last resort”. Despite the variation in demands and challenges faced by firms in the Agra footwear cluster, Knorringa (1999, 1601) highlights the common challenges to all market channels: the need to improve product quality and increase speed of production. A large majority of the producers that responded to these challenges, managed to do so by strengthening cooperation in vertical inter-firm relationships.

2.2.6 Confronting change collectively: reviving an ailing industry

Nadvi (1999) highlighted another characteristic about the nature of liberalisation and globalisation: global competition is constantly changing.

The criteria that define best practice in manufacturing are continually developing, reflecting the constant pace of upgrading in both product and process technologies (Nadvi 1999, 1605).

During the mid-1990s the surgical instruments cluster in Sialkot, Pakistan faced a major crisis of quality assurance. This crisis provided a ‘turning point’ that had the potential to determine the cluster’s future growth path and its ability to remain globally competitive. The quality requirements surgical instrument producers in the Sialkot cluster faced were closely related to other internationally recognised quality assurance certifications such as the ISO 9000 series, which certify that standardised and accountable quality control processes have been used at *each stage* in a product’s design, development, manufacture and distribution. Nadvi (1999) interrogated the collective efficiency argument further by exploring how clustered producers responded to the change in product quality demands (an exogenous crisis). The particular crisis of quality assurance facing the Sialkot surgical instruments cluster had resounding implications for inter-firm relationships within the relevant supply chains. Essentially the quality assurance standards shifted the focus away from product to process quality (Nadvi 1999, 1607). In this case example, the collective efficiency argument proved salient, as Nadvi (1999, 1607) explains the level of upgrading required could not be achieved by the individual firms (mainly small and medium sized) in the cluster alone, a collective response was needed.

The study findings suggested that in response to the pressures posed by the ‘quality assurance crisis’, upgrading in manufacturing practices in the Sialkot surgical instrument cluster was achieved through increased joint action⁹ (Nadvi 1999, 1622). However, a critical question emerged in the findings of the study: Had the resultant joint action been wholly beneficial for firms in the cluster or not?

2.2.7 Botched surgery: Collective action, collective failures and diseconomies of scale

Nadvi (1999) found that the Sialkot cluster’s response to the quality crisis provided clear signs of greater collective action as well as signs of what he called *collective failure*¹⁰. Nadvi (1999, 1623) describes two types of collectives failures experienced in the Sialkot cluster: firstly, in some cases, a lack of joint action meant existing problems (before quality crisis) remained unresolved (poor infrastructure, and sanitation, low safety and health standards and the continued use of child labour). Secondly an existing collective failure, the high environmental costs of surgical instrument manufacturing, persisted after the firms’ joint action dealing with the quality crisis.

During the 1990’s India’s woollen knitwear industry survived a dual crisis: the collapse of the Soviet Union, its largest export market and the simultaneous opening-up of the domestic market to free trade. Tewari (1999) explains how the successful adjustment to these challenges was not achieved uniformly by all firms in the Ludhiana knitwear cluster, where some firms coped better than others. Tewari (1999) argues that the advantages of clustering are not by themselves sufficient to fully explain the ability or nature of the firms’ response to the dual crises they faced. Specifically, Tewari (1999) argued the importance of acknowledging the nature of the market segments that producers are engaged in, the different pressures these segments put on the firms to reform and learn, and finally how these pressures get transmitted into concrete organisational changes within and between firms.

In 1995 the Supreme Court of India ordered the closure of hundreds of tanneries in Tamil Nadu for failing to treat their effluents. This prompted the local producers to seek a collective solution to the problem, resulting in immediate steps to form central treatment plants

⁹ The increased joint action was driven by both vertical and horizontal ties among firms in the cluster.

¹⁰ Collective failure occurred where collective action failed to take place, or where the actions of local actors resulted in the deterioration of their collective position.

(Kennedy 1999). The overall success of the Palar Valley tannery clusters in addressing the pollution crisis can be attributed to joint action, “a collective response is what allowed the clusters to survive” (Kenndey 1999, 1687). Crucially, whilst the entire cluster was served with the new treatment plant, it was the smaller firms that benefited the most, since the majority of them did not have the available resources to build their own treatment facilities. Kennedy (1999, 1673) explained joint action is more likely to succeed when actors are bound together by social, religious and kinship ties (or “social glue” as Porter [1998] describes it) and where social control can be used to incite cooperation.

However, Kennedy’s (1999) article focuses on the *diseconomies* of clustering, providing a case study that addresses a relatively neglected theme in the cluster literature. In this case, clustering of industrial firms produced negative external economies in the form of environmental damage. It was through the generation of this negative external economy that the cluster firms were ‘forced’ into a collective response to ensure their survival. However, this response also resulted in collective failures: the breaking up of town clusters into separate geographical sectors, inadvertently differentiating the ability of the local industry to meet the challenge of pollution control. The new geographical sectors that were created were unequally endowed with resources resulting in outcomes that created ‘winners’ and ‘losers’¹¹ (Kennedy 1999, 1683).

The case study examples discussed above have illustrated how clustering helps firms overcome growth constraints as well as respond to crises created by liberalisation and globalisation. Another aspect to emerge from these case studies is the need to pay more attention to exogenous variables and external linkages and their impact on local clusters.

2.2.8 Global Value Chains: The ‘winners’ and ‘losers’ in globalisation

As Schmitz (1999, 1627) highlights a key issue in current development debates focus on who ‘wins’ and who ‘loses’ from globalisation. Exploring how small- and medium-sized enterprises (SMEs) in Latin America may participate in global markets in a way that provides sustainable growth, Giuliani et al (2005) differentiate between the “high” and “low” roads to competitiveness and growth. They state that typically firms in developing countries compete

¹¹ The most serious case of failure is Pernambattu, where 48 tanneries in one sector have remained closed since 1995.

by squeezing wages and profit margins (“low road”) rather than by improving productivity, wages and profits (“high road”). The key difference between the high and low road to competitiveness is often explained by the different capabilities of firms to *upgrade*.

Humphrey & Schmitz (2002, 1020) identify four types of upgrading: *process upgrading* is achieved when firms turn inputs into outputs more efficiently by reorganising the production system or introducing superior technology; *product upgrading* is achieved when firms move into more sophisticated product lines; *functional upgrading* is achieved when firms acquire new functions to increase the overall skills content of their production activities; and *inter-sectoral upgrading* is achieved when cluster firms move into new productive activities.

Whilst both the cluster literature and global value chain literature place emphasis on the importance of upgrading they have different points of focus: the clustering literature has tended to focus on local linkages and firm upgrading, whilst the global value chain literature places emphasis on the cross-border linkages between firms involved in global production and distribution systems (Humphrey & Schmitz 2002, 1018). Critically, both Humphrey & Schmitz (2002, 1018) explain that both fields of literature stress the importance of *governance* to describe the coordination of economic activity (see Gereffi et al [2005] for detailed description of the governance of global value chains). Giuliani et al (2005) explain how governance is of particular importance for understanding the *generation, transfer* and *diffusion* of knowledge leading to innovation which facilitates both improved firm-level performance and ultimately industrial development¹². Understanding the flows of governance and knowledge throughout the value chain has important implications for industrial clusters, an example of which have been illustrated in the case studies discussed above. Essentially global value chain analysis can be used as a useful heuristic tool. Firstly, these flows will help understand the nature of inter-firm relationships within a cluster and secondly, they have implications for understanding how the cluster collectively fits into a global value chain.

¹² See lessons from Latin American clusters in Giuliani et al (2005) & East-Asia in Gereffi (1999).

Chapter Three

Industrial Development in South Africa

3.1 Characteristics of South Africa's Post-apartheid Industrial Growth Path

3.1.1 *Apartheid inheritance*

The legacy of Apartheid left South Africa grappling with exceptionally high levels of widespread poverty and inequality and the mass exclusion of the majority black population from economic activities. This had two primary implications for South African industry: firstly, South Africa had exceptionally high levels of unemployment; and secondly, South African industry typically suffered from low levels of productivity and competitiveness. There was a crucial need for post-apartheid industrial policy to shift away from the politically and economically unsustainable orientation of the apartheid regime (Chang 1997, 1). Specifically there was a need to instil macro-economic stability and remove trade barriers requiring a substantial and “high-level restructuring” of the South African economy. Essentially the post-apartheid government needed to ensure the political and economic liberalisation of the country. The latter required a shift from a “demand-side” to a “supply-side” policy orientation¹³ in order to allow the economy to become more responsive to the challenges of increasing liberalisation and globalisation.

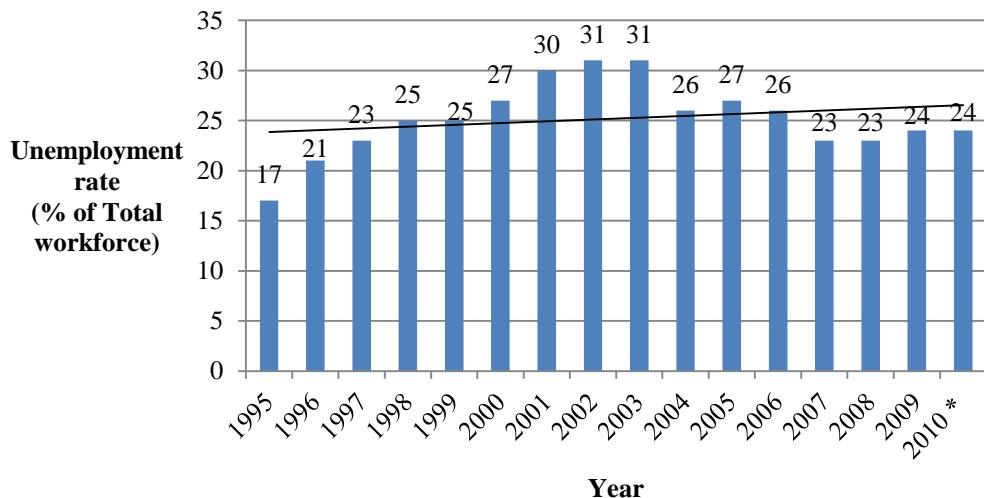
As liberalization and globalization gather pace, concern with industrial competitiveness is growing, not just in developing countries but also in mature industrial ones. But it is the former that face the most intense competitive pressures: many find that their enterprises are unable to cope with rigours of open markets – in exporting and in competing with imports – as they open their economies. Some countries are doing very well; the problem is that many are not. (Lall 2004, 1)

¹³ See Chang (1997) who describes the shift as not entirely positive.

3.1.2 Persistent unemployment: “Leapfrogging” labour-intensive light industry

Almost two decades since the democratic transition and South Africa continues to grapple with exceptionally high levels of unemployment. In fact Figure 3.1 below shows unemployment has risen in South Africa since 1995.

Figure 3.1 SA's Post-apartheid Unemployment Rate



Sources: World Bank Data 1995-2009

* Quarterly LFS, Quarter 4 2010, 2010

There is strong consensus in the relevant literature (see Rodrik [2008], Banerjee et al [2008] and Tregenna [2008]) that the main driving force behind the rise in unemployment has been the structural change of the South African economy. The impact of this structural change is understood by looking at what Tregenna (2008, 194) explains as South Africa’s “distorted” development path in which the economy “leapfrogged” from a minerals and resource-based economy to capital-intensive heavy industry, without going through a period of development of labour-intensive light industry. Tregenna (2008, 194) further suggests South Africa may now be “leapfrogging” to a services-oriented economy without ever having industrialised fully –and crucially deriving the “full benefits” from that process.

Tregenna’s (2008) findings suggest the service sector has accounted for an increasing share of total employment, whilst the manufacturing share has been declining. As Banerjee et al (2008, 738) explain, many economists have attributed the sectoral changes in the South African economy to ‘skill-biased technical change’, which have aggravated South Africa’s problem of unemployment (Banerjee et al 2008, 738). Critically, these structural changes in

the South African economy have resulted in a decreasing demand for low-skilled labour, whilst concurrently the supply of low-skilled labour has increased.

Rodrik (2008) identifies three important trends in the South African economy which together have put a significant damper on the demand for low-skilled workers in the economy: First, there has been substitution towards skilled workers *within* each economic activity; Second, there has been significant structural change away from the most low-skill intensive parts of the economy, namely tradables (including many manufacturing activities); Third, within tradables, production techniques have become progressively more capital intensive.

In addition to the impact of the structural changes in the South African economy on levels of unemployment, Tregenna (2008) further argues that net employment creation has “lagged behind” the (modest) levels of economic growth, highlighting that the South African economy has experienced significant levels of jobless growth.

3.1.3 Structural change in the SA economy: An underperforming manufacturing sector

The new democratic government was faced with the immense task of trying to address the socio-economic legacy of apartheid whilst simultaneously preparing the economy to confront the challenges of globalisation and liberalisation. The RDP and then the GEAR policy statements were instrumental in addressing these dual challenges as well as directing the content of South Africa’s industrial policy, primarily coordinated by the DTI (Rustomjee & Hanival 2010, 13).

Table 3.1: Structure of South Africa’s economy, sector contributions 1990-2006

	1990	1995	2000	2005	2006
Primary Sector	13.1	11.7	10.8	9.7	8.8
Secondary Sector	26	25	24.2	23.5	23.6
Manufacturing (as the predominant component of the secondary sector)	20.1	19.3	19	18	18
Tertiary Sector	61	63.3	64.9	66.9	62.6

Source: Rustomjee & Hanival 2010.

Table 3.1 above shows the relative decline of the primary and secondary sectors' contribution to the South African economy, whilst that of the tertiary sector has risen over the time period. The decline in the contribution of the manufacturing sector's contribution is of particular concern for South Africa's problematic unemployment as well as prospects for economic growth. Rodrik (2008, 772) explains: The weakness of South Africa's export-oriented manufacturing has hampered the opportunity to achieve significant levels of economic growth such as those achieved by the East Asian Tigers¹⁴ over the past two-decades. The extent of the weakness of South Africa's manufacturing sector is depicted clearly when compared internationally. Looking at the annual average growth rates of manufacturing value-added, Kaplan (2004, 624) compares South Africa's performance against a selection of international averages during the period 1990-2000: South Africa (1.2), Industrialised countries (2.3), Developing countries (6.4), Developing countries excluding China (4.5) and the World (2.8)¹⁵.

As previously discussed, the reason that this structural change of the economy has driven unemployment is that in South Africa non-mineral tradables (including manufacturing) are intensive in low-skilled labour compared to services in the tertiary sector¹⁶. Specifically, the relative shrinkage of manufacturing (along with economy-wide skill upgrading) has resulted in the collapse in demand for relatively unskilled workers (Rodrik 2008, 772). Kaplan (2004, 625) concurs with Rodrik (2008) but adds that the rising capital intensity in these sectors has contributed to the consistent declines in manufacturing employment.

3.1.4 Government's approach to economic challenges: promoting a labour-absorbing industrial growth path

South African Government has sought to take these concerns into consideration. The targeting of prioritised sectors, as well as an approach that regards manufacturing as being part of a more complex value chain including services, appears to be an important implication in the post-2006 DTI policy approaches (Rustomjee & Hanival 2010, 63). In January 2007

¹⁴ In past decade the growth rates of China, and to a lesser extent India, have outpaced growth of the traditional Asian Tigers (Taiwan and South Korea).

¹⁵ Also see Rodrik (2008) for South Africa-Malaysia comparison.

¹⁶ However, it is important to acknowledge that service sector employment growth would include growth in jobs with low skills profile such as domestic/ cleaning jobs, security jobs and retail employment for example.

the Cabinet adopted the National Industrial Policy Framework (NIPF). Designed to work as a framework rather than a definitive ‘blueprint’, the NIPF set out Government’s broad approach to industrialisation in the context of reaching the Accelerated and Shared Growth Initiative for South Africa (ASGI-SA) targets (DTI 2007b, 2)¹⁷. A specifically stated vision of the NIPF is the promotion of a more labour-absorbing industrialisation path which places particular emphasis on: tradable labour-intensive goods and services and economic linkages that catalyse *employment creation* (DTI 2007a, 1 emphasis added).

Guided by the NIPF, the *implementation* of this policy was set out in the first Industrial Policy Action Plan (IPAP) in 2007. Since 1994, South Africa had implemented numerous industrial policy initiatives; however the NIPF and IPAP were the first comprehensive statements of Government’s approach to industrialisation and industrial policy. Rather than a ‘one-size-fits-all’ approach to industrialisation, the NIPF (and IPAP) focuses on identifying and addressing the cross-cutting and sector-specific constraints and opportunities prevailing in the industrial economy through thirteen strategic programmes¹⁸. Not only is there a sectoral focus, but there is also a geographical focus in the NIPF and IPAP framework. The geographic focus emerges through the provision of industrial infrastructure with the aim of fostering industrial clustering, both in areas of traditional industrial agglomerations and in underdeveloped areas with latent economic potential (DTI 2007a, 34).

In 2010, after critical reflections on the successes and challenges faced by the NIPF and IPAP, IPAP2 was introduced. There were two main drivers behind the implementation of IPAP2: Firstly, the growing recognition that industrial policy needs to be scaled up from ‘easy-to-do’ actions to interventions that South Africa ‘need-to-do’ in order to generate a structurally new path of industrialisation.; Secondly, it was recognised that a one-year IPAP is too short a period and therefore IPAP2 introduced a three year period for key industrial interventions where updates would be introduced annually and with a ten-year outlook on desired economic outcomes (DTI 2010).

Like other developing countries which are strongly integrated into the world economy and significantly dependent on its good health, South

¹⁷ This includes halving unemployment and poverty by 2014 through accelerated growth of at least 6% from 2010 (DTI 2007b, 2).

¹⁸ See DTI (2007, 2) to see all thirteen strategies.

Africa has been affected by the sharp fall in demand for its export products and the fall in prices of key export commodities. In addition, the international credit crisis has meant that funds have become scarce and expensive and that portfolio investors are wary of emerging markets, including South Africa. (DTI 2009, 3)

3.1.5 Global linkages and the impact of the recession

Table 3.2: Impact of the recession on key economic indicators in RSA

	2008	2009
Foreign Direct Investment, net inflows (BoP current US\$)	9,644,834,927	5,353,688,723
Exports of goods and services (% of GDP)	36	27
Industry value added (% of GDP)	33	31
Gross Domestic Product growth (annual %)	3.6	-1.7
Unemployment (% of total labour force excluding discouraged workers)	22.9	23.8

Source: World Bank Data, indicators (2011)

The global financial crises in 2008 had a severely negative impact on the South African economy. The international impact of the crises were experienced locally where foreign direct investment in South Africa fell by 4-billion US\$ over the 2008-2009 period. Secondly, international demand for South African goods and services fell during the same period, where exports (as a percentage of GDP) fell 9% from 36% (2008) to 27% (2009).

Domestically, industry value added¹⁹ declined 2% from 33% to 31% of GDP. Overall, South Africa's already modest annual growth rates 3.6% fell to -1.7% as the country (along with most others internationally) officially fell into recession. The global financial crisis has placed added pressure on South Africa's problem of unemployment where levels rose from 22.9% to 23.8% from 2008-2009. Looking at quarterly employment data the manufacturing industry experienced an annual (October-December 2008 to October-December 2009)

¹⁹ Includes value added by manufacturing among mining, construction, electricity, water and gas.

decline in its labour force of -10.4% , roughly 202 000 jobs (Statistics South Africa, 2010, VII).

3.2 The South African Automotive Industry

3.2.1 *Global Context*

Evidence presented in Sturgeon & Florida (1999) reveal the auto industry experienced a profound transition from an older “domestic” model of competition that allowed automakers to compete by exporting from supply bases situated in their home countries, to an emerging “global” model of competition that increasingly requires the organisation of production functions on a regional and global basis. This new “global” model drove a need to adopt a “build-where-you-sell” strategy by leading automakers that then proceeded to implement regional integration strategies (Sturgeon & Florida 1999, 116). This led to a rapid increase in new assembly plant investments, both in the world’s most promising emerging automotive markets, and the “lower wage peripheries” of the largest existing markets (Sturgeon & Florida 199, 116).

The effects of globalisation and increased outsourcing have resulted in suppliers playing a larger role in the globalisation process. As a result we are witnessing the rise of global suppliers. One of the most interesting aspects of globalisation is the ways in which automakers use first tier suppliers to spread the risk of new investments. Globalisation of the supply base and the increased use of low-cost locations pose serious risk for automotive sector employment in developed economies (Sturgeon & Florida 1999, 117). Sturgeon & Biesebroeck (2010, 3-4) describe how this global integration characteristic of the “new” model has been most profound in the relationship between automakers and their largest suppliers: Production tends to be organised regionally where bulky, heavy, and model-specific parts are produced close to final assembly plants for logistical reasons to assure timely delivery. The more transportable parts are generally produced at a distance to take advantage of scale economies and low labour costs and vehicle development is concentrated in a few high-tech design centres.

The automotive industry is one of the most advanced industries in respect of output levels, direct and indirect employment, management practices and technology and manufacturing standards that create high barriers to entry. Although the vast majority of manufacturing value lies in the components industry, compared to that in the vehicle assembly industry (roughly 70:30 split), it is ultimately the original equipment manufacturers (OEMs) that determine the scale and scope of automotive components activity in developed and developing countries (Barnes & Morris 2008, 36).

3.2.2 Mapping the South African automotive industry

The automotive components industry in South Africa grew out of the first automobile assembly plants established in South Africa during the 1920s (Ford 1924, GM 1926) (Barnes 2000, 403). Direct government intervention led to a series (six in total) of local content programmes, (beginning in 1961 and ending in 1995) that involved involving a combination of tariffs and import permits, where each phase was designed to increase the degree of local content and further encourage OEM-component linkages in South Africa (Barnes 2000, 403). Until the mid-1990s the South African automotive industry was dominated by mainly domestically owned OEMs that were encouraged into ‘partnership’ with domestic automotive component firms. Barnes (2000, 404) uses the carrot-stick analogy to describe the relationship between the South African automotive industry and the OEMs during that time: as a carrot the domestic OEMs were provided significant levels of protection from their global competitors (115 per cent in mid-1995), and as a stick the OEMs in turn had to meet the government’s local content requirements and purchase much of their inputs from the uncompetitive domestic component manufacturers – or pay severe excise penalties.

3.2.3 Liberalising the local automotive industry: Learning to stand on its own two feet

From this it is clear to see and safe to conclude that the South African automotive industry developed out of high levels of government protection. The South African automotive industry was also intensely inwardly orientated: it began opening up in 1989 but the process of market liberalisation only began to meaningfully accelerate from 1995, increasingly exposing the industry to international competition, this as the new democratic government tried to make the industry more competitive and improve exports (Black 2001, 779). A phased out reduction of tariffs on both built up vehicles and components was introduced in

1995 amidst generalised tariff reductions prompted in part by pressure from the World Trade Organisation (Black 2001, 779). As a result the industry has experienced massive structural change which included increasing levels of foreign ownership as well as export growth – foreign ownership has also been increasing in the automotive components industry where locally owned firms producing under licence agreements have been bought out by foreign multinationals or have entered into joint ventures (Black 2001, 780-781).

3.2.4 MIDP: Backbone of the South African automotive industry

The MIDP was established in 1995 after considerable consultation between all relevant industry stakeholders, including government, the OEMs and automotive component producers, as well as the National Union of Metalworkers of South Africa (NUMSA). Barnes (2000, 406) outline five key objectives of the MIDP that had an overarching goal of equipping industry for the change from intensively inward to a greater outward orientation: Firstly, the MIDP was directed at improving the international competitiveness of OEMs and automotive component firms in South Africa; secondly, to improve vehicle affordability in real terms; third, to assist the growth of the local assembly and components industries, with particular emphasis on improving the industry's exporting prospects; fourth, MIDP needed to help improve the industry's trade balance; and finally it needed to stabilise the industry's employment levels.

As Black (2001, 782) explains the MIDP was continuation of the principles of import-export complementation that included the following set of incentives aimed at achieving the aforementioned objectives that included the following (Barnes 2000, 406): Firstly, the MIDP instituted a tariff phase-down schedule that initially reduced nominal rates of protection to 40% for completely built-up units (CBUs), and 30% for completely knocked-down (CKD) components by 2002 and then they were further reduced to 30% and 25% respectively by 2007. It is instructive to note that these rates were steeper than that of the requirements of South Africa's WTO obligations; Secondly, a duty-free allowance was initiated for domestic OEMs of 27% of the wholesale value of the vehicles they manufacture; Thirdly, the MIDP provided a small vehicle incentive (SVI), using a duty drawback mechanism²⁰. The SVI operated as a subsidy for the manufacture of more affordable vehicles, before being phased

²⁰ The value of the drawback was contingent upon the ex-factory value of the motor vehicle.

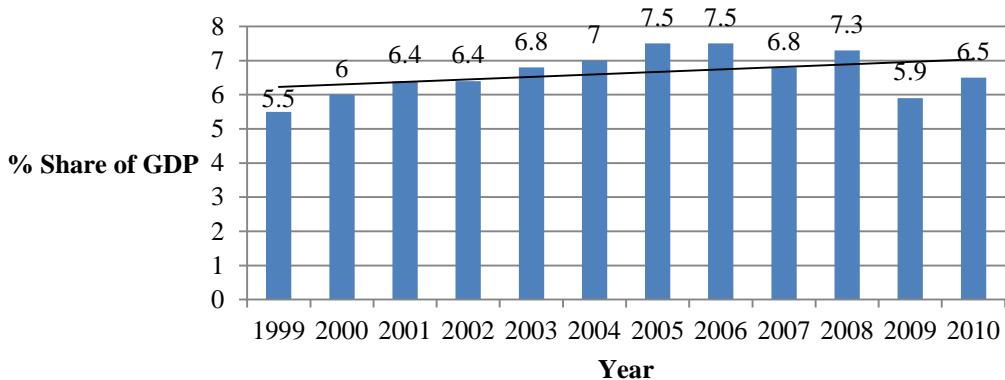
out when it was found that it artificially supported new entrants at the lower end of the market (Goldstein 2004, 88). Fourth, there was a complete removal of a minimum local content provision for domestic OEMs and; Fifth the MIDP introduced an import-export complementation (IEC) scheme that allowed OEMs and component manufacturers to earn duty credits from exporting. Critically, these duty credits could be used by firms to offset import duties on cars, components or materials, or alternatively they could be sold on the open market.

The MIDP has provided a significant incentive for OEMs to assemble locally in South Africa. However Barnes (2000, 408) suggests that at the time, the local automotive components industry could have benefitted from more government protection as it faced dualistic competitiveness challenge: First, the need to improve its competitiveness in order to keep foreign imports out of the domestic market; and secondly, it needed to reposition itself in new value chains in order to consolidate relationships with OEMs and facilitate exports.

3.2.5 Importance of the local automotive industry to the South African economy

The MIDP has proven to be a critical cornerstone in ensuring not only the survival but also the success of the local automotive and components industry. The automotive sector is a critical segment of the economy in any country, because it links several industries and services. The production of a vehicle incorporates a wide range of industrial activities providing growth and development opportunities for many secondary or support industries. In South Africa the automotive sector is the leading manufacturing sector, Figure 3.2 below indicated the sectors contribution to GDP. Overall, the sector's contribution to GDP has been increasing from 1999. The most significant drop however occurred in 2009, where its share of GDP dropped 14% from 7.3% in 2008 to 5.9% in 2009. This drop indicates the severity of the global financial crisis on the local automotive industry which has hit hard by significant decreases in global and domestic vehicle demand.

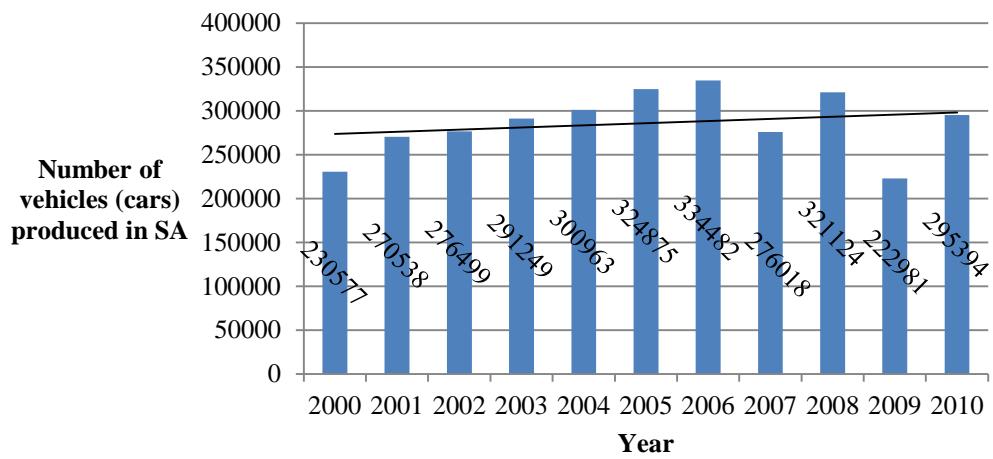
Figure 3.2 Automotive Sector Share of GDP (%)



Source: Pretorius (2011), Data provided by Naamsa

The automotive industry currently employs approximately 130 000 people nationally. This encompasses the manufacturing of accessories, components and vehicles, amounting to about 9.2% of total manufacturing employment in 2009 (DTI 2011, 129). The production of vehicles (car) has been increasing modestly, however production was severely impacted by the recession. The impact of the global financial crises dampened the demand for vehicles globally which had a negative impact on the local industry. Figure 3.2 illustrates the sharp decline in the number of vehicles produced (30.56%) in South Africa from 2008 to 2009.

Figure 3.3 Number of Vehicles (Cars) Produced in South Africa



Source: OICA 2011. <http://oica.net/category/production-statistics/>

Despite the implementation of the MIDP the local automotive industry has maintained a negative trade balance. In 2009, exports from the automotive sector amounted to R46 billion,

while imports amounted to R80.2 billion, resulting in a R34.2 billion trade deficit (DTI 2011, 129).

The South African automotive industry grew under high government protection during the years of apartheid. The advent of democracy resulted in the liberalisation of the local automotive industry that then forced it to compete against international competitors. The MIDP was a crucial mechanism used both to help the industry phase-out tariff support whilst simultaneously contributing to the growth of an industry that plays a strategically important role in strengthening South Africa's weak manufacturing sector as well as the fight against unemployment.

The role of the automotive industry is particularly important in three provinces: Gauteng, the Eastern Cape and KwaZulu-Natal. As Lorentzen et al (2007, 192) explain: the Gauteng area around Pretoria and Johannesburg is both the largest market and has the largest concentration of OEMs (BMW, Ford, Nissan, Fiat) and component firms; The Eastern Cape, the second most significant car manufacturing centre in South Africa, houses three major OEMs (DaimlerChrysler in East London, VW in Port Elizabeth, and Delta Motor Corporation in Uitenhage); and thirdly, in KZN automotive manufacturing is dominated by Toyota SA, which had for many years been the operation with the most significant domestic output. Crucially, although many of the components firms in KZN supply the other OEMs in South Africa, Toyota SA was always their most important customer (Lorentzen et al 2007, 194).

3.3 The Durban Automotive Cluster

3.3.1 *History and introduction to the DAC*

Established in January 2002, the Durban Automotive Cluster (DAC) is a public-private partnership between the eThekweni Municipality and the local automotive industry in KwaZulu-Natal that is focused on developing the competitiveness of the industry²¹. The initial stimulus for setting up the DAC came from the eThekweni municipality who acknowledged the importance of the local automotive industry in fostering regional development. At the time of its inception, Toyota SA, the major assembler in Durban, had

²¹ The DAC is thus an *induced cluster* and not a natural cluster.

secured a significant export-order and the opportunity arose to work with them and key local suppliers to secure regional economic growth. This coupled with the existing infrastructure and high levels of trust within an existing benchmarking network, the KZN Benchmarking Club, was used to initiate the DAC (Morris & Barnes 2005, 285). Most of the financing was from the eThekweni municipality (currently approximately R3.5 million per annum) which is supplemented by fees paid by the member firms.

3.3.2 Merits of the public sector's direct involvement in the formulation and running of the DAC

Such an active role by the public sector in the development of a specific sector has been disputed in the literature. Rodrik (2004, 23) argues that public support should target industry activities and not specific sectors; and the World Bank (1997) argues government should play a supporting role rather than trying to create industries from scratch. Morris & Barnes (2005) argue that the balance of public-private input into the formation and running of the DAC fit these World Bank recommendations (they did not *create* the automotive sector in KZN) and has resulted in the success of the DAC and the local automotive industry. They do however note that the support from the public sector is not uniform throughout the spheres of government: the relationship with DTI (national level) and provincial government are described as inflexible and inconsistent with erratic support, whilst the relationship with local government has been positive as they are more acutely aware of local auto industry's importance –and the institutional intimacy enabled it to play a proactive role (Morris & Barnes 2005, 287).

3.3.3 Institutional and organisational functionality of the DAC

The DAC partnership is focused on supporting the local automotive industry to achieve the strategic objectives of the automotive industry and national government stated above. The DAC is an industry driven initiative, drawing heavily on the leadership and expertise of individuals from the member firms to identify and address a wide variety of challenges confronting the industry. There were twenty-two paying member firms in the year of its inception, and there are currently around thirty-five firms covering a broad variety of related production activities and different levels of the value chain.

At an institutional-level the DAC is a Section 21 Company²² that operates according to a fixed business plan which aligns all cluster activities with a set of goals, common to the parties in the public-private partnership (DAC 2010). This administrative or organisational functionality of the DAC ensures organisational proximity²³ which facilitates the functional relationship among all members of the public-private partnership. The strength of the organisational proximity is a crucial element for the overall functioning of the DAC as the geographical proximity of the firms is dispersed over a large area.

There are six critical pillars of strategic focus that have been identified by the DAC as being core to attaining the local industry objectives and these are operationalized through the following programs (DAC 2010):

- *Localisation programme*: aimed at addressing issues inhibiting the promotion of the use of local content in the local automotive value chain (cost competitiveness);
- *Skills development programme*: is aimed at attracting (graduate development programme), developing (management and artisan development programmes) and maintaining critical industry-specific skills (HIV/AIDS treatment and care programme) sets required in the automotive sector;
- *Infrastructure programme*: has the aim of pursuing opportunities to support the optimisation of the local automotive industry value chain efficiencies within current operational constraints. Principally the programme focuses on reducing costs and improving reliability of the infrastructural system important to the local automotive industry (for example, preferential sea freight rates and Energy Efficiency projects);
- *Transformation programme*: aims to improve industry performance across all Broad-Based Black Economic Empowerment (B-BBEE) indicators by focusing on developing the capacity of firms to develop and implement effective B-BBEE strategies that also includes the development of black owned SMEs;
- *Growth programme*: aims to identify key areas of market access and investment opportunity for the KwaZulu-Natal automotive industry. Current markets of interest include the local OEMs, the European Union and increasing opportunities in other African markets;

²² Section 21 companies are registered to provide services and do not intend to make, or to be judged by, the profits that they make.

²³ See Wang (2007, 146).

- [World Class Manufacturing programme](#): assists member-firms to achieve World Class Manufacturing (WCM) status through various initiatives that include, firm level benchmarking and WCM Best Practice programmes.

These programmes operate through clear business plans, are each run by their own technical steering committee consisting firm representatives as well as a facilitator that provides technical support and controls programme activities and the DAC budget (Morris & Barnes 2006, 92). Member-firms benefit from key services such as: financial saving through joint activities, knowledge sharing through organised workshops and a firm benchmarking service, user-friendly industry-related research and online data and information that the firms can access.

3.3.4 Role of DAC in regional auto industry

KwaZulu-Natal is a strategically important province for the South African automotive industry. Toyota South Africa, the largest vehicle manufacturer in the country, is located in the province, as are several major national tier-1 suppliers. The region's total automotive employment is approximately 30 000 (DAC 2010). Over 25% of all light vehicles manufactured in South Africa are produced in KwaZulu-Natal, contributing a significant portion of the country's vehicle exports. The dominant vehicle exporter in South Africa is Toyota²⁴ with almost as many vehicles exported as all of the other South African assemblers combined in 2008 (Barnes & Hartogh 2009, 45).

Another key area in which the automotive sector contributes to the KZN economy is through the Durban port operations. The Durban Car Terminal is the country's largest import and export facility for the motor industry – the Durban Car Terminal handled 389 681 motor vehicles in 2006 (Beires n.d., 9). This is an indication of the substantial multiplier effect the local automotive industry has for the KZN economy. The KwaZulu-Natal regional automotive industry strives towards a long-term strategic objective of doubling its size by 2020. This industry objective is consistent with the national government's objective of 1.2 million vehicles being produced in South Africa by 2020.

²⁴ Any Toyota export from South Africa is sourced from KZN.

3.3.5 Firm governance in the DAC

Toyota SA, the dominant regional customer and OEM in KwaZulu-Natal, has taken a keen interest in the workings and the activities of the DAC but has been very careful not to dominate the cluster processes as many of the local suppliers have made efforts not to be too reliant on the assembler for funding and operational support (Lorentzen et al 2007, 200). Thus many of the tier-1 firms play a stronger ‘lead role’ in the DAC. The links in the local automotive value chain reinforce horizontal cooperation whereby tier-1 suppliers use their resources, industry muscle, and knowledge to provide assistance to other tier members –in particular with regard to logistics, supplier development and human resource development (Morris & Barnes 2006, 92).

3.3.6 Joint action in the DAC: “Gearing up for a tough fight for a place in the sun”

Jointly the assembler (Toyota South Africa) and the tier-1 suppliers instil both horizontal as well as vertical cooperation and learning. Morris & Barnes (2006, 92-93) state the resultant horizontal cooperation that exists among the DAC member-firms create successful scale economy benefits and learning opportunities (‘learning by visiting’) through all levels of the local automotive value chain. In addition Lorentzen et al (2007, 209) found that joint action among the DAC member-firms have lowered the costs of information provision about the relative markets, product standards, process requirements and other important variables firms need to adapt to:

Joint action also helps firms gear up for what is, not just in the global automotive industry, a tough fight for a place in the sun (Lorentzen et al 2007, 209).

Morris & Barnes (2006, 100) state the DAC has benefitted from having a ‘downstream customer’ as the value chain driver: Toyota as a major vehicle assembler is a user of the supplier inputs and thus is more intimately aware of, and affected by, competitiveness failings at upstream component manufacturers level. This provides a direct incentive for them to commit to upgrading their suppliers, strengthening the capabilities of the local value chain.

It is generally accepted both in the academic literature and readings as well as in the confidence shown by the member firms that the DAC has contributed to the overall success and growth of the local automotive and components industry in KZN. This was formally recognised when the DAC received the 2009 Partnership Award (best public-private partnership) at the annual FNB KwaZulu-Natal Top Business Portfolio Awards held on 12 May 2010 (Harrilall 2010). The DAC is thus an excellent case study for an explanation of the link between the benefits of clustering and employment. The focal point of this study however, is to interrogate *what* impact it has had on firm-level employment. The following chapter will look at the methodological considerations for the study before the study findings and analysis are presented.

Chapter 4

Methodological Considerations

The study comprised a mixed methods approach, including both qualitative and quantitative components, as well as an analysis of primary and secondary research.

4.1 Motivation for a Mixed Methods Research Design

Due to its logical and intuitive appeal, effectively “bridging the gap” between – and combining strengths of the – the quantitative and qualitative paradigms, the mixed methods approach has gained increasing popularity among researchers (Onwuegbuzie & Leech 2006, 474). The mixed methods research design is formally defined by Johnson & Onwuegbuzie (2004, 17) as,

...the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study.

The mixed method research design used in this study draws predominantly from the *mixed-model* method, where a mix of both qualitative and quantitative approaches, are used within and across the various stages of the research process (see Johnson & Onwuegbuzie 2004, 20). The benefit of *complementarity* (see Greene et al 1989) achieved when mixing quantitative and qualitative data provides the primary motivation for using a mixed methods approach in this study. In the descriptive component of the paper, the quantitative component will have priority with the qualitative component having the secondary purpose of providing substantiation as well as clarification to the quantitative findings. For the analytical component of the paper, both quantitative and qualitative data will be treated equally as qualitative data from responses captured in question six (see Annexure 1) are unpacked. Both quantitative and qualitative components were collected concurrently in the questionnaire (see Annexure 1) and they were mixed during the stages of description and analysis.

Once the questionnaire had been drafted, the process of sample selection was initiated.

4.2 Sampling Process

A purposive sampling method was used to identify twenty-four (out of a possible thirty-five) member-firms of the Durban Automotive Cluster (DAC), of which nineteen were available to be interviewed for the study. In addition, two DAC representatives (*DAC 1* and *DAC 2*), the DAC Project Manager (from BMA, the DAC's service provider) and the DAC Chairman (elected from the DAC Executive Committee), were contacted and interviews were secured with the total sample comprising 21 representatives. It must be noted that the sampling process was heavily influenced by the respondents' availability for interviews during the October-November 2011 time period. Regrettably, it was due to this limitation that an eThekwini Municipality representative was not included in the sample of the study.

Tables 4.1A and B below provides a brief description of the member-firms included in the study.

Table 4.1A: Basic description of firm sample

Firm C	L	F	H
Firm D	L	F	H
Firm E	S	F	L
Firm F	L	SA	M
Firm G	S	SA	L
Firm H	M	F	M
Firm I	M	F	M
Firm J	S	SA	L
Firm K	M	F	L
Firm L	M	SA	L
Firm M	L	SA	H
Firm N	S	SA	L
Firm O	S	SA	L
Firm P	M	SA	H
Firm Q	L	F	M
Firm R	L	F	H
Firm S	L	SA	H

Source: DAC and B&M Analysts

Table 4.1 B: Basic description of firm sample

		No. of firms
Size (average 2006-2010)	Small (0-180)	6
	Medium (181-360)	6
	Large (361+)	7
Ownership	SA	11
	Foreign	8
Technology	Low	8
	Medium	5
	High	6

Source: DAC and B&M Analysts

Respondents from the sampled firms all have senior positions within at their respective firms –either the Head of Human Resources, Managing Directors, Department Manager or Site Manager. The decision to target the firms' senior management for the interview process was based principally on three factors. Firstly, they have ready access to the firm's employment level records in 31 December 2006-2010; secondly these individuals are in a position to comment on their firm's strategic positioning within the industry; and thirdly, these individuals will be responsible for the firm's overall employment profile, from which decisions to either increase or decrease the employee headcount of the firm will be made. With regard this final factor it must be noted that some of the firms interviewed had foreign parent companies that dictated decisions on firm-level employee headcount²⁵.

It is also believed that these representatives would have both, a better understanding of the DAC and how it operates theoretically and administratively, as well as how the other fourteen selected variables in the questionnaire may (or may not) impact on their firm-level employment. Bearing this in mind a further limitation to the study must be considered. First, there was (as to be expected) variation in the level of understanding of the questions in the questionnaire among the firm level representatives in the sample. For example, some respondents had better understanding of the impact of the fifteen variables on their employment levels in question two, or had better theoretical understanding of the agglomeration effect in question five. Secondly, the individual respondents themselves had variable levels of understanding within the questionnaire itself. For example in question two,

²⁵ This is done either by a fixed-percentage split between permanent and contracted employees or, dictated *when* or by *how much* to increase or decrease the firm's employee headcount.

a single respondent may have demonstrated varying degrees of understanding for the impact of the fifteen different variables on their firms' employment levels.

In addition to the member firms, two DAC stakeholder representatives, both the DAC Chairman and the DAC Project Manager, were interviewed. The purpose of these two interviews was firstly to capture the perceptions of DAC's representatives at an institutional level and secondly, to provide a solely qualitative response capturing their perceptions on the impact industrial clustering (and the other macro-level variables) has had on employment at the local industry level.

4.3 Data Collection

Face-to-face interviews of approximately 45 minutes were conducted at the respondents' place of work, where both primary and secondary data were captured using the questionnaire (Annexure 1).

Firstly, firm-level representatives were asked to provide data on the firm's employment levels on 31 December for the years 2006 to 2010. Specifically, the employment data was to consider full time equivalents (FTE)²⁶, as well as both full-time and contracted workers. There were three cases where firm-level employment data provided in the interview did not include contracted workers (data was not available). In all these cases this limitation had been stipulated in the description. The time period 2006-2010 was chosen for two reasons: Firstly, 2006-2010 was an interesting time period for firms in the South African automotive industry. The years 2006/07 were particularly good years for production in the local automotive industry, yet merely a year later in 2008, the global financial crisis occurred. The crises resulted in economies around the world falling into recession which negatively impacted the local automotive industry which faced global declines in the demand for motor vehicles. Secondly, the time period 2006-2010 was chosen as a convenience to the respondents. It is believed that better accuracy in the respondents' responses could be achieved by asking them to reflect on more recent history.

²⁶ See specifications under Question 1 in Annexure 1.

Respondents were then asked to provide their perception of the *overall* (individual) impact of fifteen selected variables had on their firm's employment levels during the period 2006-2010. A Likert-Scale with ratings from negative-ten through to positive-ten (refer to Table 4.2 below) was used to capture their perceptions and respondents were encouraged to provide comments for each rating in order to substantiate their answer. An integer-based scale was used based on the belief that the presence of both negative and positive numbers would elicit more accurate perceptions from respondents: where negative numbers would better capture negative perceptions; zero would better capture neutral perceptions; and positive numbers would better capture positive perceptions. Whilst the limitations of a perception-based study are rooted in the probability of capturing responses based on imperfect knowledge, the Likert-Scale provides a useful tool for capturing the strength of a perception which can then be used to make comparisons (see Likert [1932] and Cross [2004, 207-208]).

Table 4.2: Likert-Scale ratings

10	Very positive impact
5	Moderately positive impact
0	Neutral (neither positive nor negative) impact
-5	Moderately negative impact
-10	Very negative impact

Table 4.3 below lists the fifteen variables selected for the questionnaire and provides a motivation for the rationale behind their inclusion in the questionnaire.

Table 4.3: Selected variables believed to impact on firm-level employment

1. South African labour market policies (SALMP)	The overarching framework stipulating terms of employment. With the remnants of the apartheid legacy still very entrenched in the South African society, emphasis has been placed on ensuring both equality and equity in the workplace. The Labour Relations Act (most recent amendment 2002) is the guiding legislation providing principles for employment –including specifications for hiring and firing both permanent and temporary labour– <i>directly</i> influencing decisions on firm-level employment.
2. Labour capabilities in relation to labour cost (LCC)	Cross-country comparative studies have shown that South African labour (in many sectors) is not only less productive than international competitors but also relatively more expensive through the higher wages they command. At the firm level, labour capabilities in relation to labour cost <i>directly</i> influence employment decisions, particularly in industries where employers have the option to automate their production system.

3. Management capabilities in relation to management cost (MCC)	There are various levels of management within the organisational hierarchy of a firm, each of which commands a specific set of skills required to ensure smooth operations at the firm. Due to the skills shortage in South Africa many firms are expected to pay a premium to secure managers in key positions. Management capabilities in relation to management cost –at all levels of the organisational hierarchy– will have a <i>direct</i> influence whether firms employ more managers with less managerial responsibilities or <i>vice-versa</i> .
4. South African trade policies and tariffs (SATPT)	South African trade policies and tariffs dictate how local firms both engage in international markets as well as compete with international competitors in local markets. These policies influence <i>how</i> and <i>where</i> firms produce, and have an <i>indirect</i> impact on firm-level employment decisions.
5. Exchange rates (ER)	Exchange rates will impact firm-level decision making depending both on whether the firm is a net importer or exporter and well as the nature of exchange agreement –fixed or flexible– the firm has with its trading partners. These two considerations will impact on firm level production thus <i>indirectly</i> influencing firm-level employment decisions. The Rand experienced periods of volatility from 2006-2010 in uncertain economic climates.
6. Interest rates (IR)	The interest rate determines the cost of borrowing which influences firms' investment decisions which impact on firms' growth. The growth pattern will influence the firms' demand for labour, thus interest rates have an <i>indirect</i> impact on firm employment levels. The cost of borrowing did periodically rise during the recession, disrupting trends of general decline in preceding years.
7. Motor Industry Development Programme (MIDP)	The MIDP is a tool of South African industrial policy aimed strategically to intervene and provide support for the local automotive industry. Widely regarded as <i>directly</i> ensuring the survival and growth of the local automotive industry which is a large employer in the South Africa's manufacturing sector (see section 3.2.4 above for more detail).
8. Durban Automotive Cluster (DAC)	The DAC is a public-private partnership aimed at improving the competitiveness of the regional automotive industry in Durban. The existence of the DAC has contributed to the success of the local automotive industry which is a strategically important source of employment and thus can be seen to have an <i>indirect</i> effect on the members' firm-level employment (see section 3.3 above for more detail).
9. Factor cost movements –price of: electricity, water and municipal rates– (FCM)	The contribution of electricity, water and municipal rates to the overall operation cost varies depending on the nature of the firm's production system. The impact of fluctuating factor costs is likely to influence firm-level employment decisions <i>indirectly</i> depending on how firms are able to reduce onerous cost when necessary. During the studied period, electricity tariffs substantially increased annually from 2008 and municipal rates in many areas also increased.
10. Critical skills availability (CSA)	The availability of critical skills <i>directly</i> impacts on firms' employment decisions. Historically, South Africa has grappled with severe supply-side constraints in the labour market. This has led to demand exceeding the supply of many critical skills, constraining firm-level employment growth.

11. Trade unions (TU)	Trade unions command a great deal of power in the political and economic spheres of South Africa. Critically, trade unions are key actors in wage negotiations as well as other collective bargaining agreements between employers and (unionised) workers and thus have a <i>direct</i> impact on firm-level employment levels.
12. Customer supply chain development processes (CSDP)	Large OEMs or tier-1 suppliers have an interest in developing their suppliers' capabilities to ensure product quality and reliability. Whilst customers and suppliers are not focused on creating jobs, the supply chain development processes may have an <i>indirect</i> impact on employment levels depending on the nature of the supply chain development.
13. Customer orders (CO)	Customer order volumes may have a <i>direct</i> impact on employment levels as a change in customer orders will result in a change in the level of production and thus number of employees required to meet these orders.
14. Parent company or licence support (PCLS)	Parent company or licence support may have a <i>direct</i> , <i>indirect</i> or <i>no impact</i> on employment levels depending on the nature of the licence terms or relationship with the parent company, whereby specific agreements on employment ratios or levels may (or may not) be specified.
15. Adoption of new technologies (NT)	The adoption of new technologies may have one of three possible impacts on a firm's employment levels: new technologies may replace existing labour (negative impact); new technologies may have no impact on existing employment levels (neutral); or they may have a positive impact on employment levels whereby new technologies/machinery create a demand for additional labour to run them. Therefore the adoption of new technologies has a <i>direct</i> impact on firm-level employment.

Thirdly, to supplement the findings from the rating scale, respondents were asked general questions to further interrogate the impact of the DAC on employment:

1. What activities/attributes of the DAC support employment growth in the automotive and components industry? List the three most important factors in order of importance.

This question is critical to identifying *what* aspects of industrial clustering –both institutional and natural– have an impact on industrial clustering and exactly *how* they do so.

2. Hypothetically, if the DAC never existed 2006-2010, what would the impact have been on the firms' employment levels over this time period? Indicate the effect as either a positive, neutral or negative percentage change in the firms' employment levels.

This question addresses the primary aim of the study but attempts to elicit new responses by encouraging the respondent to think of the impact of industrial clustering on firm-level employment from a different perspective.

3. Does the agglomeration effect of the DAC have an impact on the firms' employment levels?

The question on the agglomeration effect is used to address a notion at the very core of the cluster literature: the existence of external economies gained by firms due to their special proximity –as the work by Alfred Marshall suggests which was discussed earlier in Chapter Two. Essentially this questions aims to expand on this notion by interrogating whether firms' believe the agglomeration effect has impacted on employment levels.

4.4 Compiling the Data Collected

The quantitative component of the study was analysed using STATA and Microsoft Excel. A new data set was created to analyse the primary research data secured.

Firstly, the sampled firms' employment-levels for 31 December 2006-2010 was tabulated to compare the general employment trends for all the sample firms. Secondly, primary research data collected through the Likert-Scales used in the firm-level interviews were analysed and forming the core analytical focus of the study. The Likert-Scale results for the DAC were compared in relation to those of the other fourteen variables to determine its impact on firm-level employment. The application of the T-test was then used to discuss the significance of these findings by refereeing to the resultant P-values (see Gujarati [2003 129-138]). To ensure that the data was analysed in a meaningful manner firms were divided into two groups: Group 1 which includes the top nine firms and Group 2 which includes the bottom ten firms based on the overall percentage change in their employment levels from 2006-2010. Then the two groups were stratified according to three firm characteristics: size (based on the number of employees), type of ownership (local or foreign owned) and their degree of technological intensity.

The results from the data interrogation constituted the primary research contribution of the study. These outputs were then be used to interrogate the findings in relation to the central research question, of whether industrial clustering has a positive impact on the employment profiles of the firms in the DAC.

Chapter Five

Descriptive Research Findings

5.1 Firm-level Employment Data

Table 5.1 Sampled Firm Employment Levels 2006-2010

	2006	2007	2008	2009	2010	Mean 2006-2010	% Change 2006-2010
Firm A	209	236	221	160	181	201.4	-13.4
Firm B	35	39	46	46	48	42.8	37.1
Firm C *	2087	1946	1990	1820	1948	1958.2	-6.7
Firm D	387	417	440	515	635	478.8	64.1
Firm E	64	64	48	38	38	50.4	-40.6
Firm F	481	478	426	429	423	447.4	-12.1
Firm G	110	114	105	100	98	105.4	-10.9
Firm H	388	381	268	275	271	316.6	-30.2
Firm I **	476	282	321	182	204	293	-57.1
Firm J	32	28	26	24	24	26.8	-25
Firm K	248	256	350	355	360	313.8	45.2
Firm L	393	484	378	206	181	328.4	-53.9
Firm M * & ***	166	163	174	168	168	167.8	1.2
Firm N	185	161	135	127	88	139.2	-52.4
Firm O	10	10	10	9	9	9.6	-10
Firm P	391	332	306	230	245	300.8	-37.3
Firm Q	682	756	598	548	527	622.2	-22.7
Firm R	1608	1503	1306	1145	1110	1334.4	-31
Firm S *	1100	1039	976	733	710	911.6	-35.5
Year Averages	476.4	457.3	427.6	374.2	382.5		
Total employed (sample)	9052	8689	8124	7110	7268		

Note: * Employment figures exclude contracted and outsourced workers

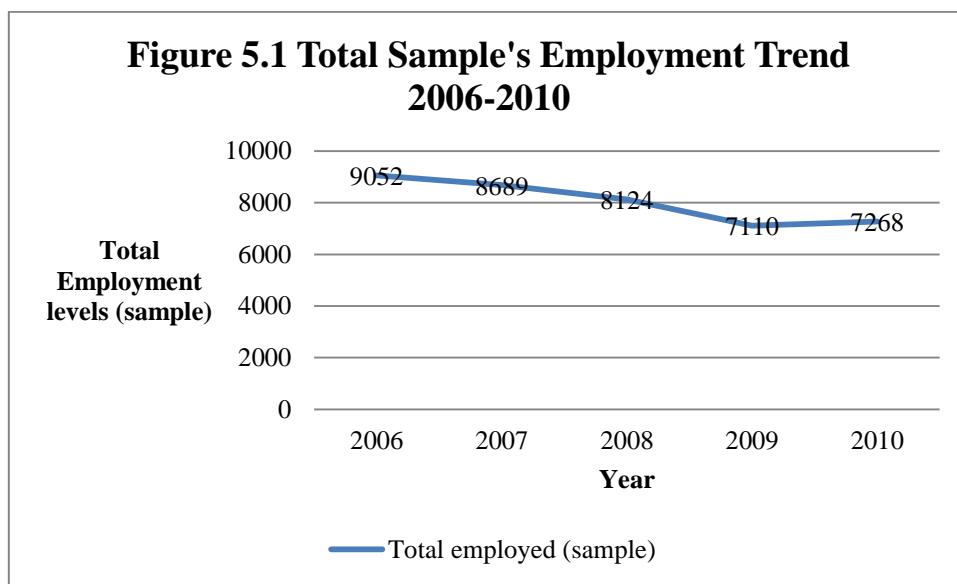
** 2006 figure calculated using average of 2006 figures from other eighteen firms

*** Figure represents 7% (percentage of workforce dedicated to automotive –related activities) of firm's total employment levels

5.1.1 Employment trends for total sample

Referring to Table 5.1 above and Figure 5.1 below, total employment levels of the sampled firms declined 21.5% from 2006 (9,052) to 2009 (7,110) before increasing slightly by 157 (2.2%) in 2010 to 7267.

Coinciding with the negative impact of the recession on the local automotive industry, the most significant decline occurred from 2008 to 2009, where total employment levels in the sample dropped by 12.48% from 8,124 to 7,110 employees. It should be noted the predominant reason for the decline in the total employment levels of the sample from 2006 and 2007 can be attributed to some of the large firms in the sample shedding ‘excess’ employees – a large amount of retirement packages were accepted by employees at *Firm C* who had an aging workforce – as productivity levels rose.



Source: Data provided by firms in the interview process

5.1.2 Employment trends for individual firms

A full 79% of the sampled firms experienced overall declines in their total employment levels from 2006-2010, with some firms experiencing significant percentage decreases from the levels in 2006 to their levels in 2010: *Firm E* experienced an overall decline of 40% from 2006 to 2010, which included a 16% decrease from 2007 to 2008 due to a significant decrease in customer orders induced by the recession; Driven primarily by on-going operational restructuring at the firm from 2008-2010, *Firm L* experienced an overall decline in employment levels of 53.7% from 2006-2010; The combination of a reduction in customer orders during the recession as well as a managerial decision to remove the “deadwood” out the firm (many employees either took retirement packages or got retrenched) resulted in a significant decrease in the employee headcount of 30.71% at *Firm N* from 2009-2010 overall, the firm experienced a substantial decline of 52% in their employment levels from 2006-2010.

However four firms experienced overall growth in employment levels during the period 2006-2010. By expanding their customer base and branching out into new areas of production *Firm B* increased its 2006 employment level 37.1% by 2010; *Firm D* experienced overall growth of 64.1% from 2006 to 2010 with an average annual employment growth rate of 13.41%. Firstly, the firm was able to offset the impact of the recession in 2008 by including a new division to their production system which required the addition of a second shift, and secondly, there was an increase in customer orders as Toyota –a major customer – showed signs of recovery in 2010; *Firm K* achieved a 45.2% increase in their 2006 employment level by 2010. This overall increase was driven primarily by major expansions in production initiated by new projects implemented at their primary customer during the period 2007-2008.

5.2 Likert-Scale Results: Perceptions of the variables' impact on firm-level employment

Table 5.2 Likert-Scale results

Firm	SALMP	LCC	MCC	SATPT	ER	IR	MIDP	DAC	FCM	CSA	TU	CSD	CO	PCLS	NT	*	**
A	-3	-5	-2	.	0	-3	.	0	0	0	0	0	-5	0	-5	-1.77	2.17
B	-2	-5	5	0	0	0	0	6	0	6	0	3	8	0	0	1.4	2.17
C	-7	0	4	-10	-1	0	0	0	-1	3	-10	-2	0	7	0	-1.13	4.7
D	-5	-5	0	0	0	5	5	0	0	5	-5	0	5	-5	5	0.33	4
E	-5	0	5	0	-2	-5	0	3	0	-4	-5	2	-2	0	5	-0.53	3.36
F	-10	-10	-5	0	-3	0	5	0	0	-10	-10	5	-2	0	-2	-2.8	5.17
G	-7	-6	2	0	-1	4	4	5	-1	-5	-3	3	0	0	2	-0.2	3.73
H	0	-5	5	5	3	0	8	0	0	3	-5	0	-5	-3	-3	0.2	4
I	-5	-5	5	0	-1	-3	3	3	-6	0	-6	-3	-5	0	5	-1.2	3.9
J	-8	-6	-9	-10	-4	0	6	4	-10	-4	-7	7	-7	0	-5	-3.53	5.67
K	3	3	5	7	-8	7	6	4	-3	-5	-2	2	-4	7	4	1.73	4.89
L	-5	2	0	0	0	0	0	0	-2	-2	0	0	-3	0	-2	-0.8	1.7
M	0	5	10	-10	-5	-5	5	5	-5	-5	0	5	5	0	5	0.67	5.63
N	-5	-3	5	-3	0	0	0	5	-5	-5	3	6	5	10	0	0.87	4.64
O	-5	7	-4	0	0	0	0	0	-3	0	0	-3	-5	0	0	-0.87	2.95
P	0	-4	-2	5	-1	-3	5	1	-3	-3	0	2	-4	4	-3	-0.4	3.18
Q	-3	-2	-4	5	0	0	8	7	-8	-3	-8	5	3	-5	-3	-0.53	5.13
R	0	-3	-6	0	-3	0	6	1	0	5	-10	3	5	-2	6	0.13	4.55
S	0	-5	0	-5	5	5	-5	0	-5	-10	-10	-5	-10	-5	10	-2.67	5.94
•	14	12	5	8	9	7	1	2	13	11	15	3	9	6	4		
***	-3.53	-2.47	0.74	-0.89	-1.11	0.11	3.11	2.32	-2.74	-1.58	-4.11	1.58	-1.11	0.42	1	-0.56	
****	3.39	4.29	4.95	5.11	2.81	3.26	3.53	2.47	3.03	4.7	4.25	3.32	4.99	4.07	4.2	2.13	

Source: Likert-Scale results captured in questionnaire administered. Mean and standard deviations, own calculations

Note: * Firm mean;

** Firm standard deviation

***Variable mean

**** Variable standard deviation

•Rank in descending order from 1 to 15 based on mean scores

5.2.1 Overall perceptions of the South African macro-environment on employment

When calculating the mean of *all* the Likert-Scale results, the list of selected variables scored a mean rating of -0.58. This indicates the respondents have a slightly negative perception of the impact of the fifteen variables on employment levels in the regional automotive industry during the period 2006-2010. Twelve firms had an overall negative mean rating for the fifteen variables: *Firm J* had the lowest overall mean for all the variables at -3.53 (relatively high standard deviation of 5.67), *Firm F* the second lowest at -2.8 (relatively high standard deviation of 5.17) and *Firm S* the third lowest at -2.67 (highest standard deviation at 5.94).

Although modestly so, the remaining seven firms had an overall positive mean rating for the fifteen variables, with only two above positive-one: *Firm K* at 1.73 (relatively high standard deviation of 4.89) and *Firm B* at 1.67 (standard deviation of 3.98). Both these firms experienced positive overall percentage changes in their employment levels over the period 2006-2010, at 45.2% and 37.1% respectively.

5.2.2 Individual variables' performances

Summaries of the perceptions expressed by the firm-level representatives for each individual variable will now be presented. The most positive and negative variables will be highlighted, whilst comments from the firm-level respondents will be used to provide reasons for the various ratings provided.

South African labour market policies

The South African labour market policies were on average perceived by the nineteen sampled respondents to have the second most negative impact on their firms' employment levels, with an average rating in the sample of -3.53 (std. dev. 3.39). However, it is instructive to note that considering the range of the scale utilised in the study, a score of -3.53 is still only moderately negative. The views of the representative from *Firm F* (-10) echoed a common sentiment amongst the majority of the other sampled firms that the South African labour market policies are simply too inflexible, making it "onerous" to expand the workforce. Although the representative from *Firm C* (-7) agreed with the basic principles of worker

protection and employment equity outlined in the South African labour policies, it was argued that the rigidity of these policies “do not encourage employment”. At *Firm G* (-7) the representative stated that many of the policies and legislation were “overly complex”, and the rigidities often made it “easier to buy machinery” instead of expand the workforce.

Firm K (3) was the only sampled firm-level representative to provide the South African labour market policy a positive rating –although it was stated that more flexible legislation regarding temporary labour would make employing more permanent labour easier. Five firm-level representatives said the variable had no impact on their firm level employment. *Firm H* (0) shared the sentiment that the current labour market policies did not “force decisions on how we –at *Firm H*– choose to hire labour”, whilst *Firm M* (0) stated simply, “just comply, don’t complain about the rules”.

Labour capabilities in relation to labour cost

Labour capabilities in relation to labour cost were perceived by the representatives from the sampled firms to have the fourth most negative impact on firm level employment, with an average rating on the Likert-Scale of -2.47 (std. dev. 4.29). The most common negative sentiment to emerge focused on the concern that low productivity of workers in the local automotive industry makes them relatively more expensive –particularly compared to international competitors. The representative from *Firm F* (-10) stated this trend led the firm to try employ less workers with higher skills and/or further automate production during the studied period.

Despite the majority of negative responses, there were four firm-level representatives that gave positive responses: *Firm O* (7) experienced no problematic issues with worker productivity, stating “productivity is good”, and therefore did not experience a mismatch between worker productivity and cost; *Firm M* (5) stated that in-house training left productivity levels “where they needed to be”; *Firm K* (3) shared this sentiment and stated the cost of labour was not an issue however, labour productivity was a problem requiring extensive in-house training; the representative from *Firm L* (2) describes an interesting paradox whereby the “less capable or productive the pool of labour, the more employees the firm needs to hire” in order to achieve production targets.

Management capabilities in relation to management cost

Management capabilities in relation to management costs were viewed on average as slightly positive at 0.74 although there was a high degree of variation in the responses by the sampled firms (std. dev. 4.95). The representative from *Firm M* (10) described the firm's horizontal management structures characterised by a relatively small management team that takes on a wide range of managerial responsibilities, thus the firm "got a lot out of them". The representative at *Firm N* (5) explained that during the period studied, a large restructuring of management at the firm resulted in the firm shedding the "dead wood" within the management structures. Thus the firm was currently getting more value out of a smaller management team who is having to "multi-task" with more managerial-responsibilities. The representative at *Firm I* (5) believed that management were less expensive in relation to labour at their firm.

There were however, seven firm-level representatives that viewed the variable as having a negative impact on employment. Among these responses were specific concerns with medium- and lower-level management. At *Firm J* (-9) the middle management "aren't skilled enough" and do not have the capacity to drive operations at the firm. At *Firm F* (-5) retrenchments during the period 2008/09 were concentrated at the levels of middle-management and lower –however, in 2009, *Firm R* (-6) retrenched roughly fifty management-staff from across all levels of management within the firm.

South African trade policies and tariffs

Overall, South African trade policies and tariffs were perceived as having a slightly negative impact on firm level employment with an average of -0.89, however there was a high degree of variation among firm-level responses (std. dev. 5.11). Nine of the sampled firms said existing trade policies and tariffs had no impact (rating of 0) on their firm's employment levels during the time period studied. Some of these representatives stated their answer may have been different given a different time period, whilst others stated their products produced where difficult to import and export and thus were not exposed to threats from cheaper international competitors supplying the local market.

Three firm-level representatives believed current trade policies and tariffs in the country had a very negative impact (-10) on their firm-level employment during the period 2006-2010.

Firm M and *Firm C* made specific reference to the need for greater government support against competition from cheap foreign imports, whilst *Firm J* stated that they had lost export business abroad to Chinese competitors. However those firms that exported products benefitted from these policies, for example *Firm H* (5), *Firm P* (5) and *Firm Q* (5) stated successful exports –achieved through beneficial trade policies and tariffs– enabled them to achieve zero ratings on the imported components in their production processes, which in turn assisted competitiveness and helped sustain employment levels during the 2006-2010 period.

Exchange rate

With an overall average rating of -1.11 (std. dev. 2.81) the exchange rate was perceived by the sampled firms to have a slightly negative impact on firm-level employment during the period 2006-2010. The majority of firm-level representatives who believed the exchange rate had a negative impact on their firm's employment levels during the 2006-2010 period stated the *volatility* of the exchange rate was problematic more so than the actual rate itself. For example *Firm M* (-5) stated the exchange rate volatility made it difficult to plan for future production –and thus the number of employees required.

Seven of the sampled firm representatives stated the impact of the exchange rate on their firm-level employment as neutral (0). The predominant reasons for these responses were: as stated above, the exchange rate volatility was problematic for future planning in production, but did *not* have an effect on the firms overall employment levels; some firms had limited exposure to the exchange rate, due to the high proportion of local material used for inputs and outputs that were supplied to the local market; and some firms had back-to-back agreements with their customers, which allowed them to offset either gains or losses in exchange rate fluctuations.

Interest rates

The firm-level representatives' responses indicated a slightly positive perception of the impact of interest rates on their firm level employment during 2006-2010, with an average rating of 0.11 (std. dev. 3.26). *Firm D* (5) stated the low interest rates during the period

2006-2010 helped boost customer order volumes – particularly during the period 2009-2010. The positive impact of low interest rates on customer order volumes was common response among the other firms that perceived the interest rates as a positive impact on employment during the studied period.

Among the seven firm-level representatives that perceived a neutral impact on firm-level employment, there was a common view that the overall trends in the interest rates during the time period had a very indirect impact on employment levels. The respondent from *Firm L* (0) explained, “interest rates came down consistently over past five years, but have had a neutral impact on employment”.

However, the rise in interest rates that did occur during the recession did impact negatively on employment levels at some of the sampled firms. The representative from *Firm M* (-5) explained how the rise in interest rates during the 2006-2010 period occurred at a time of intensive investment, driving the costs beyond projected levels. The majority of the firm-level representatives that viewed the interest rates negatively expressed the view that the rise in interest rates that did occur during the 2006-2010 period simply made borrowing too expensive for them, and thus negatively impacted on the growth prospects of their respective firms.

Motor Industry Development Programme

With an overall average rating of 3.11 (std. dev. 3.53) the MIDP was rated by the firm-level representatives in the sample as having the most positive impact on firm-level employment during the period 2006-2010. Eleven of the firm-level representatives in the sample gave the MIDP a positive rating. The representative from *Firm Q* (8) stated the firm “benefitted a lot from promotion of localisation”, which is a crucial incentive maintaining the interest of their foreign parent company in the South African operation. The representative from *Firm H* (8) stated the MIDP “assisted greatly during the period”, providing an advantage to attract business from OEMs that resulted in increased order volumes which in turn assisted the firm to offset overhead costs. Similarly, the representative from *Firm R* (6) stated the “sole reason the company grew from 2004 to 2008” was due to the impact of the MIDP. Further, “if it wasn’t for the MIDP we (*Firm R*) would be employing fewer people” currently, but critically during the recession, the impact of the MIDP “helped maintain employment” at the firm.

Out of the six firms that provided neutral (0) ratings for the MIDP, three were firms where automotive industry-related production is a relatively smaller component of their total production operation compared to the other sampled firms.

Durban Automotive Cluster

The DAC achieved the second highest rating from the sampled firm-level representatives with an overall average of 2.32 (std. dev. 2.47). The response from the *Firm B* (6) representative sums up the general perceptions of the firms that rated the DAC positively, whereby the DAC is perceived to have a, “very *indirect impact*, but the outcomes have had a positive impact on employment”. Other comments from the respondents that perceived the impact of the DAC on firm level employment discussed various activities of the DAC that will be interrogated later in the paper.

The remaining eight sampled firms all provided neutral ratings (0) for the DAC and general consensus was that the impact of the DAC on employment was simply *too indirect* in relation to other variables in the questionnaire. No firm-level representatives viewed the DAC as having a negative impact on firm level employment.

Factor cost movements

With an overall average rating of -2.74 (std. dev. 3.03) factor cost movements where rated the third most negative impact on firm level employment during the period 2006-2010. The ratings provided on this variable where highly dependent on the contribution of these costs (water, electricity and rates) to the firms overall cost component –which in turn depended on the type of production the firm is involved in. *Firm J* (-10) stated that electricity was a high proportion of the firm’s overall costs that were exacerbated during the Eskom tariff increases from 2008. *Firm Q* (-8) is also highly dependent on electricity, and due to the tariff increases the firm had to close two of its production operations resulting in job losses. *Firm N* (-5) stated “electricity is both expensive and unreliable” acting as a hindrance to smooth production operations. The firm-level representatives that provided neutral (0) ratings stated that factor costs were a relatively small proportion of overall operational costs and thus had no impact on firm-level employment

Critical skills availability

Critical skills availability had an overall negative impact on firm-level employment with an average score of -1.58. However there was a high degree of variability among the ratings (std. dev. 5.14). Every firm in the sample exercised extensive in-house training to equip new employees with the necessary skills required for their specific production activities. The respondent from *Firm G* (-5) explained, “The necessary skills aren’t available and we have to do in-house training as the skills we require are not available freely in the labour pool”.

Finding labourers with an adequate level of basic arithmetic and technical skills is problematic and there is a common concern on the shortage of artisanal skill among the sampled firms. In 2009, *Firm F* (-10) had to turn down orders from a large OEM because of the shortage of certain technical skills required to meet the customer’s order. The respondent at *Firm J* (-4) blamed the “erosion of the social environment” for negatively affecting their supply of people to employ resulting in a costly screening process and high labour turnover.

The majority of the firms that gave this variable a positive rating had no difficulty sourcing people to be trained. The representative from *Firm R* (5) provided an interesting perspective on the critical skills shortage. They experience no problem sourcing people to train and have an intensive in-house training programme. However, ironically the poor level of skills available to employ means the firm needs to employ “one-and-a-half people to do one person’s job”.

Trade unions

On average, the trade unions were perceived to have the most negative impact on firm-level employment during 2006-2010 with an average rating of -4.11 (std. dev. 4.25). The views of the respondent from *Firm C* (-10) reflect a common attitude of those that perceived the trade unions as having a very negative impact on firm-level employment,

Why can’t they fight for the creation of *new jobs*, by seeking creative solutions? The trade union is not a partner in job creation.

The representative from *Firm F* (-10) expands on this sentiment, “the trade union is looking for more money for their existing members” and were not encouraging the creation of new jobs and therefore “do not assist employment growth” at their firm. A specific example of strike action and the subsequent wage increases at *Firm R* (-10) in 2010 were stated as having –and will continue to have –a direct negative impact on employment growth at the firm. The representative from *Firm J* (-7) expressed concern with the individuals representing the trade unions and argued the relationship between the firm and their trade union would work well if the trade union representatives had a better understanding of how businesses operate – especially during wage negotiations :

A better understanding by the trade union representative of how businesses operate would mean the two parties could work better together to seek employment solutions.

The representative from *Firm Q* (-8) stated the manner in which employers get locked in to *inflexible* employment agreements, tend to encourage the firm to resort to contracted labour as an alternative.

However there was one firm in the sample that seemed to have a good relationship with their trade union (and the unionised workers). The representative from *Firm N* (3) explained, “We have a good working relationship with our trade union”. Stating a recent strike (during the studied time period) as an example, 50% of the unionised workers at *Firm N* remained working, the reason for which was based on the “good working relationship between management, workers and unions”.

Customer supply chain development processes

Customer supply chain development processes were perceived to have the third most positive impact on firm-level employment among the sampled firms, with an overall average of 1.58 (std. dev. 3.32). The respondent from *Firm J* (7) simply stated, “We wouldn’t be in business in the local automotive industry without the support from customers within the supply chain” (especially during the global financial crisis). In 2009, *Firm F* (5) managed to secure new business through their relationship with a major OEM customer which helped reduce the

negative impact of the recession. *Firm G* (3) supplies three of the major automotive OEMs in South Africa and the representative stated,

They (the OEM customers) are demanding, but crucially they assist us with their demands, and their demands are beneficial to the growth of the company.

However there were four firms in the sample that felt that supply chain development processes had had a negative impact on their employment levels during the studied time period. In 2006 *Firm I* (-3) had an in-house delivery unit which was then outsourced, resulting in a loss of jobs at the firm. The respondent from *Firm O* (-3) felt that *verbally* there were promising plans to promote customer supply chain development, but *practically* progress was not happening as projected during the 2006-2010 period. The respondent argued that this lack of practical implementation stifled the firm's growth opportunities during the period.

Customer orders

There was overwhelming consensus among all the sampled firms that customer orders have the most direct impact on firm-level employment. Whether this impact was perceived to be positive or negative depended strongly on trends – for each individual firm – in customer orders during the studied period. Overall the average rating of customer orders among the sampled firms was -1.11 although there was a high degree of variability among the responses (std. dev. 4.99). Eleven sampled firms perceived the overall impact of customer orders on firm-level employment as negative. Due to the collapsed demand of a large customer during the recession, *Firm J* (-7) suffered a massive reduction in customer orders resulting in forced retrenchments. The respondent from *Firm H* (-5) stated customer orders have had a “clear negative impact” on employment levels particularly 2008-2010 as it is the “dominant variable that drives business and thus employment levels at the firm”. Although *Firm L* (-3) enjoy a wide variety of customers, their customer order volumes are dominated by Toyota SA which was negatively impacted by the recession –resulting in reduced order volumes. As a result, at the time of the interview, the order book was half of what it was in 2007 and the decision was made to “drastically rationalise the business to focus on more profitable operations”, resulting in considerable job losses over the 2008-2010 period.

With increasing volumes of customer orders both before and after the recession, the overall impact of fluctuating customer orders at *Firm C* (0) and *Firm G* (0) resulted in neutral impacts on employment levels at these firms.

However in six of the sampled firms, the overall impact of fluctuating customer order volumes had positive impact on firm employment levels. *Firm B* (8) has made an active effort to improve the breadth of their customer base in an attempt to spread the risk of fluctuating customer orders and allowing them to offset the impact of the recession. *Firm N* (3), *Firm D* (5) and *Firm R* (5) all secured new product orders from their major customers that had a positive impact on their firms' employment levels. Specifically the respondent from *Firm N* (3) stated an “important lesson” was learnt in spreading their risk of dependency and product range among *numerous* customers.

Parent company and licence support

The impact of parent company and licence support was only relevant for those firms in the sample that operated under such organisational structures. The overall average rating was 0.42 (std. dev. 4.07) with seven firm-level representatives providing zero-ratings as the variable was not applicable for their firms. The representative from *Firm N* (10) stated the institutional and organisational support from their parent company during the recession was “crucial” to the firm’s survival. The parent company of *Firm C* (7) actively supports the learnership and BEE programmes, both of which have positive impacts on employment levels at the firm.

However, reasons provided for the negative ratings were dominated by the demands made by foreign parent companies. *Firm D*’s (-5) parent company requires an employment ration of 70/30 –70% permanent and 30% temporary/contract labour –placing a ceiling on the maximum level of permanent employees. The respondent from *Firm Q* (-5) stated their parent company issued cuts of headcount during the recession in order to reduce costs, whilst the parent company of *Firm R* (-2) is in favour of employing fewer people in order to reduce headcount cost.

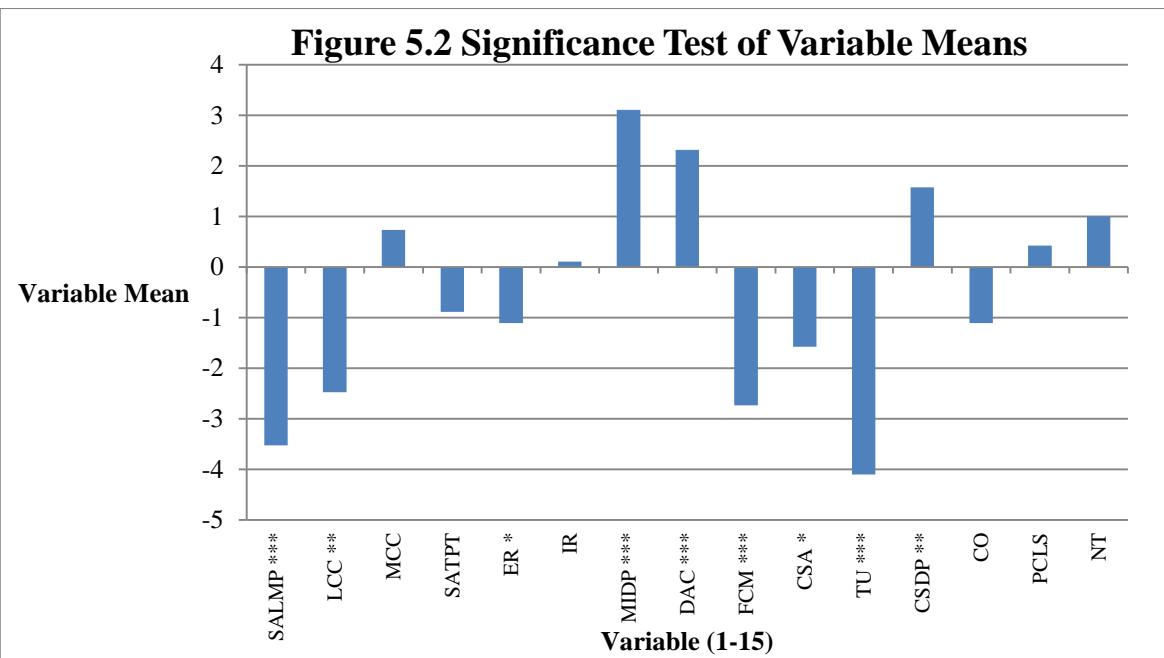
The adoption of new technology

Overall the adoption of new technologies had a slightly positive average rating of 1. However, there was a high degree of variability in the responses (std. dev. 4.23). At *Firm R* (6) investment in new technologies during the 2006-2010 period resulted in new employment opportunities at the firm. Investments in new technology at *Firm M* (5) contributed to employment figures being stable during the period 2009-2010. At *Firm I* (5) investments in new technologies were as a result of the firm securing new production projects that generated the need to increase the number of labourers at the firm. New technologies at *Firm G* (2) helped maintain jobs in a tough economic environment, although the representative stated that: “these investments will only show *improved* employment levels in years to come”.

There were four firms in the sample that stated investments in new technologies had no impact on employment levels. *Firm B* (0) and *Firm C* (0) both invested in new technology during the period 2006-2010, however these investments had no impact on firm-level employment as existing workers were reshuffled to accommodate the operation of the new machinery. Both *Firm N* (0) and *Firm O* (0) did not invest in new technology during the studied time period, thus the variable had no impact on their firm-level employment.

In all the negative ratings, investments in new technology replaced labour. The response from the representative at *Firm P* (-3) mirrors a common response from these firms, “automation in our production process –and improvement of production bottlenecks – have resulted in cuts in labour during the studied time period”.

5.2.3 Statistical significance of the Likert-Scale results



Source: Own calculations based on data captured during the interview process

Note: *** Highly significant, P-value 0.01 or less

** Moderately significant, P-value 0.05 or less

* Significant, P-value 0.1 or less

No star, not statistically significant, but may be suggestive

Using the standard T-test the significance of the Likert-Scale results were scrutinised based on the resultant P-values. Figure 5.2 above graphically represents the level of significance (see note) for each individual variable. The results for the impact of South African labour market policies, the MIDP, the DAC, factor cost movements and the Trade Unions on the sampled firms' employment levels are *highly significant*; those of the labour capabilities in relation to labour cost and customer supply chain development processes are *moderately significant* and exchange rates and critical skills availability are *significant*. The P-values for management capabilities in relation to management cost, South African trade policies and tariffs, interest rates, customer orders, parent company and licence support and new technologies were too high (greater than 0.1) and therefore bare no statistical significance, instead they are merely suggestive.

Table 5.3 Variable means ranked with respective P-values

Variable	Variable mean	P-Value
MIDP	3.11	0.0016
DAC	2.32	0.0007
CSDP	1.58	0.0529
NT	1	0.3164
MCC	0.74	0.5249
PCLS	0.42	0.6577
IR	0.11	0.8898
SATPT	-0.89	0.4705
ER	-1.11	0.1032
CO	-1.11	0.3469
CSA	-1.58	0.1141
LCC	-2.47	0.0216
FCM	-2.74	0.001
SALMP	-3.53	0.0003
TU	-4.11	0.0005

Source: Own calculations based on data captured during the interview process

Table 5.3 above lists the fifteen selected variables in descending order from most positive to most negative, based on their Likert-Scale results, with the respective P-values. Interestingly, the variable perceived to have had the most positive impact on firm-level employment, the MIDP (3.11), was highly significant with a P-value of 0.0016. The DAC (2.32), the second most positive impact on firm-level employment was also the third most statistically significant variable with a P-value of 0.0007. This finding is of particular importance to this study as it strengthens the relevance of the analytical considerations that focus on the impact of the DAC on firm-level employment that are unpacked in the following chapter.

The two variables with the most negative impact on firm-level employment, the South African labour market policies (-3.53) and trade unions (-4.11) were the most statistically significant variables in terms of their P-values at 0.0003 and 0.0005 respectively. As the third most negative impact on firm-level employment, factor cost movements (-2.74), was also highly significant with a P-value of 0.001.

5.3 Activities & Attributes of the DAC in Support of Firm-level Employment in the Regional Automotive Industry.

Table 5.4 Top three activities and attributes of the DAC

Activity/Attribute (top three) *	Number of responses
Benchmarking	9
Supply chain development	5
Localisation	4

* Based on the total number of responses received from firm-level and DAC representatives

The findings in Table 5.3 represent the top three activities and attribute of the DAC based on the responses from both the firm-level representatives as well as the DAC representatives to question three of the questionnaire (see Annexure 1).

Benchmarking

The respondent from *Firm E* said it had benefitted from both the individual benchmarking exercises as well as the benchmark comparisons to international competitors. In particular the firm benefitted from pricing comparisons which in turn assisted them being more price-competitive –ensuring their survival as a firm in the industry. More directly, the respondent from *Firm I* stated,

Benchmarking activities have helped us [*Firm I*] better understand what the requirements are for the ‘first world’ standards and we have moved towards these standards... Had we not gone this route we could have lost jobs.

Supply chain development

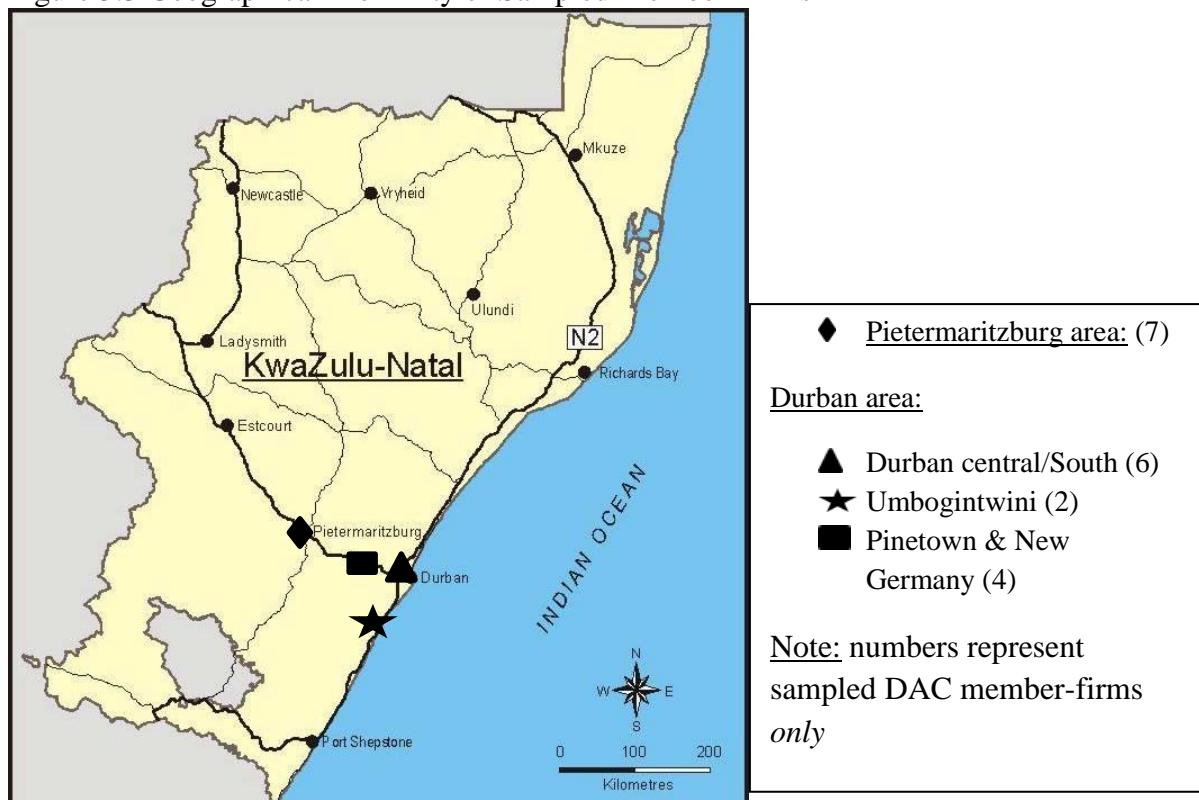
The representative from *Firm I* found that mutual learning from the opportunities and challenges experienced by other firm in the cluster had been enhanced by both formal and informal communication in the DAC network. The respondent from *Firm F* explained how the firm had directly benefitted from improved capacity of its suppliers at the lower end of the local automotive value chain.

Localisation programme

Firm E began feeling real effect of the DAC's localisation programme in 2010 as they secured orders from another tier-1 supplier in the cluster .The representative from *Firm E* believes the localisation programme will have a greater impact moving forward in the future as the company looks to expand business locally, encouraging other firms to source local inputs and materials. *DAC 2* believes the localisation programme can have a "secondary impact" on employment growth by creating a localised pool of skilled labour that may be conducive to employment growth.

5.4 The Existence and Impact of an Agglomeration Effect in the DAC

Figure 5.3 Geographical Proximity of Sampled Member-Firms



Source: Adapted version of unpublished map by F. Sokolic, UKZN, B&M Analysts in Lorentzen et al (2007, 195)

Table 5.5 Firm responses to questions regarding the agglomeration effect in the DAC

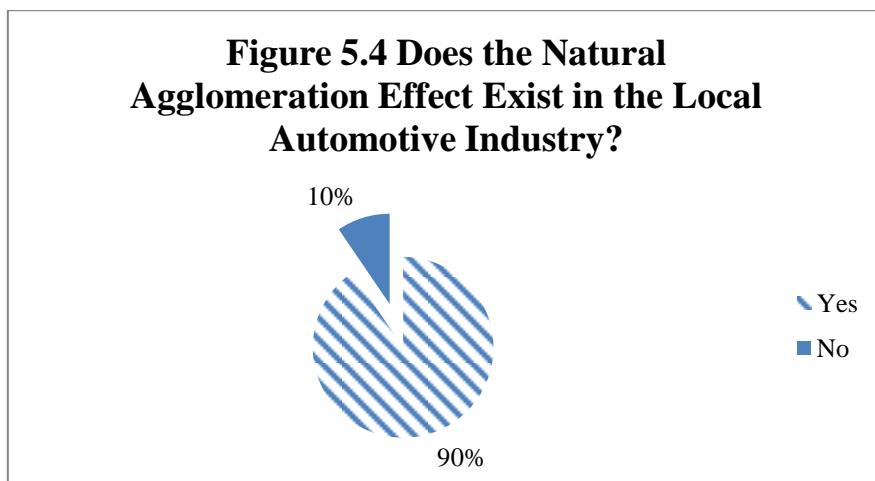
	5.1 *	5.2 *	5.3 *
<i>Firm A</i>	Y	N	N
<i>Firm B</i>	Y	N	Y
<i>Firm C</i>	Y	N	N
<i>Firm D</i>	Y	Y	N
<i>Firm E</i>	Y	N	Y
<i>Firm F</i>	Y	Y	Y
<i>Firm G</i>	Y	Y	Y
<i>Firm H</i>	Y	N	Y
<i>Firm I</i>	Y	N	Y
<i>Firm J</i>	Y	N	Y
<i>Firm K</i>	N	N	Y
<i>Firm L</i>	Y	Y	Y
<i>Firm M</i>	Y	Y	Y
<i>Firm N</i>	Y	Y	Y
<i>Firm O</i>	Y	N	Y
<i>Firm P</i>	N	N	Y
<i>Firm Q</i>	Y	N	Y
<i>Firm R</i>	Y	N	Y
<i>Firm S</i>	Y	Y	Y
<i>DAC 1</i>	Y	N	Y
<i>DAC 2</i>	Y	N	N
	Y=19/ N=2	Y=7/ N=14	Y=17/ N=4

Source: Data captured during interview process

Note: * corresponds to Question five in the questionnaire (Annexure 1)

The findings on the existence –and impact on employment– of the agglomeration effect in the DAC include the responses from both the firm-level representatives and the DAC representatives.

5.4.1 Does a natural agglomeration effect exist in the local automotive industry?



Source: Own calculations based on data captured during the interview process

Nineteen out of the twenty-one representatives believe the agglomeration effect exists in the local automotive industry. The agglomeration of many of the firms –particularly in the Durban-South region– is driven by the location of Toyota SA, the major OEM. However, spatially the member-firms in the DAC are spread over large geographical area meaning there are fair distances between firms that are located in different areas in the province (see Figure 5.3). The respondent from *Firm G* elaborates,

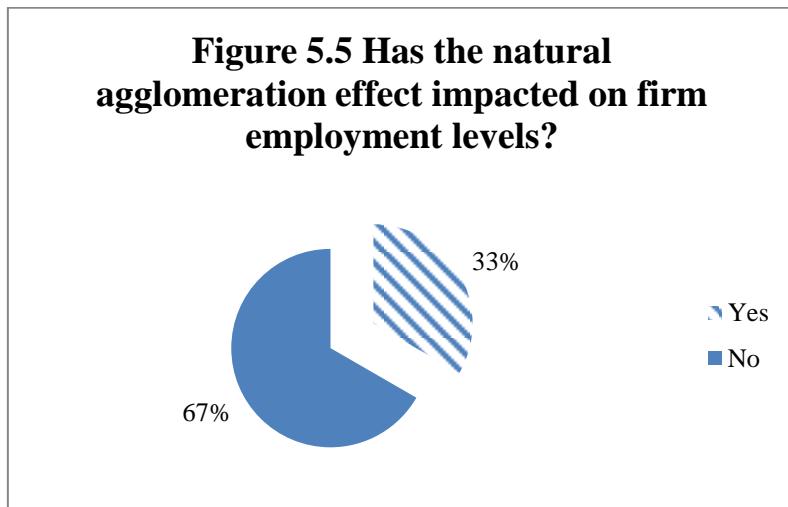
The long distance between member-firms does hinder the agglomeration effect. However the administrative strength of the DAC helps reduce this barrier.

The respondent from *Firm N* expands on this by stating, both formal and informal communications have helped reduce this spatial barriers to the benefits of agglomeration in the local automotive industry.

There were two firms, *Firm K* and *Firm P* that noted there was no natural agglomeration effect in the local automotive industry. Both firms highlighted two issues. Firstly, they stated the agglomeration effect was not *natural* as is based on the demands of the dominant OEMs. However, this paper rejects this notion that the agglomeration effect is *unnatural* due to its relation to dominant OEMs. The emergence and geographical concentration of firms around a dominant OEM does not deem the resultant agglomeration effect as *unnatural* or *forced*. The exact reasoning was used by other firms to argue the existence of the *natural* agglomeration effect, “we and other firms in the DAC have deliberately located around Toyota” ~ *Firm D*.

The second concern focused on the extent of member-firm cooperation. The respondent from *Firm P* believed there is “no drive to work together to benefit each other”, whilst the respondent from *Firm K* believes some member-firms are “hesitant to share information” with other member firms, particularly if they are seen as possible competitors.

5.4.2 Has the natural agglomeration effect impacted on your employment?



Source: Own calculations based on data captured during the interview process

Although there was a general consensus that the natural agglomeration effect existed in the local automotive industry, the majority of the sampled firms felt it had no impact on their firm-level employment. Fourteen respondents believed the natural agglomeration effect had no impact on firm-level employment. The perceptions of the representative from *Firm H* echo a common sentiment by those firms that believed the agglomeration effect has a no impact on firm-level employment,

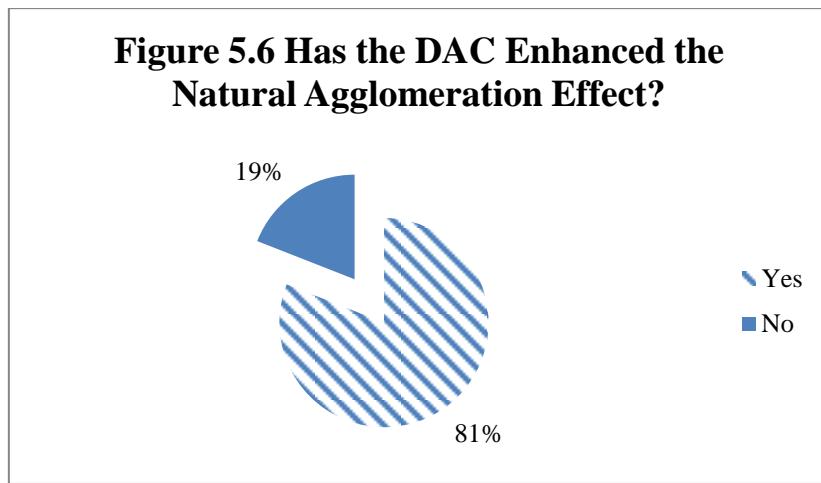
...the agglomeration effect does not impact on employment level,
instead business during the time drives labour demand.

The representative from *Firm P* believes the impact on firm-level employment is more an example of “poaching” than a “pooling” of labour, especially those with higher skills levels, of which there is a small pool.

There were seven firms that believed the agglomeration effect did have an impact on firm-level employment. Crucially, the representative from *Firm G* highlighted that natural agglomeration effect helped *maintain* employment levels more than it assisted growth during the period 2006-2010. The respondent from *Firm F* believes there is a pooling of critical skills as a result of the DAC that has had a positive impact on firm-level employment. Finally, the respondents from *Firm G*, *Firm M* and *Firm S* all stated the importance of

networking for business opportunities –and to secure supply– with other member-firms, and the resulting positive impact it has had on firm-level employment.

5.4.3 Has the DAC enhanced any natural agglomeration effect?



Finally, the majority (seventeen) of the sampled firms believe the DAC had enhanced the natural agglomeration effect in the local automotive industry. The representative from *Firm L* provided four ways in which the DAC enhanced the natural agglomeration effect. Firstly, the DAC enhances a “natural network effect” where old relationships between firms have been renewed; secondly, the DAC acts as an “expedient for sharing information”; thirdly, it enhanced both formal and informal communication and information sharing among member-firms; and finally the DAC has provided a platform to engage with customers and suppliers in a “non-threatening environment”

The representative from *Firm R* explained the DAC has enhanced intra-regional communication (for example firms within Pietermaritzburg) but also interregional communication (firms in Pietermaritzburg and Durban South for example), thus ‘reducing’ the spatial distances among member-firms. As mentioned by the respondent from *Firm L*, the DAC has helped *Firm R* “break down rigid customer supplier relationships” which greatly assisted mutual learning between their suppliers –as well as those member-firms with which they have no business relations.

The representative from *Firm S* shared this notion of mutual learning and stated their firm had benefitted from becoming more aware of other member-firms' existence and best business practises.

There were four firms in the sample that believed the DAC had not enhanced the natural agglomeration effect in the local automotive industry. Both *Firm A* and *Firm C* stated the agglomeration existed prior to the formal establishment of the DAC as an institution. Both representatives from *Firm D* and the *DAC 2* believe the positioning of major suppliers has a more direct impact on the natural agglomeration effect than the existence of the DAC itself.

The descriptive component of this paper has mapped key employment trends of the sampled firms, demonstrated the perceived impact of the DAC on firm-level employment (in relation to that of fourteen other key variables) and unpacked key activities and attributes of the DAC as well as the impact of the agglomeration effect on firm level employment. The following chapter aims to link employment trends with the findings on the DAC. First the Likert-Scale results of the DAC are stratified to interrogate any suggestive trends based on (three) firm characteristics. Deeper analytical considerations are then provided to further unpack notable trends, as well as link the findings with the relevant literature discussed in Chapters Two and Three. Finally, the findings are discussed in terms of suggestions for local and national government.

Chapter Six

Analytical Considerations

6.1 Interrogating the Relationship between Firm Employment Levels & DAC

6.1.1 *Grouping the firm sample: Top and bottom firms*

Table 6.1 Sample grouped according to overall percentage change in employment 2006-2010

Top 9 (Group 1)	DAC Likert-scale Rating	Bottom 10 (Group 2)	DAC Likert-scale Rating		
% Change		% Change			
<i>Firm D</i>	64.1	0	<i>Firm Q</i>	-22.7	7
<i>Firm K</i>	45.2	4	<i>Firm J</i>	-25	4
<i>Firm B</i>	37.1	6	<i>Firm H</i>	-30.2	0
<i>Firm M</i>	1.2	5	<i>Firm R</i>	-31	1
<i>Firm C</i>	-6.7	0	<i>Firm S</i>	-35.5	0
<i>Firm O</i>	-10	0	<i>Firm P</i>	-37.3	1
<i>Firm G</i>	-10.9	5	<i>Firm E</i>	-40.6	3
<i>Firm F</i>	-12.1	0	<i>Firm N</i>	-52.4	5
<i>Firm A</i>	-13.4	0	<i>Firm L</i>	-53.9	0
		<i>Firm I</i>	-57.1	3	
Mean	2.22		2.44		
Std. Dev	2.68		2.41		

Source: Own calculations based on data captured during interview process

As mentioned in previous chapters, the impact of the recession had a profoundly negative impact on firm-level employment among the DAC member firms. Specifically the negative impact on the demand for vehicles globally had a ‘trickle-down’ effect from the reduction in assembly production volumes at the major OEMs (Toyota SA in the case of the DAC) which then filtered down the value chain to local suppliers of parts and components that experienced reduced order volumes. As illustrated in Section 5.1 this had a very negative impact on the employment trends among the sampled firms. 79% of the sampled firms experienced overall declines in their employment trends from 2006-2010. Referring to Table 6.1 above, the firms were first ranked in descending order based on the overall percentage change in their employment levels from 2006-2010. Once ranked, the firms were divided (roughly) in half into two groups: Group 1 (lists the top nine firms) and Group 2 (the bottom ten firms) – due to the fact that the total firm-sample was an uneven number (nineteen) Group 2 was allocated ten firms considering most of the firms experienced overall declines in their employment levels for 31 December 2006 to 2010. Interestingly, the average Likert-scale rating of the

DAC was marginally higher in Group 2 at 2.44 (2.41) than in Group 1 at 2.22 (2.68), possible explanations of which will be unpacked in the analysis below.

6.1.2 Stratifying the firm sample: Three key firm characteristics

A key objective of the study was to determine whether the impact of industrial clustering on firm-level employment varies depending on certain key characteristics of the firms. Firm size, the type of ownership and degree of technological intensity were chosen as three firm characteristics that would be used to stratify the sampled firms. The following analysis is meant to be *suggestive* and would not hold under stringent statistical significance testing for the following three reasons: Firstly, the sample size is small (nineteen firms) and is further reduced as the sampled firms are stratified; Secondly, each sampled firm bears all three characteristics, and the impact of industrial clustering on the firms employment levels cannot –statistically– be attributed to *one* of the three characteristics in isolation of the others; and thirdly, once stratified, each characteristic does not hold an equal (or weighted) number of sampled firms.

Table 6.2 Total firm sample stratified into size, ownership and technology

		No. of Firms	DAC mean	Std. Dev
SIZE (average 2006-2010)	Small (0-180)	6	3.83	2.14
	Medium (181-360)	6	1.33	1.75
	Large (361+)	7	1.86	2.91
OWNERSHIP	SA	11	2.36	2.58
	Foreign	8	2.25	2.5
TECHNOLOGY	Low	8	3.38	2.26
	Medium	5	2	3.08
	High	6	1.17	1.94

Source: Own calculations from data collected during the interview process

Table 6.2 above reflects the overall mean ratings for the DAC for the nineteen sampled firms when stratified by firm size, type of ownership and degree of technological intensity.

Size

It is clear that on average the small firms (3.83) in the sample perceived the impact of the DAC impact on the employment far more positively than both the medium (1.33) and large

(1.86) firms. This is to be expected as comparatively smaller firms lower down the value chain –second and third tier– suppliers would stand to benefit more from the external economies within the cluster. For example by sharing their production best practices both *Firm L* and *Firm S* stated they had direct incentives to assist their smaller local suppliers in order to strengthen the local supply chain. The representative from *Firm N*, a small firm, stated supply chain development as the most important activity of the DAC for their employment growth. Similarly, the representative from *Firm B* stated the twinning programme –where small firms are ‘paired’ with a large tier-1 supplier in the DAC– as critical to assisting the firm achieve best practice in their production which ultimately had a positive influence on their employment levels.

Ownership

On average, the representatives from locally owned (2.36) firms rated the impact of the DAC on their firm-level employment slightly more positively than those of the foreign owned (2.25) firms. Other than specific examples where foreign parent companies had a very direct impact –both positive and negative examples emerged in the study– on employment decisions in the foreign-owned member firms (discussed in Section 5.2.2), the link between type of ownership and the impact of the DAC on employment was not spoken of directly in any of the interviews. Therefore it would not be instructive to speculate on any correlative or even suggestive relationships between the type of ownership and the impact of the DAC on employment levels. Instead, this provides an avenue for further, more specific research interrogating this relationship.

Technology

The average rating of the DAC by representatives of firms with a low (3.38) degree of technological intensity in their production system was higher than that of both the medium (2) and highly (1.17) technologically intensive firms in the sample. Within this sample of nineteen firms there does seem to be a correlation between small and medium sized firms and firms with low degree of technological intensity, all of which have comparatively higher overall mean ratings for the DAC. Similar to the *type of ownership*, there was very little direct references made between degree of technological intensity and the DAC. However the representative from *Firm L* did make specific mention of cost cutting benefits accrued

through shared maintenance of very specific machinery used by three member-firms located in close vicinity to each other.

Various trends interrogating the impact of the DAC on firm level employment will now be explored by stratifying the two sub-samples, Group 1 and Group 2, according to firm size, type of ownership and degree of technological intensity. Once again it is prudent to note the findings that emerge from these processes will be merely *suggestive* in nature – as the issue of small sample size is further exaggerated.

6.1.3 Unpacking key trends in both groups through the process of stratification

Table 6.3 Group 1 stratified according to firm size, type of ownership and degree of technological intensity

		No. of Firms	DAC Rating	Std. Dev.
Size (average 2006-2010)	Small (0-180)	3	3.67	3.21
	Medium (181-360)	2	2	2.83
	Large (361+)	4	1.25	2.5
Ownership	SA	6	2.67	2.94
	Foreign	3	1.33	2.31
Technology	Low	4	3.75	2.63
	Medium	2	0	0
	High	3	1.67	2.89

Source: Own calculations based on data captured during the interview process

Referring to Table 6.3 above, it is clear that among the nine firms in the sample with the healthiest employment growth profiles from 2006 to 2010, those that are small (3.67), South African owned (2.67) or operate with a low degree of technological intensity(3.75) perceive the impact of the DAC on their firm-level employment most positively. The four large (1.25), three foreign owned (1.33) or two firms with medium levels of technological intensity (0) perceived the impact of the DAC on their firm-level employment figures to be either only slightly positive, or neutral.

Table 6.4: Group 2 stratified according to firm size, type of ownership and degree of technological intensity.

		No. of Firms	DAC Rating	Std. Dev.
Size (average 2006-2010)	Small (0-180)	3	4	1
	Medium (181-360)	4	1	1.41
	Large (361+)	3	2.67	3.79
Ownership	SA	5	2	2.35
	Foreign	5	2.8	2.68
Technology	Low	4	3	2.16
	Medium	3	3.33	3.51
	High	3	0.67	0.58

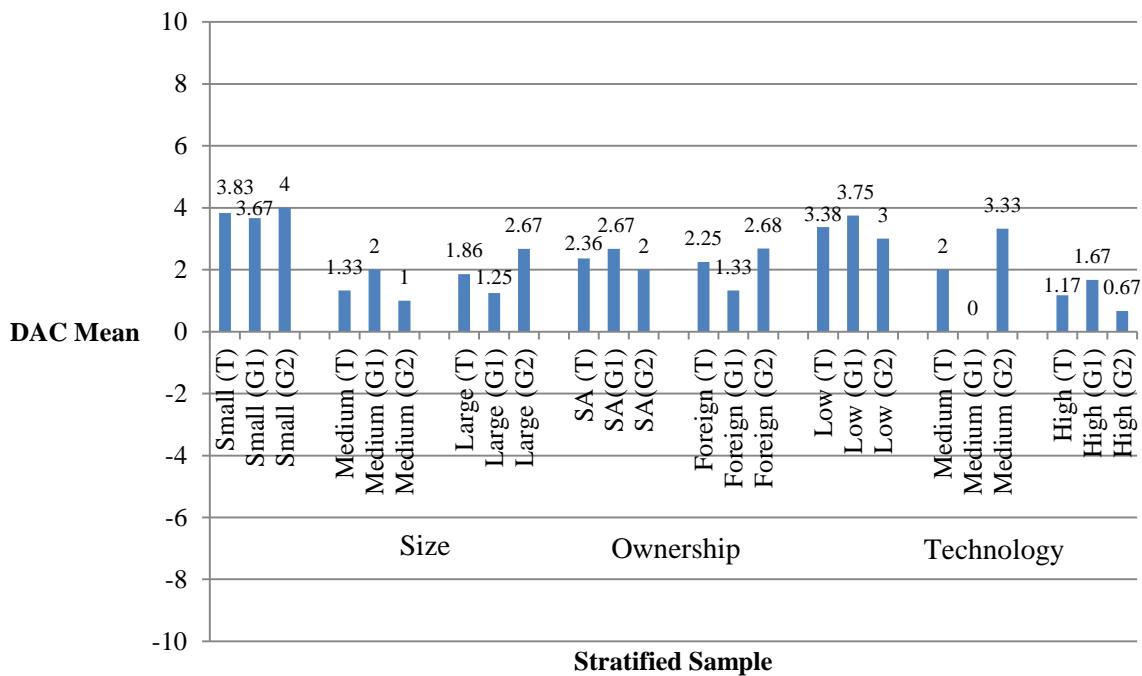
Source: Own calculations based on data captured during the interview process

Interestingly, the bottom ten firms in the sample provided different trends to those in Group 1. Similarly to Group 1, the small firms perceived the impact of the DAC most positively (4), however in Group 2 foreign owned (2.8) or medium technology (3.33) firms were the other two sub-groups that perceived the impact of the DAC on their employment trends most positively. On the other end of the scale, those firms that are medium sized (1), South African owned (2) or operated with a high degree of technological intensity (0.67) perceived the DAC's impact on their firms' employment levels to be either only slightly positive, or neutral.

6.1.4 Summary: Interrogating key trends

Figure 6.1 below is a graphical summary of the findings that have been discussed thus far. Trends can be compared among the different subgroups according to the firm characteristics (size, ownership and technology) and noteworthy ratings (both high and low) are discussed, drawing from qualitative responses from respondents.

Figure 6.1 Summary of DAC Ratings Stratified by Subgroups



Source: Own calculations based on data captured during the interview process

Note: T= Total sample, G1= Group 1 and G2= Group 2

As is clearly depicted in Figure 6.1 above, on average small firms among all groups perceive the impact of the DAC on their firm-level employment most positively. *Firm B* (6) was the only small firm to experience overall growth – Group 1 – in their employment levels from 2006-2010 and the firm-level representative stated whilst the “outcomes” of the DAC activities impacted on the firms employment levels positively, it was acknowledged this impact was very “indirect”. The representative from *Firm G* (5), also in Group 1, stated that being a member of the DAC had helped the firm “sustain levels of employment during the tough economic times” experienced during the recession. This view explains that whilst the firm did not experience employment *growth* during the period 2006-2010, the impact of the DAC helped reduce the negative impact of the recession on the firm’s employment levels. In a sample where 79% of the firms experienced overall declines in their employment levels from 2006-2010, the perception that the DAC had a positive impact on helping firms to “*sustain*” jobs is particularly relevant. This point is further suggestive by the fact that on average, small firms in Group 2 provided the highest overall rating for the DAC, of 4 (1) – see Figure 6.1 above.

It must be noted that all six small firms in the sample have a low degree of technological intensity in their production which explains the high average ratings depicted in Figure 6.1 above –there are two additional firms with low degrees of technological intensity in the sample both of which are medium in size. These findings are consistent with the research conducted in both developed and developing (see Schmitz 1995 discussed in Section 2.1.4) countries that have shown that small firms in clusters have been able to overcome specific constraints to their growth through the positive benefits associated with industrial clustering (see McCormick 1999, 1533 for an example of the benefits of technological spill-overs). Using networks established in the DAC, *Firm B* was able to expand its customer base that resulted in increased customer orders which helped the firm not only sustain employment levels but grow amidst the challenging market conditions caused by the recession. This example is consistent with the views shared by Knorringa (1999, 1588) who argues that larger clusters in developing countries –as is the case of the DAC– usually consist of a variety of market channels that provide different growth opportunities for small producers.

Following this logic it was interesting to see that the average rating for medium sized firms was smaller than that of the large firms in the sample –with the exception of that in Group 1– where five out of seven of the large firms also had a high degree of technological intensity. Whilst quantitatively this can be explained by the comparatively higher rating provided by firms in Group 1 (2) compared to those in Group 2 (1.25), based on the information gathered in the study, no conclusive qualitative explanation can be provided to substantiate this trend

6.2 Reflections on the Study Findings: Relevance of the findings to the industrial clustering literature

6.2.1 *Cooperation and Crisis*

The contractionary market environment caused by the impact of the recession provided considerable challenges to the local automotive industry that experienced significant decrease in the demand for motor-vehicles. For many firms in the sample, the reduction in customer orders (mean of -1.11) had a direct impact on employment levels. This was coupled with rising factor costs, particularly the electricity tariff increases that were implemented during the same period as the recession. The study provides some interesting insight into how the

member-firm in the DAC addressed these challenges, more importantly it provides examples of varying degrees of joint action among the firms.

The importance of a collective response by clustered firms to an exogenous crisis was discussed by Nadvi (1999, see Section 2.2.6), although the findings from this study suggest that the response of the sampled firms in the DAC to the impact of the recession was not uniformly collective. Both *Firm G* (5) and *Firm E* (3) stated the challenges faced by the recession resulted in them being *inwardly focused* as they tried to “fight internal fires”. Their reduced involvement in the DAC during that time may have resulted in them underutilising the additional support structures generated through inter-firm knowledge sharing or technical support provided at an institutional level. This behaviour is contrary to the examples of collective response to crises discussed in the studies by Nadvi (1999) and Kennedy (1999) where increased inter-firm cooperation was stimulated in response to exogenous crises.

Critically, Kennedy (1999) found that it was the small firms in clusters that benefitted the most from the collective response to crises. However, the impact of industrial clustering on employment levels on small firms in the sample of this study seemed variable: The representative from *Firm O* (0) felt that the firm didn’t experience any positive impact on their employment levels through the DAC during the period 2006-2010. Yet, the representative from *Firm J* (4) stated the knowledge gained through DAC activities helped *sustain* the company during the recession, and *Firm B* (6) was not only able sustain employment levels but *grew* amidst the challenging market conditions caused by the recession, as mentioned in Chapter Five.

Although not explicitly interrogated in this study, the issue of cluster firm heterogeneity as an explanation for differences in firms’ response to crises (as discussed by Knorringa’s [1999] see Section 2.2.6) may well be a plausible explanatory factor in describing various successes and failures of the DAC firms response to the recession –and the resultant effect these responses had on their employment levels. In addition to the spread of sampled firms along size, type of ownership and degree of technological intensity described above, heterogeneity among the sampled firms in this study are prominent in three other characteristics:

- Differing levels in the local automotive supply chain (the sample included tier 1, tier 2 and tier 3 suppliers),

- The types of products (parts and components) they provide to the local automotive industry,
- And thirdly, the firms sampled also varied in the proportion automotive-related production represented in their total production.

It is possible that the third point may strongly influence a firm's willingness to address crises collectively. For example, a firm where automotive-related production contributes a small proportion of their overall production may feel the need to respond collectively to an automotive industry related crises *less* than that of a firm whose production is largely automotive-industry related.

The conclusion drawn from this discussion is that the challenges created by the recession may very well have had very different implications for the various member firms in the sample, a plausible explanation for which can be expressed by the heterogeneity of the firms within the sample. In turn, the heterogeneity may very well explain the variation in the need for joint action by the firms sampled. The six strategic programmes discussed are examples of successfully initiated joint action among the member firms in the DAC. The individual focus on each of the six programmes (see Section 3.3.3) was strategically identified by both private and public partners in the DAC, as crucial to achieving the long-term strategic objective of the KZN regional automotive industry which is to double its size by 2020. However the nature and extent of the pressures of the recession, particularly the large declines in customer orders many firms faced, may have forced firms to be inwardly focused, suggesting collective action may have had little impact on the decision to reduce labour headcount.

6.2.2 External economies: The agglomeration effect, a diluted impact on employment

As mentioned in Section 5.4.2 above, 90% of the sampled firms believe a natural agglomeration effect exists within the local automotive industry. Critically, the agglomeration effect lies at the heart of the founding principles of industrial clustering with the opportunity of passive advantages gained due to spatial proximity of sectorally homogenous firms (see Marshall's (1920) in Section 2.1.1). Based on the responses from both firm-level and DAC representatives, it is clear the most prominent external economies enhanced by the natural agglomeration and existence of the DAC are *market access*, the *pooling of skilled labour* and

the *dissemination of knowledge*. Critically, the existence of the DAC in an institutional and administrative capacity has strengthened inter-firm communications both formally and informally, assisting the generation of these external economies.

With regard to market access, the existence of the DAC provides an opportunity for firms to market their capabilities to other member-firms –particularly on an informal basis– which has resulted in opportunities for new business among some of the sampled firms. As the representative from *Firm M* suggests:

...through the cluster you meet representatives from other member firms who need what you are producing.

The pooling of critical skills was a frequently mentioned positive external economy by the respondents. The agglomeration effect in the DAC has helped pool critical skills in the area. It emerged that a critical source for the pool of labour is indeed Toyota:

Toyota's investment in skills development has created a very large pool of skilled labour... many of which end up working for other firms. (*Firm I*)

However it is important to note, the pooling of skilled labour was not seen as uniformly positive by all the respondents as the following view suggests:

There is a *poaching* more than *pooling* of labour. Especially at the higher skilled levels where the pool is very small (*Firm P*)

The dissemination of knowledge was highlighted by the respondents as an important positive external economy stimulated by the agglomeration effect. The representative from *Firm S* elaborated as follows:

Firms operating in the same area have become aware of each other's existence, best business practises and as a result have been able to share ideas and sometimes common interests.

Critically, inter-firm communication enhanced by the existence of the DAC has assisted mutual learning among member-firms, even though they may have not had direct business relations together.

Whilst positive external economies have occurred as a result of the natural agglomeration effect, the perceived impact it has on firm-level employment is less promising. As illustrated in Figure 5.5 67% of the respondents believe the natural agglomeration effect has no impact on firm employment levels. The link between the natural agglomeration effect (and the resultant external economies) and firm-level employment was frequently cited as either less critical in relation to other influential factors such as customer demand, for example, or simply *too indirect*. The majority of the 33% that believed the natural agglomeration effect *did* impact on employment levels stated the impact was *very indirect*, but had a positive impact on customer-supplier business relations among the member-firms.

6.2.3 Competitiveness and employment: Are the dots linked?

A driving force behind the emergence of the cluster literature was derived by studies promulgating the importance of industrial clustering for firm- and industry-level competitiveness. Porter's (1998) work on industrial clustering was pioneering in this regard as he acknowledged the shifting nature of modern competition away from a Marshallian focus on scale economies, towards a specific focus on productivity and *how* firms choose to compete. As Schmitz & Nadvi (1999) stated in the World Development Special issue *Clustering and Industrialisation*, clustering can (and has) played an important role in firms in developing economies overcome growth constraints and compete in international markets. The links between the need to improve competitiveness and the opportunity for developmental outcomes for firms and industries in developing countries has been clearly articulated (for example, some of the case studies that were discussed in Chapter Two). However the crucial question for this study is what the resultant implications are for employment levels, given that unemployment is one of South Africa's critical developmental challenges.

The eleven firms that perceived the impact of the DAC on their firm-level employment positively all provided examples of how positive external economies (knowledge spill-overs or access to new markets for example) or DAC related activities (benchmarking, supply chain

development and localisation programmes for example) assisted their firms either sustain or grow employment levels over the 2006-2010 period. The representative from *Firm I* (3) stated the DAC “helped *secure employment* more than assist employment growth” through improved productivity achieved from lessons learnt from the benchmarking exercises.

However, an issue that emerged prominently in the firm-level responses was the apparent disjuncture between the increased competitiveness achieved as a result of the DAC and the resultant level of employment. For example, the respondent from *Firm S* (0) believes the DAC plays a significant role in assisting firms become aware of their competitive position in relation to other firms, enabling them to adopt systems that will improve their own competitiveness. Similar notions were adopted by half of the firms that provided a neutral rating for the DAC in the Likert-Scale results. However, most did not make the link between the increased competitiveness and a resultant impact on firm-level employment –either positive or negative. It can then be argued that the perceived impact of the DAC on firm-level employment at these firms is simply *too indirect* for direct linkages to be made by the respondents.

6.3 The Government: Suggestions for a key actor

6.3.1 *Facilitating a public-private partnership*

The most meaningful role of the DAC is to educate government on what is required to create jobs. There is a disconnect between the language of the public sector and the private sector... the government says we need to *create jobs* through industry, whilst for the private sector the focus is profit objectives... government must find a way to manipulate private-sector objectives to generate employment growth... they are not understanding this well at the moment... an organisation like the DAC can provide a platform to better coordinate communication in this regard... (*DAC 2*)

Question Six in the questionnaire (Annexure 1) provided a platform for the respondents to provide any *additional* comments with regard to the DAC as an institution and their impact on firm-level employment. A major theme that emerged from these responses was the role of the DAC in facilitating the relationship between the public and private sectors. The quote above suggests an important role the DAC plays in coordinating the relationship between the public and private sectors. The majority of firm-level responses indicated that the relationship between the firms and local government had been successful in many regards. Crucial to this success has been the ‘collective voice’ of the DAC member-firms that have helped negotiate a better deal with local government to assist the local automotive industry. Three respondents (two firm-level representatives and one DAC representative) believed a larger annual budget from the local government would allow the DAC to have a more *direct* impact on employment level. The DAC’s total annual budget for (the year end 31 December) 2010 was R3.4 million (DAC 2010). It was argued that a larger budget would be largely beneficial, particularly for the small firms, as the impact of the DAC on firm-level employment has been perceived to be *very indirect* by the majority of the respondents.

The motivation for a larger annual budget needs to clearly incorporate both public (job creation) and private (profit maximisation) objectives. The DAC clearly seeks a greater role in facilitating communication between its public and private partners, reducing the disjunction between these two objectives. In doing so a motivation for a larger annual budget could be strengthened as the funds would better service the objectives of both partners.

Reflecting on the findings from the study, some important considerations have emerged for both local and national governments, with particular implications for South Africa’s industrial policy.

6.3.2 Suggestions for local government: Making it work at the grass-roots level

Operating at the grass-roots level of government and their role as active partners in the DAC, the eThekini municipality plays a key role in ensuring the success of the local automotive industry. Reflecting on the Likert-Scale results in Chapter Five, the local government clearly needs to address factors that have had a negative impact on employment growth in the local automotive industry. For example, the negative impact of factor cost (electricity, municipal rates and water prices) on firm-level employment by better understanding how these

decisions impact on the local industry. This is not to argue that factor costs should not increase, but rather by engaging with industry prior to enforcing these decisions, the local government could mitigate this negative impact on industry and employment growth.

For a direct response to the need to stimulate employment growth in the local automotive industry, the following two initiatives could be considered: Firstly, the DAC could engage with local government to identify the key labour-intensive components of a vehicle. Once these components have been identified, direct and deliberate support could be provided to both new and existing firms involved in the production of these components in order to maximise opportunities for employment growth. Such an initiative is in line with the NIPF vision of the promotion of a more *labour-absorbing* industrialisation path.

Secondly, the members of the DAC could prioritise a strategy to attract new customers to the region. Whilst the DAC firms do supply a selection of the major OEMs operating in South Africa, currently Toyota SA is a dominant customer in the KZN automotive industry.

Attracting new customers to invest in the local automotive industry could result in various positive opportunities:

- Firstly, expanding the existing customer base would reduce the risk of reliance on one major customer for existing firms in the DAC and;
- Secondly, new customers would increase order volumes that were perceived by the respondents in the study to have a very direct impact on firm level employment; and
- Thirdly, the emergence of new market opportunities would benefit existing suppliers, who could use the opportunities to grow their own firms, whilst also attracting new suppliers who are attracted to the region.

To ensure the success of such initiatives, both public and private partners in the DAC have important roles to play:

- First, the eThekweni municipality needs to demonstrate they both understand the needs of the local automotive industry and that they are willing to act on these needs to assist the local industry grow.
- Secondly, the existing firms within the DAC need to first clarify and then deliver on a defined cluster *identity* that is aligned to their competencies, from which to market local industry to other major OEMs. For example, the DAC could market the

production of *quality* parts and components and a *safe and strategic location* for OEMs to expand into emerging African markets.

In both these suggestions it is the growth of the local automotive industry that will generate opportunities for employment growth.

6.3.4 Suggestions for national government: Keeping their eyes on the road

The continual success of the KZN automotive industry is important motivation for the continuation of government's sectoral and geographic focus that underpins South Africa's industrial policy approach. However there is a danger that South Africa's industrial policy vision is disjointed by the actual needs and challenges faced by industries at the grass-roots level. Some of the constraints to employment growth noted by the sampled firms in the DAC indicate key macro-constraints that need to be addressed at a national level.

It is clear from the findings in this sample that the trade unions are perceived to have a very negative impact on the firm level employment. The main concern expressed by the firm-level respondents were: their inflexibility in labour-related concerns; unwillingness to work with the firms to create creative solutions to try enhance firm-level employment growth; and the generally poor understanding by trade union representatives of how firms work at an operational level. The DAC can have a more collective response to address the last two concerns by facilitating engagement with the trade unions and their representatives to try address these last two concerns in particular.

Similarly, the DAC could think of enhancing streams of communication with government to explain issues around inflexibility of the labour market policies. Crucially communications would be grounded by balancing the importance of issues of employment equity and equality with industry specific needs of the local automotive industry. However, unpacking the complexity of such a task is beyond the scope of this paper.

Labour capabilities in relation to labour cost and critical skills availability, were two other variables that were perceived to have a very negative on firm-level employment. The DAC currently actively engages in skills development and training initiatives and the majority of the sampled firms have in-house training programmes for new employees. The continuation

of such programmes is an important initiative required to address the supply-side concern of low productivity levels that coupled with comparatively high wages, reduce the local automotive industry's competitiveness internationally. However, there is a critical need to adequately address South Africa's supply-side constraints to employment. The struggling manufacturing sector discussed in Chapter Three cannot grow if scarcity of critical skills and poor worker-productivity persist.

On the other hand, the MIDP was on average perceived to have the most positive impact on firm-level employment among the sampled firms and it is well documented in the relevant literature to have played a critical role in the survival and growth of the automotive industry in South Africa. The findings generated therefore support the government's extension of the MIDP to 2012, and its replacement with a similar, sector-specific program, the APDP. Critically, national government and industry stakeholders need to consider the important role of the APDP, which will take over from the MIDP in 2013.

According to Ellis (2008), the APDP will be a 'market neutral programme' benefitting the local automotive industry in general and not certain sectors to the detriment of others. Crucially, the APDP is geared to encouraging increased local value addition. This should lead to a growth of the local auto industry, not only at a 1st tier level but also at the 2nd and 3rd tier level (Ellis 2008). The support provided by the APDP will assist the local auto industry through to 2020 which should assist with long-term strategic planning. The DAC has an administrative role to ensure that all member firms have full understanding of the ADPD and the resultant implications for their respective firms.

6.3.5 Purposive clustering: Motivation for a relatively inexpensive tool to facilitate employment growth

There is however a crucial lesson to take from the success of the MIDP and the DAC with regard to their impact on firm-level employment. Whilst the importance of the MIDP (and the ADPD from 2013 to 2030) to the survival of the local automotive industry is immense, so too is the cost to fund the programme. The MIDP subsidies that have helped the South African automotive industry to survive and grow since 1995 are large. From 1996 to 2003 automobile producers received and used import rebate credit certificates worth over R55 billion

(nationally) – in 2002 and 2003 alone their value exceeded R15 billion per year (Flatters 2005, 4).

Reflecting on the findings of this study, the impact of the MIDP (3.11) was rated on average to have had a 0.79 more positive impact on firm-level employment than the DAC (2.32) during the period 2006 to 2010. However the financial cost of running the DAC (annual budget roughly R3.4 million) is considerably less than that of the MIDP (mentioned above). Whilst this does not in any way wish suggest the two initiatives are substitutable, it does suggest an important lesson to government: Purposive industrial clustering has achieved a positive impact on firm-level employment in the KZN automotive industry with a considerably smaller financial cost compared to other variables, notably the MIDP.

This point is a motivator for two further suggestions: Firstly, a *larger* budget for the DAC, which based on the firm-level responses captured in this study, would allow the DAC to have a more *direct*, positive impact on firm-level employment for the member-firms in the KZN automotive industry. Secondly, it encourages the establishment of more purposive clusters in South Africa within the ambit of a sectoral and geographically specific industrial policy strategy.

Chapter Seven

Concluding remarks

The purpose of this chapter is to summarise the key findings of the research. Over the past two decades research on industrial clusters have shown that industrial clustering assists firms – particularly small firms – overcome constraints to growth and compete in global markets. In doing so, clustering stimulates positive industrial development, and by implication creates employment opportunities. This study has consequently attempted to interrogate the developmental impact of industrial clustering by determining whether the role it plays in improving industry growth has positively impacted on employment growth in a regional automotive industry. Using the DAC as a case study, the primary objective of this research is to interrogate the impact of industrial clustering on firm-level employment. Studies explicitly focusing on the impact of industrial clustering on employment are very limited, and it is hoped that the findings of this study provide impetus for further research, thereby expanding the pool of relevant case material.

7.1 Hard Data: Evidence of a bruising period for the local automotive industry

The employment data for the period 31 December 2006-2010, as gathered from the sampled firm-level representatives, was intended to provide a set of hard data that could be used as a reference point to ground the study findings. With 79% of the sampled firms experiencing overall declines in their employment levels during the studied period – due primarily to the negative impact of the 2008/2009 recession on the industry–, the study had to shift focus from interrogating the impact of industrial clustering on employment *growth*, to interrogating its direct and indirect impact on firm-level employment.

Having established general trends of firm-level employment among the sampled firms, a key objective of the study was to determine the nature and extent of the impact of the DAC on the firms' employment profiles in relation to a range of fourteen variables identified as critical to employment in the industry. In effect, these fourteen macro, meso and micro-level variables functioned as a control for defining the impact of the DAC on employment levels in the regional automotive industry. Whilst there are too many variables impacting on employment trends at any one firm to determine a direct relationship between the activities of the DAC

and employment creation and/or loss at the firms, by juxtaposing each variable in relation to one another using a Likert-Scale, the relative importance of the DAC is made explicit.

7.2 The MIDP & DAC: Most positive impacts on firm-level employment

It [the MIDP] is the sole reason the company grew from 2004 to 2008 (*Firm R*)

Based on the Likert-Scale results, the MIDP was perceived to have the most positive impact on firm-level employment over the period 2006-2010, with an average rating of 3.11 (std. dev. 3.53). This result is unsurprising as the MIDP has played an integral role in ensuring both the survival and successes achieved by the South African automotive industry. Without it, the local automotive industry would in all probability be exponentially smaller than it is today.

The DAC was perceived, on average, to have the second most positive impact on the sampled firms' employment levels over the five year period, with an overall average of 2.32 (std. dev. 2.47). Although positive, the impact of the DAC on firm-level employment was perceived by the majority of the sampled firms as being *very indirect*. For eight of the sampled firms the impact was simply too indirect, warranting a neutral response on their employment levels. Very positively, no firms viewed the DAC's activities as having a negative impact on their employment.

Once the nature and extent of the impact of the DAC on firms' employment profiles had been established in relation to other key variables the study attempted to determine whether industrial clustering had fostered a more or less positive employment dynamic in larger or smaller firms, local or foreign owned firms, or higher versus lower technology firms.

7.3 Clear Positive Impact for both Small Firms and Firms with Low Degrees of technological Intensity

Once the sample had been grouped according to overall employment trends over the period 2006-2010, the process of stratification indicated that on average, small firms and firms with low technological intensity in their production perceived the impact of the DAC most

positively. Due to the small sample size, these findings are merely *suggestive*. However they are aligned with empirical evidence that suggests such firms may benefit more from positive externalities and joint action achieved through industrial clustering (see Nadvi & Schmitz [1999] special issue in *World Development*). The results for the DAC when stratified according to ‘type of ownership’ provided no significant quantitative trends across the two groups. In addition, no qualitative data were provided from the firm-level responses to substantiate a link with industrial clustering and the type of ownership. This leaves an opportunity for more focused study interrogating the relationship in greater detail, although it may indicate that in an increasingly globalised industry, like the automotive industry, ownership is not a defining criterion of industry success. In other words, South African owned firms have to operate at the same standards as their multinational counterparts.

The study then focused on determining what activities or attributes of the DAC have assisted firm-level employment growth.

7.4 Beneficial Activities and Attributes of the DAC & the Impact of the Agglomeration effect on Firm-level employment

Firm-level benchmarks, supply chain development and the localisation programme were identified by the firms as the top three most beneficial activities of the DAC for firm-level employment. All three of these activities are administered by an institutional arm of the DAC. The supply chain development and localisation programmes are examples of positive outcomes emerging from the DAC as a result of joint action in response to challenges firms face in achieving core industry growth objectives. The positive impact of the benchmarking activities had direct benefits for individual firm-level competitiveness and growth that firms then acknowledged as having had a positive –albeit indirect – impact on employment. The impact of the supply chain development programme was similarly viewed by firms. It gave firms the opportunity to upgrade their capabilities, which in turn result in positive spin-offs for their employment levels. The localisation programme is perceived as positively impacting on firm employment levels through its impact on increased customer orders as suppliers benefit from large customers increasing their demand for local content. The majority of firm-level representatives described how customer orders had a very direct impact on their demand for labour.

The paper then explored the existence and impact of the natural agglomeration effect on firm-level employment. Whilst an overwhelming majority of the respondents acknowledged the existence of a natural agglomeration effect in the local automotive industry, 67% of the respondents believed it has no impact on firm-level employment. The link between the natural agglomeration effect (and the resultant external economies) and firm-level employment was frequently cited as either *less critical* in relation to other influential factors such as customer demand, for example, or simply *too indirect* to relate directly to their employment trends.

Some firms –particularly small firms– believed the DAC could have a more *direct* impact on employment levels with a larger annual budget from the local eThekweni municipality. The dynamics of the public-private partnership in the DAC are unpacked (see Chapter Six) and the study argues the motivation for a larger annual budget needs to clearly incorporate both public (job creation) and private (profit maximisation) objectives. The DAC should seek a greater role in facilitating communication between its public and private partners, reducing the disjunction between their two objectives. In doing so a motivation for a larger annual budget could be strengthened as the funds would better service the objectives of both partners.

7.5 Suggestions for Government: Strengthening synergies between national and grass-roots levels

Lastly, the paper provided suggestions for both local and national government. Reflecting on the most negative variables that emerged from the Likert-Scale results, it is clear that government needs to better understand the implications of these variables on the growth and development prospects of local industries. It is then suggested that the DAC member-firms start collectively engaging government as “one voice” to address such concerns. In a sense the DAC could play a facilitatory role that enhances the communication between public and private sectors in order to ensure both parties better align their objectives.

In conclusion, this paper attempted to contribute to the industrial clustering literature at both an empirical as well as theoretical level. Empirically, the DAC is one variable amongst many

that impacted on employment levels on the firms in the sample during the period 2006 to 2010. During this period the local automotive industry was put under severe strain as the global financial crisis in 2008 and 2009 negatively impacted on the demand for motor vehicles both globally and locally. This resulted in the reduction in order volumes for the firms in the sample, the majority of which experienced overall declines in their employment levels from 2006 to 2010. The evidence from this study suggests the DAC had a positive, albeit indirect, impact on the employment levels at the sampled firms. Specifically, the activities of the DAC appear to have supported many firms in the sample to *sustain* their employment levels through improved competitiveness during the tough economic conditions evident over the period 2008-2009.

Theoretically, the study shows industrial clustering of the purposive kind can have a positive impact on employment. Further, it appears to represent a low risk, low cost opportunity for firms to benefit from the positive external economies such as knowledge spill overs and pooling of skilled-labour. This is of particular importance for small firms, as well as firms with low degrees of technological intensity that stand to benefit most from these spill-overs. Secondly, the study highlighted the opportunity purposive clustering provides for strengthening firm cooperation through joint action. Critically, firms in a purposive cluster have the advantage of acting collectively to facilitate learning processes and align activities whilst also bolstering communication with government. Such communication is vital for firms to provide a platform from which the critical micro, meso and macro issues, that impact on firm-level growth and employment levels, can be addressed. This study interrogates the major positive (MIDP) and negative (labour market policies) impact of these variables providing incite on the *extent* and *nature* of their impact on firm-level employment among the firms in the DAC.

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Appendix

Annex 1: Questionnaire



Does industrial clustering have an impact on firm-level employment? A case study of the Durban Auto Cluster (DAC)

Dear respondent

Please note that this research is being conducted under the supervision of Professor Justin Barnes and will be used both for my Masters' dissertation at the School of Development Studies, UKZN, as well as to provide feedback on the research findings to the Durban Automotive Cluster. All individual responses attained from this questionnaire will be aggregated to ensure anonymity in my final dissertation and DAC report.

Yours sincerely

Sean Kirby

Email address: sagkirby88@gmail.com

1. Please provide your firm's total aggregated employment levels on the 31st of December for each of the following years:

Year (on 31 st of December)	Employment level (FTEs)*	Major reason(s) for Change in Employment Levels
2010		
2009		
2008		
2007		
2006		

* FTE = Full Time Equivalents: the total number of employees at the firm, including part time workers, with their fractional time at the company converted into a portion of a FTE. Two workers employed on 50% employment contracts would, for example, be equivalent to 1 FTE employee.

2. Using a rating scale from -10 to 10, please provide your perceptions of the impact the following 15 variables on employment-levels within your firm for the period 31 December 2006-2010. Please note that **10** = a critical positive impact on employment levels, **5** = a clear positive impact on employment levels, **0** = no impact (neither positive nor negative), **-5** = a clear negative impact on employment levels, and **-10** = a critical, destructive impact on employment levels

Variable	Rating	Comments
1. South African labour market policies		
2. Labour capabilities in relation to cost		
3. Management capabilities in relation to cost		
4. South African trade policies and tariffs		
5. Exchange rates		
6. Interest rates		
7. Motor Industry Development Programme		
8. Durban Automotive Cluster		

9. Factor cost movements (electricity, water and rates)		
10. Critical skills availability		
11. Trade Unions		
12. Customer supply chain development processes		
13. Customer orders		
14. Parent company or licence support		
15. Adoption of new technologies		

3. What activities/attributes of the DAC have supported employment growth in the regional automotive assembly and components industry over the period 2006 to 2010? List the three most important factors **in order of importance**.

Three most important factors	Comments
1.	
2.	
3.	

4. Hypothetically, if the DAC had not existed over the period 2006-2010, what would the impact have been on your firm's employment levels over this time period? Indicate the affect as either a *positive, neutral or negative* percentage change in the firm's employment levels.

Hypothetical % change (positive, neutral or negative)	Comments

5. The clustering literature suggests that a concentration of firms in a locality derive natural external economic benefits from their common location (an agglomeration effect). Do you believe that such an agglomeration effect exists for the automotive industry in Durban/Pietermaritzburg? Has it impacted on your employment levels, and finally, has the DAC as an institution positively enhanced this agglomeration effect?

Cluster issue	Response	Comments
Does a natural agglomeration effect exist in the local auto industry?	Yes or No	
If yes, has the natural agglomeration effect impacted on your employment?	Yes or No	
Has the DAC enhanced any natural agglomeration effect?	Yes or No	

6. Would you like to make any additional comments in respect of the DAC as an institution and its impact on your firm's employment levels?

Thank you for your time.