

**CLUSTERING AS A STRATEGY FOR MANUFACTURING
PERFORMANCE IN THE EASTERN CAPE AUTOMOTIVE
INDUSTRY**

**THESIS
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by

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DECLARATION

Except for references specifically indicated in the text, and as such help as I have indicated, this thesis is wholly my work and has not been submitted for degree purposes at any other university.

GC Makuwaza

Grahamstown

January 2001

ABSTRACT

South Africa's current industrial policy focuses on the economy at two levels: a sectoral and spatial level. The former relates to the manner in which industrial policy is concentrating on particular sectors i.e. industrial clusters. This shift in industrial policy from targeting individual industries to an emphasis on industrial clusters, has complemented the change in focus to export promotion under trade policy. Furthermore, there has been increasing recognition of the need to improve industry performance and competitiveness in order to successfully implement export growth.

Industry clusters are considered as having the potential to increase manufacturing performance and can provide the basis for sustainable competitive advantage for nations. Consequently the concept of industry clusters was introduced in South Africa in 1997. Because industry clusters are relatively new in South Africa, most of the cluster initiatives in various sectors of the economy are in their early stages of development. Nevertheless, some are already showing signs of potential success in increasing competitiveness in particular sectors.

This thesis uses Porter's "diamond" framework approach to investigate whether clustering has improved the manufacturing performance of the motor industry in the Eastern Cape. International experience from both developed and developing countries will illustrate the potential of clustering as a powerful strategy in increasing manufacturing performance and consequently competitiveness. Ultimately this should lead to long-term economic development, especially if government adopts cluster-based economic development policies.

Information from a survey conducted on both the motor vehicle assemblers and component suppliers is used in this study. The findings reveal that it is mainly the motor vehicle assemblers who have experienced some improvements in manufacturing performance. The components sector on the other hand has not experienced any such improvements.

This thesis concludes with the recommendation that it is important to develop cluster policy as a broader and dynamic view of competition. The main emphasis under such policy would be a move from targeting particular industries and providing subsidies towards focusing attention to all clusters in the economy. To effectively apply such a policy requires the repositioning of national, local and provincial government in order to become more involved in regional development issues. Moreover, the various levels of government need to incorporate cluster policy into their competitive strategies.

TABLE OF CONTENTS

	Page
Abstract	iii
List of Tables	xi
List of Figures	xii
Acknowledgements	xiii
Dedication	xiv
CHAPTER 1: INTRODUCTION	
1.1 Background	1
1.2 Problem Statement	2
1.3 Objectives of research	3
1.4 Methodology	4
1.5 Outline of thesis	5
CHAPTER 2: THEORY OF INDUSTRY CLUSTERING	
2.1 Introduction	7
2.2 Defining industry clusters	8
2.3 Literature Review	15
2.3.1 Modern applications of industry clustering	15
2.3.1.1 Porter's "diamond" framework	15
2.3.1.2 The "diamond" as a system	19
2.3.1.3 The "diamond" framework and growth centres	20
2.3.1.4 Other recent contributions to cluster theory	21
2.3.2 Theoretical foundations of clustering	24
2.3.2.1 External Economies	24
2.3.2.2 Co-operative competition	35
2.3.2.3 Rivalry	43
2.3.2.4 Path Dependence	44
2.3.2.5 The Innovation Environment	46

2.4 Role of government in regional clusters	50
2.4.1 Government and cluster upgrading	50
2.4.2 Cluster-based policy	52
2.5 Industry clusters for economic development	55
2.5.1 Evaluation and critique of industry cluster policies	58
2.6 Conclusion	60

CHAPTER 3: INTERNATIONAL EXPERIENCE WITH INDUSTRY CLUSTERS

3.1 Introduction	62
3.2 Silicon Valley in the USA	62
3.2.1 Introduction	62
3.2.2. Factor conditions	63
3.2.3 Supporting and related industries	65
3.2.4 Demand conditions	70
3.2.5 Firm structure, strategy and rivalry	71
3.2.6 Social capital in Silicon Valley as a means to economic development	74
3.3 Sinos Valley in Brazil	77
3.3.1 Introduction	77
3.3.2 Factor conditions	78
3.3.3 Supporting and related industries	79
3.3.4 Demand conditions	82
3.3.5 Firm structure, strategy and rivalry	84
3.3.6 Social capital in Sinos Valley as means to economic development	87
3.4 Arizona in USA	89
3.4.1 Introduction	89
3.4.2 Factor conditions	91
3.4.3 Supporting and related industries	92
3.4.4 Demand conditions	93
3.4.5 Firm structure, strategy and rivalry	94

3.4.6 Social capital in Arizona as a means to economic development	95
3.5 Conclusion	96

CHAPTER 4: CURRENT MACRO & REGIONAL POLICIES REGARDING CLUSTERING IN SOUTH AFRICA

4.1 Introduction	97
4.2 Background to the South African Cluster Initiatives	98
4.2.1 The Spatial Development Initiative (SDI) Programme	99
4.2.2 Industrial Development Zones (IDZs)	102
4.2.2.1 IDZs in the Eastern Cape	103
4.3 Role of the Department of Trade and Industry in the cluster process	104
4.3.1 Industrial clusters	105
4.3.2 Cluster Secretariat	106
4.4 Examples of cluster initiatives in South Africa	108
4.4.1 Introduction	108
4.4.2 The Saligna Hardwood Furniture Cluster Initiative	109
4.4.3 The Capital Equipment Cluster Initiative	113
4.5 Conclusion	116

CHAPTER 5: THE EASTERN CAPE AUTOMOTIVE CLUSTER

5.1 Introduction	118
5.2 Historical background to the South African Automotive Industry	119
5.2.1 Local content programmes in the automotive industry	120
5.2.2 The impact of local content programmes on automotive industry	123
5.3 Motor Industry Development Programme (MIDP)	124
5.3.1 Policy instruments of the MIDP	125
5.3.1.1 Tariff reductions	125
5.3.1.2 Fewer models and higher volumes	126
5.3.1.3 Upgrading industry capacity	127

5.4 Automotive industry in the Eastern Cape	127
5.4.1 Delta	127
5.4.2 Volkswagen	128
5.4.3 DaimlerChrysler	129
5.4.4 The component sector	129
5.4.5 Impact of the MIDP on the Eastern Cape Automotive Industry	130
5.4.5.1 Exports	131
5.4.5.2 Imports	134
5.4.5.3 Investment Trends	135
5.4.5.4 Employment Trends	135
5.4.5.5 Labour Relations	136
5.4.5.6 Tariff Reductions	137
5.4.5.7 Relations between OEMs and component manufacturers	138
5.4.5.8 Market Characteristics	140
5.5 Formation of the Eastern Cape Motor industry cluster initiative	142
5.5.1 Introduction	142
5.5.2 Regional focus of the motor industry cluster initiative	144
5.5.3 Objectives of the Eastern Cape Cluster Initiative	145
5.5.4 The structure of the cluster initiative	146
5.5.4.1 The Strategic Investments Project Team	148
5.5.4.2 The Human Resource Development Project Team	149
5.5.4.3 The Logistics Project Team	152
5.5.4.4 The Supplier Development Project Team	155
5.6 Conclusion	157

CHAPTER 6: ROLE AND ANALYSIS OF THE AUTOMOTIVE CLUSTER AS A VEHICLE FOR MANUFACTURING PERFORMANCE

6.1 Introduction	158
6.2 The motor vehicle assembly industry	159
6.2.1 Relationships of assembly firms with suppliers	159
6.2.2 Market-area for assembly firms	162
6.2.3 Inter-firm competition	163
6.2.4 Inter-firm co-operation	165
6.2.5 Associations affiliated to assembly firms	166
6.2.6 Assembly firms' views on Government Policy	167
6.2.7 Impact of cluster initiative on assembly firms	168
6.3 The component sector	170
6.3.1 Relationships of component firms with suppliers	172
6.3.2 Market area for component firms	174
6.3.3 Inter-firm competition	177
6.3.4 Inter-firm co-operations	178
6.3.5 Associations affiliated to assembly firms	179
6.3.6 Component firms' views on Government Policy	180
6.3.7 Impact of cluster initiative on component firms	181
6.4 Analysis of survey	183
6.4.1 Factor conditions	184
6.4.2 Related and supporting firms	189
6.4.3 Demand conditions	192
6.4.4 Firms structure, strategy and rivalry	193
6.5 Social capital in the Eastern Cape's motor industry as a means to economic development	196
6.6 Summary and Conclusion	198

CHAPTER 7: CONCLUSION	
7.1 Introduction	199
7.2 Overview of argument	199
7.3 Future role of cluster initiatives in the motor industry	201
 APPENDIX 1	 204
APPENDIX 2	211
 BIBLIOGRAPHY	 213

LIST OF TABLES

	Page
Table 5.1 Ownership changes at South African OEMs	122
Table 5.2 Exports of motor vehicles and parts 1990-1998	132
Table 5.3 Imports of motor vehicle parts 1991-1999	134

LIST OF FIGURES

	Page
Figure 2.1	Porter’s “diamond” of competitive advantage 16
Figure 2.2	Equilibrium for: (a) firm not in a cluster; (b) firm in a cluster 41
Figure 6.1	Distribution of component suppliers to assembly firms 161
Figure 6.2	Market distribution of assembly firms 163
Figure 6.3	Areas of cooperation between assembly firms 165
Figure 6.4	Government policies that could have increased cluster effectiveness 168
Figure 6.5	Impact of cluster initiative on assembly firms 170
Figure 6.6	Nature of ownership of component firms 171
Figure 6.7	Distribution of raw material suppliers to component firms 173
Figure 6.8	Primary market for component firms 175
Figure 6.9	Market distribution for component firms 176
Figure 6.10	Location of competitors to component firms 177
Figure 6.11	Areas of cooperation between component firms 179
Figure 6.12	Government policies that could have increased cluster effectiveness 181
Figure 6.13	Impact of cluster initiative on component firms 182

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DEDICATION

This thesis is dedicated to the memory of my father

Basil, Gilbert, Pasihapaori Makuwaza

(1946-2000).

"You nurtured the spirit of learning in us and you were a constant source of inspiration. Thank you for all the love, support, guidance and blessings which you gave to us."

Rest in Peace.

CHAPTER 1

INTRODUCTION

1.1 Background

The main goal of industrial policy in South Africa is to raise the levels of industrial investment, performance and exports (CSIR, 1998: 1). One of the key policy elements to this end is industrial clustering. Since 1997, the Department of Trade and Industry (DTI) has facilitated a series of cluster initiatives, a number of which are apparently showing success.

Industry clusters are essentially concentrations of competing and related firms. Basically industry clusters bring together both the firms, which produce final products, with their suppliers, and contractors that constitute supporting and related firms. At the same time clustering attracts the economic infrastructure of an industry such as specialised business services, human resources and education institutions. Together this critical mass of competing and related firms contributes to the overall competitiveness of an industry. Industry clusters work on the premise that the most successful business centres are economic systems where co-operation as well as competition are evident. Firms in a cluster therefore co-operate at industry level while competing at firm level.

The Industrial Strategy Project (ISP) initiated in South Africa in 1990 was aimed at supporting the development of industrial policy (CSIR, 1998: 1). It revealed that South Africa has not been an attractive location for foreign investment. The poor performance of South Africa's manufacturing sector was one of the major issues that compounded the problems facing the South African economy. The manufacturing sector in particular was noteworthy in its inability to create jobs or produce commodities that satisfied the divergent needs of the domestic or the international market (Dunne & Morris, 1999: 3). One of the most conspicuous manufacturing industries in the ISP survey was the automotive industry, which like most industries in South Africa, had developed under a long history of import substituting industrial policy (ISI). For the motor industry this took the form of a series of local content programmes aimed at increasing a vehicle's

local content whilst rapidly increasing the prices of imported fully built up (FBU) vehicles. Although this encouraged foreign motor manufacturers to establish assembly plants in the country, it also led to an uncompetitive motor industry serving a captive domestic market (CSIR, 1998: 1).

With South Africa's increasing participation in the world economy since the late 1990s, however, the government has embraced global trends towards reduced trade barriers. The landmark event was the government becoming a signatory to the World Trade Organisation (WTO) Treaty in 1994, in which it is bound to lower both tariff and non-tariff trade barriers. Consequently there has been a shift in trade policy from import substituting industrialisation (ISI) to trade liberalisation, with a strong focus on export promotion (Dunne & Morris, 1999: 3). In the motor industry, the elements of trade liberalisation have been embodied in the Motor Industry Development Programme (MIDP), which has exposed the industry to stiff competition from imports, especially fully built up units, as well as various components.

It is under these conditions that the South African motor industry is competing both nationally and internationally. This study will focus on the Eastern Cape industry, which contributes 39,9% of the country's total output of motor vehicles (IDC, 1997: 4). In order to capitalise on the current focus on export promotion, under industrial and trade policy, the industry has to improve its competitiveness by upgrading its manufacturing performance. It is instructive to note that current industrial policy also focuses on the economy at both a sectoral level (industrial clusters) and spatial level (spatial development initiatives). This thesis will concentrate on the former in investigating the potential for clustering to spawn increases in manufacturing performance. A particular focus will be on the Fish River Motor Industry Cluster Initiative, established in April 1998 to enhance the motor industry's competitiveness.

1.2 Problem statement

As stated above the motor industry in the Eastern Cape has developed under a highly protected environment. This inward orientation of industrial policy under the previous government led to high cost structures and low volumes in the industry. Ultimately this

has circumscribed the competitive ability of the motor industry, given the recent industrial policy, which places emphasis on international competitiveness achieved through increased exports.

Undoubtedly the industry forms the backbone of manufacturing in the Eastern Cape, contributing almost 50% of the total value added of goods manufactured in the region (Hosking, 1999: 8) and employing 24,1% of the province's labour force (IDC, 1997: 4). The industry is concentrated in two metropolitan areas: Port Elizabeth-Uitenhage and East London. It therefore holds potential for a successful cluster initiative. Worldwide research and experience show that industry clustering is enhanced by geographic concentration. At the same time, the dynamic nature of industry clusters embodied in market and non-market linkages, can lead to an increase in competitiveness in particular industries. Ultimately this develops into competitive advantages in these industries for particular nations. Furthermore, the decisions to invest by firms are influenced largely by macroeconomic and location factors, particularly the strength of a cluster. Generally, the jobs created per rand will be higher where the cluster is strong (Morfessis, 1994: 85).

Given the above precarious position of the motor industry in the Eastern Cape, and also the fact that the industry already possesses one fundamental element of industry clusters i.e. geographical concentration, it is worthwhile investigating whether clustering can be a viable solution to improving performance in the industry.

1.3 Objectives of the research

The overarching goal of this research is to investigate the impact of the Fish River Motor Industry Cluster Initiative on the manufacturing performance of the motor industry in the Eastern Cape province. This will entail:

- giving an overview of the theory of industry clustering;
- drawing inferences from international experience with industry clusters;
- placing industry clusters within the context of current industrial policy in South Africa. This includes exploring whether the specialised programmes run by the

Department of Trade and Industry (DTI) on the basis of existing clusters elsewhere in South Africa can be useful within the Eastern Cape's motor industry;

- describing the automotive cluster in the Eastern Cape and analysing its economic contribution to the economy of the Eastern Cape;
- investigating the impact of the Fish River Motor Industry Cluster initiative on manufacturing performance in the industry.

Reference to the automotive or motor sector (these will be used interchangeably) will encompass both the motor vehicle assemblers and the component manufacturers for this study.

1.4 Methodology

Both secondary and primary data are used in this study. The former consists of a literature review of the relevant theories on industry clustering. Porter's so called "diamond" framework of competitive advantage (1990; 1998) forms the core of these theories and therefore constitutes the basis of this thesis. It will be realised that the on-going debate on industry clusters revolves around the appropriate definition of these clusters. Consequently, a variety of competing conceptions have been developed.

The latter (primary data) was obtained from surveys conducted on both the Eastern Cape motor vehicle assemblers and component manufacturers affiliated to the National Association of Automotive Component and Allied Manufacturers (NAACAM). The questionnaire used for the survey is mainly based on a qualitative study conducted by Nadvi & Schmitz (1994) on clustering in less developed countries (LDCs). The questionnaire is given in Appendix One. Obtaining views from the automotive manufacturers through questionnaires was considered an effective way of accessing quantifiable and comparable information on the impact of the cluster initiative on their business concerns.

All three motor vehicle assemblers (DaimlerChrysler, Delta, and Volkswagen South Africa), as well as the Ford engine plant participated in the survey. Twenty-three of the component manufacturers in the Eastern Cape affiliated to NAACAM were surveyed.

Eleven of these firms participated in the survey, whilst eight explicitly declined to participate.

Interviews also played a major role in obtaining information on the cluster initiative and in capturing important relationships, which the questionnaire could not reveal. These interviews were conducted with 14 leaders, most of whom are industry specialists and consultants affiliated to the four project teams under the cluster initiative (human resources development, logistics, strategic investments, and supplier development), as well as union representatives and government officials from the DTI. The list of relevant names is given in Appendix Two.

1.5 Outline of thesis

This thesis is divided into seven chapters. Chapter 2 gives an outline of the theory of industry clustering. Porter's "diamond" framework forms the core of this theory and serves as point of departure. However, in order to obtain a detailed and comprehensive analysis of industry clustering, Porter's framework needs to be enriched with contributions from location theories (Weber, 1929), externalities (Marshall, 1920) and path dependence (Krugman, 1991).

Chapter 3 analyses international experience with industry clusters. It makes use of three case studies: Silicon Valley in the United States of America (USA), Sinos Valley in Brazil, and Arizona also in the USA. It focuses on the manner in which industry clusters developed in each of these areas, and their contributions to the overall competitiveness and development of their regions. Reference will be made to these case studies when analysing South Africa's experience with industry clusters both in the automotive sector (Chapter 5 & 6) and other sectors of the economy (Chapter 4).

Chapter 4 puts industry clusters into the context of current industrial policy in South Africa. Particular emphasis is placed on the manner in which current industrial policy has taken a spatial and sectoral dimension. The chapter further explores the focused education and training programmes run by the DTI on the basis of existing clusters in South Africa. Finally, the chapter analyses South Africa's experience with the industry

cluster initiatives, with the intention of drawing inferences for the cluster initiative in the Eastern Cape's automotive industry.

Chapter 5 describes the automotive cluster in the Eastern Cape, and analyses its contribution to the economy of the region. It also analyses the current operating environment and hence the conditions governing the competitive ability of the industry, with specific reference to the MIDP. The formation, structure, and objective of the Fish River Motor Industry Cluster Initiative will be analysed in the last part of this chapter.

Chapter 6 explores whether the cluster initiative has had an impact on the manufacturing performance of the firms in the Eastern Cape's automotive industry. This analysis is based on the quantitative data obtained from the survey on component manufacturers and motor vehicle assemblers, as well as the qualitative information obtained from the interviews. Finally, the findings are interpreted in the context of Porter's 'diamond' framework on competitive advantage and inferences are drawn for future improvement.

Chapter 7 summarises the arguments for industry clustering and draws conclusions for future policy for the automotive sector.

CHAPTER 2

THEORY OF INDUSTRY CLUSTERING

2.1 Introduction

Due to the increasing attention currently given to innovative economic development strategies by both the public and private sectors, industry cluster policies are receiving increasing attention. These policies represent a change in focus, in that they are moving away from firm-oriented policies characteristic of traditional economic development programmes. The fundamental difference of cluster policies is their emphasis on the fact that firms and industries are inter-related in both direct and indirect ways, (Le Veen, 1998: 1).

A variety of competing approaches to clusters have been developed both in theory and practice. This is not surprising given the variations in the definitions of clusters. Consequently, a significant debate has emerged surrounding the actual definition and identification of clusters, as well as the factors driving their development. One of the outcomes of this debate is the realization that one will come to different definitions of clusters depending on the emphasis or significance attached to the dimensions of industry clusters. Moreover, specific priorities, realities and opinions will influence policy makers and authors to stress certain aspects of clustering over others. This does not undermine the cluster concept; rather it substantiates the value of the cluster approach for both government and business (Jacob & de Man, 1996: 425).

In order to create some structure in the variety of possible approaches, Section 2.2 will initially present a brief overview of them, aimed at finding the key dimensions in clustering. In Section 2.3 the discussion will develop into an analysis of cluster theory, centred on a detailed exposition of the theoretical foundations of industry clusters. The approach in this section is to offer the modern application of cluster theory first such as the work of Porter (1990; 1998; 2000) and Dunning (1995; 1997). This is in view of the fact that Porter's "diamond" is used throughout this study as a basis for analysing various cluster initiatives. The earlier work on cluster theory is therefore presented after that. An attempt will also be made in Section 2.3.2.2 to give an interpretation of the advantages of clustering within a microeconomic

framework. Finally, Sections 2.4 and 2.5 will focus on how cluster policies can be translated into economic development programmes.

2.2 Defining Industry Clusters

The essence of industry clusters lies in the ability to develop relationships through strategic partnerships between companies, customers, suppliers, research and education institutions, and the wider business community. The overall benefits of such well-structured and focused relationships include: “an improvement in company performance, an increase in the emergence and growth of new business; increased innovation, and an ability to attract knowledge-based inward investment” (Botham & Downes, 1999: 1). The main objective of such relationships is to improve competitiveness by combining skills and resources through collaborative arrangements. Within these clusters are groups of inter-related industries that drive wealth creation primarily through exports of goods and services. The set of industries is related through buyer-supplier and supplier-buyer relationships, or by common technologies, common buyers or distribution channels, or common labour pools (Porter, 1998: 149). Porter develops his argument further when he identifies two general types of clusters: *vertical* and *horizontal*.

Vertical clusters are made up of industries linked through buyer-supplier relationships. Within these clusters are core companies (i.e. end market producers), as well as companies at earlier stages in the value-adding chain (i.e. suppliers). One can also observe trends towards subcontracting, which can be facilitated by umbrella associations and personal networking (Held, 1996: 251). An example of a vertical cluster would be the chain of supplier-assembler-distributor-customer. *Horizontal* clusters on the other hand are made up of industries, which might share a common market for end products, use a common technology or labour force, or require similar natural resources. Implicitly several industries or sectors can be part of such a cluster. Consequently one observes shared-resource relationships, in which a common transportation infrastructure or workforce can be shared. Examples of such clusters include a tourism cluster or a distribution cluster composed of trucking, air transport, transport services, and wholesale trade industries.

In illustrating this dimension, Porter (1998:149) as cited in Jacobs & de Man (1996: 428) incorporates

sixteen possible clusters:

- four upstream industries: - materials/metals, forest products, petroleum/chemicals, semiconductors/computers;
- six industrial and supporting functions:- multiple businesses, transportation, power generation and distribution, office, telecommunications, defence;
- six final consumption goods and services industries:- food/beverages, textiles/apparel, housing/household, healthcare, personal, entertainment/leisure.

Within these sixteen clusters, four levels can be identified: “primary goods, machinery for production, speciality inputs and associated services” (Jacobs & de Man, 1996: 428). Conventional distinctions in economic activity have emphasised primary, secondary and tertiary sectors. The addition of associated services is therefore one of Porter’s outstanding contributions to the cluster approach. This is because it transcends the conventional division of sectors, illustrating the manner in which agriculture, industry and services depend on each other. An isolated focus on any one of these sectors therefore undermines the usefulness of the cluster approach. The implication thereof is that a region or nation needs to recognise the significant manner in which its agricultural, industrial and service sectors complement and reinforce each other (Jacobs & de Man, 1996: 428).

A major drawback, however, with Porter’s highly quantitative method is that he does not adequately reveal the existence of interrelationships between firms in a cluster. Because his clusters are too statistical, they only provide an understanding of the relative specialization pattern of a country. This is on the basis of the number of competitive industries, which are present in each of the possible clusters. It is therefore difficult to detect the presence of existing networks of cooperating firms within or between clusters from statistics. This is crucial if one is keen to make a distinction between clusters and networks. In making this distinction it is important to realise that not all firms in a cluster cooperate with each other. Only those firms in clusters, which do interact, actually form networks within the cluster or between clusters. Implicitly, both a qualitative approach to clustering, as well as an input-output analysis, is required to distinguish between clusters and networks (Jacobs & de Man, 1996: 428).

Synergies can arise when two or more viable clusters reinforce each other, hence the manner in which clusters overlap is important. This is why the quality of a network is important and should also be used in defining a cluster. Not only the question of whether firms really cooperate is important here, but the way in which they do so as well. It is erroneous to assume that networks are ideal collections of firms that are disposed towards self-renewal. Networks can actually hinder innovation and encourage defensive behaviour. Relationships with suppliers for example can stimulate innovation but can also be used to pass expenses on to partners and to squeeze them financially.

Jacobs & De Man (1996: 425-37) and Rosenfeld (1997: 3-23) provide detailed analyses of the different definitions of industry clusters, although these authors also use the definitions of vertical and horizontal clusters as the foundation for their definitions. To identify other key dimensions that may be used to define clusters, they also include such dimensions as the geographic or spatial clustering of economic activity, use of common technology, the presence of a central actor (i.e. a large firm, research centre), and the quality of the firm network, or firm cooperation (Jacobs & DeMan, 1996: 428-9). These authors believe that by defining the key dimensions of clustering, relevant and specific policies can be developed, ultimately increasing their potential effectiveness.

The *geographical dimension*, being the most prominent, assumes the spatial clustering of economic activity. A regional cluster is therefore an industrial cluster in which member firms are in close geographic proximity to each other i.e. geographic agglomeration of firms in the same or closely related industries. According to the CIO Enterprise magazine (1998) as cited in Department of Economic Affairs, Environment and Tourism - DEAET (2000: 2), a cluster is a geographically concentrated group of companies and supporting institutions. Moreover, it contains both market and non-market linkages. These links facilitate suppliers and competitors to work together on business processes, purchases, investments and technical research. In similar perspective, Doeringer & Terkla (1995:225) maintain that industry clusters are, “geographical concentrations of industries that gain performance advantages through co-location.” This definition is similar to that of agglomeration economies. However, it is within industry clusters (as will be analysed in Section 2.4.1) that agglomeration economies are likely to be observed.

Given the extensive literature on industrial districts, the distinction between regional clusters and industrial districts (a subset of regional clusters) is worth highlighting. Industrial districts, such as the Italian industrial districts described in Goodman & Bamford (1990); Brusco (1992: 259-269); and Piore & Sabel (1984: 28-31) are concentrations of firms involved in interdependent production processes. These firms are often in the same industry or industry segment, which are embedded in the local community. Although industrial districts are premised on a single industry or even a single industry segment, regional clusters generally involve a range of related industries. It is important to realise that an industry cluster is different from the classic definition of industry sectors. This is because it embodies the entire value-chain of a broadly defined industry from suppliers to end products, including supporting services and specialised infrastructure.

Another dimension to the cluster approach is the *technological dimension*. In this case a collection of industries can share a basic technology due to their technological relatedness and synergy. Closely linked to this dimension is the *lateral dimension*, that is, when different sectors with specific competencies that can be shared result in economies of scale, which can develop into new combinations such as the multimedia cluster. In this case there exists competitor and collaborator relationships between companies producing the same or similar goods and services at a specific level in the value chain, (Anderson, 1994: 27). Competitors often share information (unintentionally most of the time) about product and process innovations, as well as market opportunities. This might eventually lead to formal collaborative arrangements to develop such innovations in pre-competitive and strategic alliances. A *focal* dimension also exists in defining clusters. In this case a cluster of firms forms around a central actor such as a firm, an extended family, a research centre or an educational institution.

Together with vertical and horizontal relationships, Rosenfeld (1997: 10) also uses, "the size of the cluster, the economic or strategic importance of the cluster, the range of products produced or services used, and the use of common inputs," to define clusters. He points out that many viable clusters are situated in small inter-related industries. The employment concentrations of these clusters are not particularly striking, therefore defining clusters solely by the size of the constituent industries or the scale of employment has its obvious shortcomings. His definition of an industry cluster also refers to the

element of geographic proximity of inter-related or complementary firms, which actively interact as they share a specialised infrastructure, labour markets and services. Firms in the cluster also encounter common opportunities and threats. Evident in Rosenfeld's (1997: 10) definition of industry clusters is the significant role of social interaction and firm cooperation in determining the dynamic nature of the cluster.

According to the DEAET (2000: 4), one can also define clusters as '*emerging*' in which case there are potential linkages or common resource issues, which are not currently well established. Unsurprisingly, such clusters consist of relatively young, inter-related and fast-growing industries. Because these industries essentially become more integrated and important to the regional economy, they are often most in need of resources and assistance to enhance their regional prosperity. Examples of such industries include environmental technology, software and computer services and recreation goods. From these examples it can be argued that emerging clusters can be non-traditional industries (i.e. environmental technology), which are not designated Standard Industrial Classification (SIC) sectors.

Stabilising clusters on the other hand diversify the economic base of a region, whilst adding stability. At the same time, they widen the scope of employment in the region to those not in possession of any formal training or experience to enter into high technology related industries. Examples of such clusters include the tourism industry, services, horticulture and fruit and vegetables (DEAET, 2000: 4). While continuing to be the fundamental economic drivers of the region, *mature* clusters consist of industries that are experiencing declining or low employment growth. Nevertheless, they are the source of many high value-added employment opportunities, such as: "defence and transportation manufacturing, business services, financial services, computer and electronics manufacturing and medical services" (DEAET, 2000: 4).

While clusters often form naturally (e.g. Northern Italy, Silicon Valley and Western Cape Wine lands), stakeholders in an industry or region can expedite the development of a competitive cluster. This requires a substantial process of interaction between the stakeholders. Within this context, an industry can devise a *cluster initiative*, in which case industry stakeholders can combine efforts to exploit mutual projects to the advantage of the group (cluster) as a whole, and therefore improve the competitiveness of the region. The underlying logic is that stakeholders should discover areas where they can work

together to make the industry viable, while competing as individual firms. The strength of the cluster, as opposed to specific incentives, essentially influences investment decisions by downstream firms, (DEAET, 2000: 6). Similarly, the competitive ability of these firms, which are usually small, is also governed by the strength of the cluster. Small firms generally lack the capacity to appropriate many of the supporting activities, hence the need to depend on the linkages and relationships, which a viable cluster can develop.

It is important to realise that the cluster initiative process is industry driven and not driven by government. At the same time such an initiative should not replace individual decisions by firms or government. Rather such initiatives should form the counterpart to individual firm decisions as well as those of government, in which case they can highlight areas where cooperation and joint action are both essential and effective (Davies, 1998:2). It is also important to realise that the formation of a cluster initiative is not a short-term process as it requires that the stakeholders work together to gather information, understand their common challenges and then develop strategies to overcome these. To bear results, the process also requires time and commitment from all its members, in particular leadership is required from all stakeholders in the industry. Using working groups, which are managed by a steering committee, as well as a consultant or facilitator, the industry should be able to identify the challenges it faces as well as the key success areas or enabling factors to increase competitiveness.

What value is there in participating in a cluster initiative? The preceding analysis indicated that the overall incentive for being part of a cluster initiative lies in the resultant increase in competitiveness. Needless to say, this is a relatively broad term with numerous facets to it. More specifically, stakeholders in a cluster initiative can benefit from having a forum which assists in overcoming challenges facing the industry i.e. new market development, training and better supply management. The ability to identify and address gaps or problems in the industry is also enhanced. For example, the generic issues in training and skills, research and development (R&D) institutions and infrastructure can be collectively dealt with. Being part of the cluster process also provides opportunities to establish linkages with other players in the industry in order to source inputs and obtain favourable prices, launch joint marketing initiatives and even to tender for large projects. Because data or statistics are better obtained under the initiative, an understanding of the structure of the industry can be enhanced through combined research

and general interaction. Finally, the initiative not only improves access to government initiatives and supply side measures to an industry, it also provides a platform to contribute to government policy formulation, especially policy directly impacting on the industry i.e. tariff reform, trade negotiations, and supply side measures (DEAET, 2000: 6).

As evidenced in the literature cited in the preceding paragraphs, there are several common concepts in the definition of an industry cluster, none of which are mutually exclusive. First, there is general consensus that clusters are dynamic in nature. Ideally clusters are characterised by interaction as well as functional relationships between firms and industries. Both Rosenfeld (1997: 10) and Doeringer & Terkla (1995: 230) make reference to the role of social interaction and the development of functional relationships thereof. Secondly, in most cluster definitions, there is consistent reference to the geographic scope of the cluster, and the significance of spatial proximity. Despite the fact that geographic scope is important in defining clusters, every cluster has different geographic requirements. There is therefore no standard definition of the appropriate geographic scope of a cluster (Le Veen, 1998: 2).

A third common theme in the literature is recognising the broader context in which individual firms operate. Emphasis should therefore be on looking beyond individual industries. It appears that a majority of authors are in favour of an extensive definition of clusters that are defined by both horizontal and vertical relationships, and include both direct and indirect linkages. Many practitioners in reality, however, have merely based their definition of industry clusters on the concentration of employment in single industry. The literature argues that this overlooks the functional relationships between industries, as well as the interdependent and dynamic relationships that make clusters so distinctive. This therefore merely depicts an industry concentration (Doeringer & Terkla, 1995: 230; Rosenfeld, 1997:10).

Lastly, a prevalent theme in the literature is that of the role of social infrastructure in defining industry clusters. Social infrastructure is essential in facilitating the exchange of information. It is insufficient to merely have evidence of a cluster (i.e. geographic proximity), since this does not necessarily imply an effective cluster. In order to develop its dynamic nature, a strong cluster should also be characterised by social interaction, trust, and a shared vision. The importance of social interaction is supported by cluster

definitions given by Jacob & de Mann (1996: 428) as well as Saxenian (1994: 54) in her discussion of Silicon Valley.

2.3 Cluster Theory

Since this thesis is based on the most recent applications of industry cluster's (i.e. Porter's "diamond" framework), the literature review will begin with it. The analysis will then trace back the origins and the core underlying theoretical concepts of industry clusters, focusing on theories by Marshall (1920) and Weber (1929). This is an attempt to enrich recent contributions to clustering, which on their own do not adequately explain the dynamics and advantages of industry clusters. Section 2.3.1 will start with contributions from Porter and authors such as Dunning, whilst Section 2.3.2 will focus on the theoretical foundations of clustering embodied in Weber and Marshall's contributions.

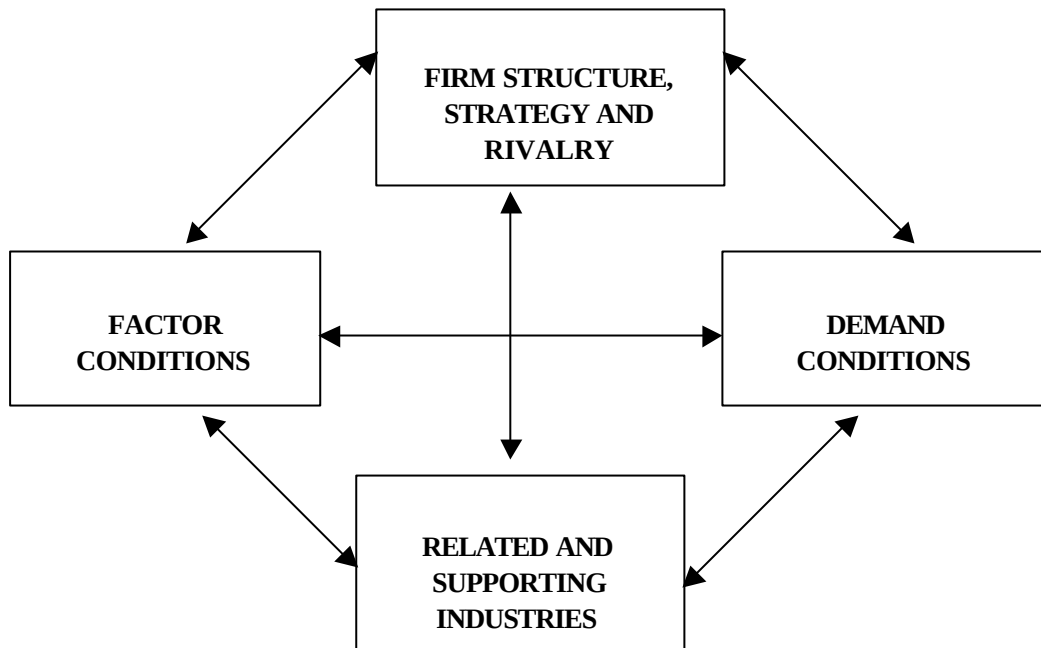
2.3.1 Modern applications of industry clustering

The idea of clusters is not new. As will be seen in Section 2.4.1, Marshall (1920) paid much attention to it in his study of industries in the United Kingdom in the early 20th century. Recently the idea of clusters has been given a new lease of life by Porter (1990, 1998). He argues that competitive advantage and strong industrial clusters are interrelated and that successful clusters drive economic development (Porter, 1998: 149). Economic development depends upon competitive companies, which serve international markets. However, such companies are more likely to emerge and prosper if they are part of a geographically concentrated industry. An industry consists of a number of firms producing essentially the same product (i.e. industries are defined by specific products such as personal computers rather than generic sectors or technologies, such as electronics). In turn, competitive industries are more likely to develop in regions where the industry is part of a cluster.

2.3.1.1 Porter's "diamond" framework

Porter provides a framework for analysing competitive advantages. This is his so-called "diamond" which consists of four attributes: demand conditions; supporting and related industries; factor conditions and firm strategy, structure and rivalry. Individually and as a system these determinants of national advantage create the context in which a nation's firms are created or compete. Figure 2.1 illustrates these four attributes.

FIGURE 2.1 PORTER'S "DIAMOND" OF COMPETITIVE ADVANTAGE



Source: Porter (1998: 72)

The four attributes in figure 2.1 will be analysed in the following section:

(i) Demand conditions

As illustrated in Figure 2.1, this is one of the attributes in Porter's diamond. It is the nature, rather than the size of local demand, which is important. Successful clusters need to serve global markets. Nevertheless, clusters can derive considerable advantages from 'leading edge' or sophisticated local customers who work with suppliers to promote innovation (Porter, 1998: 149-151). This is ideally derived from the fact that local demand should lead world demand. The implication thereof is that an ability to meet local demand creates the ability to serve global markets. At the same time, demanding customers can include both final customers and intermediate demand (i.e. other companies in the production chain).

(ii) Supporting and related industries

These can be industries within the production chain (i.e. customers and suppliers) or those with shared locational requirements. World-class local suppliers can provide potential advantages, such as cheaper and easier access to inputs. The geographic concentration of industries with shared requirements enables an area to achieve a high level of development necessary to support cluster-specific factor conditions such as specialist skills, training programmes, logistics and technology development centres (Porter 1998 151).

(iii) Factor Conditions

These can be divided into basic (or generalised) and advanced (or specialist) factors. The former include for example, "transportation infrastructure and secondary schools" (Porter, 1998: 132). Authors such as Botham & Downes (1999: 6) also include, "climate, raw materials, a literate, numerate and increasingly IT competent labour force." Basic factors form the basis for the creation of specialised factors. Consequently, continued investment in these factors is critical to national advantage. However, exclusive emphasis on basic factors is insufficient as a foundation for, and in maintaining competitiveness in the long run. This is because of the ease with which competitors can duplicate most of these factors. Porter (1998: 132) argues that advanced factors are therefore more significant. In similar perspective, Botham & Downes (1999: 7) maintain that the most important factors in determining competitiveness, are cluster-specific factors, notably cluster-specific knowledge and know-how. Examples of these include: "cluster-specific research programmes; effective knowledge and technology transfer; a highly skilled workforce; high and guaranteed quality standards; image; specialist information and know-how relating to, for example world markets and generic improvements" (Botham & Downes, 1999: 7). The reason for the importance of specialist skills to long-term competitiveness, lies in the difficulty of imitation that such factors have.

Unlike some "natural" basic factors (i.e. climate, raw materials), advanced factors are created. Consequently, Porter (1998: 132) indicates that exceptionally accomplished "factor creation mechanisms" are required for the creation and improvement of advanced factors, citing world-renown research institutions as an example. In addition Botham & Downes (1999: 7) give examples of technology centres and trade associations. Trade associations are often represented within the cluster

leadership, concentrating their efforts on improving the innovative capacity of cluster participants, as well as giving direction to potential cluster development. Their overall objective is to move away from campaigning for subsidies from the government, as well as attempting to preserve the existing state of affairs in the cluster's industries.

(iv) Firm strategy, structure and rivalry

According to Porter (1998: 107-8), this determinant relates to, "the context in which firms are created, organised and managed as well as the nature of domestic rivalry." He further indicates that corporate strategy and the operating environment are interdependent. An alignment between managerial styles and organisational types is bound to produce results when it is compatible to both the operating environment and to the industries' sources of competitive advantage.

Active domestic rivalry is essential in developing and sustaining competitive advantage in an industry (Porter, 1998: 117). Botham & Downes (1999: 9) agree with this view. They further indicate the need for business formation in clusters, a process they consider essential in stimulating and maintaining active rivalry. Again Porter (1998: 122-3) cites this when he deliberates on the role of spin-offs from established firms and internal diversification as sources of vigorous competition within a cluster's industries. At the same time, successful competition not only depends on price, but also (and more importantly) on non-price competition. Competition can develop into an emotive issue, in which case pride and even jealousy can spur rivalry between local chief executive officers (CEOs) or managers relating to for example: "reputation for quality products, technological excellence, innovation and global leadership" (Botham & Downes, 1999: 8; Porter, 1998: 118-9).

Owing to the potential to induce innovation and upgrading which local competitors and rivals render, they are more important than internationally more distant ones, (Porter, 1998: 117-8; Botham & Downes, 1999: 8). As such, foreign competitors could have an upper hand in terms of the value of their currency, government protection or subsidies. On the other hand, the significance of local rivals operating in the same business environment cannot be minimised in the same manner, since companies must respond to compete. At the same time, due to the visibility of domestic rivals, innovation and business improvements are more quickly perceived, understood, replicated and further improved. This is

heightened by geographic proximity (Porter, 1998: 120). Underlying many effective clusters are strategies that constantly enhance productivity through innovation and adding value, as opposed to obtaining static efficiency through simply cutting costs. In this case a local environment that encourages long-term commitment and investment is essential. For example, without a market such as the National Association of Securities Dealers Automated Quotation (NASDAQ) System, new high technology companies would be frustrated in their efforts to reinvest capital for long-term capital growth, rather than providing short-term income for investors (Bothman & Downes, 1999: 9).

2.3.1.2 The "diamond" as a system

It is important to realise that the "diamond" is a dynamic system. Competitiveness is generated from the cohesion of the cluster and how it operates. Competencies throughout the diamond are beneficial. Without high quality advanced factors, effective local demand for example, is unlikely to generate competitiveness. However, according to Porter (1998: 144,147), there is nothing deterministic about the model i.e. due to its complexity, it is difficult to establish cause and effect. With some limited disadvantages, competitiveness is possible. Some basic factor disadvantages such as high wages or land costs can stimulate innovation, which becomes a source of competitive advantage.

The nature, as well as the effectiveness of networks within the cluster is also important (Porter, 1998: 148). Basically nations are leaders in those industries located in clusters characterised by effective networks. For example, if not well connected with local suppliers, local demanding consumers will not generate competitiveness. Ultimately, the success of an individual company may be partly dependent on how well developed and integrated the four elements of Porter's "diamond" are in a particular cluster. One can conclude that the core of Porter's analysis is the basic conditions determining cluster competitiveness. His framework is therefore focussed on end-market sectors, which according to Bergman & Feser (1999: 5) serve as a point of departure for studying clusters. At the same time, his framework rests on using both information flow and rivalry between geographically proximate firms to explain the success of clusters (Norton, 1999:3).

It is important to appreciate that time and place lead to variations in factors that drive a cluster. In the initial stages of a cluster, basic factors (e.g. raw materials, low labour costs) can be important. However,

as income rises, capital investment becomes more significant, even though capital is currently internationally mobile and available to an increasing number of regions. Strong clusters therefore rely on innovation and the exploitation of knowledge. The manner in which the “diamond” drives innovation and improvements within the cluster, forms the fundamental significance of this framework (Porter, 1998: 145). Many of the mechanisms have already been described, including the role of local rivalry, new firm formation, customer links, the research base and technology transfer. It is also important to appreciate that the innovation process varies from cluster to cluster, (e.g. it is very different in a food compared to an information technology cluster) and depends upon the overall system and not simply on individual companies.

2.3.1.3 The “diamond” framework and growth centres

It is interesting to note that Porter's ideas are grounded in Perroux's understanding of economic growth and change. Perroux (1950:95-6) as cited in Bergman & Feser (1999: 6), argued that propulsive or leading industries are important in understanding economic growth and change. Propulsive industries are essentially those that dominate other sectors because of their large size, considerable market power, and/or role as lead innovators. These propulsive industries, or even individual firms represent growth poles, which attract, focus, and direct other economic resources. Such concentrations of producers, suppliers, and other economic agents are extremely similar to clusters. As cited in Bergman & Feser (1999: 6), Perroux's view (1950:90) on economic space is that it is non-spatial i.e. physical space does not necessarily bear any relationship to economic space. Relations between firms, their customers and suppliers, as well as with other key economic institutions are therefore not bound by physical space. At least where adequate economic grounds existed, firm linkages will widen their scope without spatial limit throughout the globe. Taking the view that geographic space was ‘banal’, Perroux (1950: 90) in Bergman & Feser (1999: 6) argued that directing ones analysis to particular regions would only provide a distorted picture of the growth and development process.

Apparent similarities between the cluster concept and Perroux's theory of growth poles are evident. The preceding paragraphs highlighted how the cluster focuses on the manner in which end-market industries drive the value chains, which they lead. This facet in clustering has many parallels to the notion that propulsive industries are dominant economic actors in growth pole analysis. Through the demand for

intermediate and capital goods, end-market industries are able to trigger potential for growth throughout the cluster. In addition, these end-market industries usually consist of internationally competitive, world-class firms. Consequently, there is scope for them to lead in disseminating innovations in products and processes, (Bergman & Feser, 1999: 6). Moreover, overall cluster competitiveness can be partly driven by end market industries, depending on their degree of market power to influence improvements in technology as well as the manufacturing strategies to their suppliers. On the other hand, one can also perceive market power among some cluster members as exerting a detrimental influence on the overall cluster. Perroux's ideas (1950: 95-6; 102) as cited in Bergman & Feser (1999: 6), as well as their extensions, are also relevant for the industry clusters in that his theory contributed to the rise of a regional development strategy (i.e. growth centres/poles). This development strategy had a tremendous rise in popularity in policy only to eventually fail. Though it might be premature to tell whether industry cluster policies will experience the same fate, their increasing popularity appears nearly as dramatic.

One of the most important reasons why growth centre strategies did not succeed, is that insufficient attention was paid to the economic and social preconditions (Malizia & Feser, 1998 as cited in Bergman & Feser, 1999: 6). Practitioners seemed to emphasise the role that backward and forward linkages in strategic and favoured sectors could play to stimulate regional growth, especially in underdeveloped areas (Hirschman, 1958:100-19). Based on the average patterns generated from input-output analysis, it was overly assumed that localised interindustry trade would take on this form. Implicitly, linkages were viewed almost mechanically. The fundamental difference between growth centres and the industry cluster concept is that the latter stresses *why* businesses decide to establish collaborative relationships in trade, while the former is based on the assumption that such partnerships were inevitable (Bergman & Feser, 1999: 7).

2.3.1.4 Other recent contributions to cluster theory

Dunning (1995: 466) prefers to call the cluster process an - "**alliance capitalism**". This type of capitalism is an outcome of significant technological advances, coupled with the globalisation of many kinds of value-added activity. These events have led to a shift towards both cooperation and competition in production and transactions between successful wealth-creating agents.

Inter-firm cooperation is neither a novel concept nor entirely remarkable. What is perhaps new is its

relative importance in the way organisations operate and are structured. The ability of individual firms to generate growth that is based on innovation, is increasingly being used to determine how successful the firms involved in co-operative arrangements are. Such growth is dependent on the quality of network relationships. Factors that determine such quality include: "the range, depth and closeness of the interaction between firms and their alliance or network parties and by the effect that such alliances are having upon overall industrial performance," (Dunning, 1995: 470). The contribution to institutional effectiveness of these alliances measured in terms of economic performance and innovative capacity is referred to by Fountain (1997:1), as '**social capital**.' This form of capital is the "capability" that is created when a group of organizations develops the ability to work together to obtain mutual benefits. Clearly, this view contrasts with that which influenced the thinking of economists since Adam Smith, whereby collaboration among firms was considered a sign of structural market failure, as opposed to a means of reducing endemic market failure.¹

Dunning (1995: 466) suggests that over the last two decades both the justifications for concluding inter-firm alliances and their impact on economic welfare have changed significantly. Currently, the compelling reason for concluding arrangements of this nature is to minimise the transaction and co-ordinating costs associated with arms-length market transactions. At the same time, such arrangements can enhance the assets, skills, and experiences of the firms involved. The other reason for collaborative arrangements is more inclined towards protecting existing (or gaining new) proprietary or O-specific (Ownership specific) advantages. Consequently, Dunning (1995: 467) suggests that co-operative alliances are consistent with strategies to acquire assets through

foreign direct investment (FDI). Over the past decade the formation of alliances has increasingly been to overcome or create barriers to entry in national or international markets, as well as to develop new skills.

¹ **Structural market failure** arises from the actions of participants in or outside the market to distort the conditions of supply and demand. **Endemic or natural market failure** arises from the inability of markets to organise transactions in an optimal way; it is difficult to predict behaviour of participants (i.e. missing markets).

In line with Dunning (1995: 461-88), Fountain (1997: 8) suggests that the goals of most strategic alliances in clusters should be to gain access to new and complementary technologies. This should enhance and expedite the innovatory or learning processes, and ultimately improve the efficiency of particular activities - e.g. research and development, marketing and distribution, manufacturing methods. Underlying these alliances should be a reduction in the impact of technological advances, and the globalisation of the market economy on the organisation of economic activity.

Technology, a supply-side phenomenon has had several consequences on economic activity. For example, it has increased the fixed costs of a vast range of manufacturing and service activities, especially those associated with learning and innovation. It has also increased the relatedness of particular technologies that may require joint use in order to supply a specific product. Technology has also reduced the product life cycle of certain products, whilst increasing, "the significance of multi-purpose or core technologies such as robotization, informatics and biotechnology" (Dunning, 1995: 467). There has also been an increasing emphasis on improving the core competencies of firms, as well as the manner in which these are organised, in order to become globally competitive.

On the other hand, the main consequence of globalisation of economic activity has been to force firms to be more dynamically competitive. Local, globally competitive suppliers still provide obvious advantages, despite the inevitable probability that many inputs and products have to be obtained globally, (Botham & Downes, 1999: 11). Furthermore, as evidenced in Porter's analysis, the innovation process remains highly localised. The implication thereof is that there is a need for a more determined effort to raise the efficiency with which firms produce their existing products. At the same time there is a need for successful innovations of new products and the upgrading of assets and skills throughout their value chain. This can be partly achieved through the use of industry clusters whose combination of collaboration and competition can achieve innovation and higher efficiency levels in production.

2.3.2 Theoretical Foundations of industry clustering

Although in the previous section authors such as Dunning (1995; 1997) and Porter (1990; 1998) have presented convincing accounts of economic interdependence, geography, and competitiveness, they are not really specific on the responsible underlying mechanisms. For example, most of the literature takes Porter's concepts only as a point of departure. Hence any discussion on industry clusters has to draw

from a wide range of more developed ideas. This forms an essential part in explaining the origins of industry clusters, the dynamic nature of their growth process and development, as well as the advantages of using the cluster concept as a basis for regional policy (Bergman & Feser, 1999: 7).

An analysis of some of the core theoretical concepts that are frequently cited to explain cluster dynamics and validate cluster-based policies will be presented in the following sections. Sections 2.3.2.1 to 2.3.2.5 will analyse the five core theoretical concepts, which underpin the literature on regional industry clusters. These include external economies; co-operative competition; interfirm rivalry; path dependence, and the innovation environment. Notably Section 2.3.2.2 will provide a microeconomic framework of clustering in which it is illustrated as holding potential as a powerful strategy that can lead to the reduction of costs for firms in a cluster whilst increasing their output.

2.3.2.1 External Economies

As noted in Section 2.2, a geographical dimension can be used in defining a cluster. This dimension can be regarded as an essential facilitating factor, if not a necessary condition in the cluster process. The premise is that the relationships in a cluster will be stronger if the distances separating participants are as short as possible. The process of clustering, as well as the interchange among industries in the cluster, works best when the industries are geographically concentrated. The flow of information that drives the flow of goods and services improves as distance decreases (Porter, 1990: 157). Proximity also tends to restrict from filtering out of a region. This is due to face-to-face communication, which allows information to leak out slowly. Although information technologies have reduced the impact of physical distances, many activities ranging from product design to contract negotiations can only be accomplished by face-to-face exchanges.

Just-In-Time (J-I-T) inventory management and time-to-market responsiveness are current standard elements of competitiveness and productivity. A prerequisite for their successful implementation is geographic proximity. The importance which proximity has in reducing the time taken to complete the production cycle is based on Toyota's guiding principle that the source of competitiveness is elimination of waste, including wasted time and delivery effort. Much of this waste is apparently derived from relationships between firms (Morris & Kaplinski, 1997: 6). In this context, geographically proximate

suppliers and users would provide the “least waste” alternative. Another important aspect of geographic concentration is its influence on improvement and innovation² in production. As mentioned in Section 2.3.1.1, geographic proximity intensifies the concentration of information as well as the rate at which it flows within an industry. This has positive ramifications for the diffusion of innovative activity i.e. it increases the rate at which it pervades the industry. At the same time, proximity increases knowledge of competitor behaviour in which case the ability to assess potential advantages from improvements in production is increased. Ultimately the competitive behaviour of firms is energised.

As convincing as these suggested reasons for geographical proximity might be, they do not comprehensively answer the question: *Why and when does the manufacturing industry become clustered in a few regions, leaving others relatively undeveloped?* Two approaches to understanding benefits to concentration dominate the literature: industrial location theory that builds on Weber (1929). These benefits are called agglomeration economies, and the Marshallian neoclassical perspective that takes as its point of departure Marshall's (1920) analysis of external scale economies and their presence in "industrial districts." In both cases sources of externalities are cited as the reason why firms co-locate. The literature differ somewhat in their relative emphasis on static versus dynamic externalities. Nevertheless, this theoretical framework will endeavour to further validate the importance of geographic proximity. As will be discussed in the following sections, it is possible to develop a very simple model of geographic concentration of manufacturing based on the interaction of economies of scale and transportation costs.

(i) Industrial Location Theory

The goal of maximising profits has dominated the locational choice in most discussions of the location problem, where profits are taken as the difference between revenue and cost. Consequently, the theory surrounding location of industry, is essentially an account of the complex interdependence of forces and reactions implicit in the profit maximization objective. As mentioned in Section 2.2 agglomeration is an important element of spatial clustering in the economy, hence it is important to dwell on this aspect.

² Innovation is essentially the search for, and discovery, development, improvement, adoption and commercialisation of new processes, new products and new organizational structure and procedures. Uncertainty, risk taking, probing and reprobating, experimenting and testing are elements, which characterize

Weber (1929: 134-135) was the first location theorist to discuss agglomeration explicitly. He suggested that agglomeration economies determine the favoured location only when the two main location factors, transport orientation (minimum transport costs) and labour orientation (low labour cost sites) are not dominant. Hence if transportation considerations result in industries concentrating close to raw material supplies or markets, this does not represent agglomeration theory. In a nutshell, Weber's point was that it would prove to be profitable for two or more firms to agglomerate at the same site if the agglomeration economies gained there exceeded the additional transport costs incurred as a result of deviation from the minimum transport cost (*MTC*) site. To illustrate this, imagine an entrepreneur who has three units of production and who is considering where to locate. Assuming that economies of scale are irrelevant, the entrepreneur could locate each unit at its optimal transport point. Or, the entrepreneur could locate the three units adjacent to each other at a centre of agglomeration, thereby realising localisation economies, but only at the expense of larger transportation costs. In this context, a unit of production may be perceived as making a trade-off between transport costs for production costs when it shifts to the centre of agglomeration (Isard, 1956: 179).

▪ Critique of location theory

Weber's agglomeration theory has been sharply criticised by critics who argue that the above proposition is not empirically sound. They argue that the development of society occurs over a long period of time. Consequently, the existing physical structural framework could be a product of past developments. Plants have already been built and are producing. Consequently there are opportunity costs associated with relocating these plants i.e. one would have to forgo the use of facilities which eventually become outmoded. Weber's critics have therefore stressed the significant benefits of existing production points as centres of agglomeration, whether they exhibit labour or any other form of orientation. They argue that as new units of production emerge, they will tend to benefit from localisation economies by agglomerating around established production points. The ability of these points to attract new firms is thereby strengthened and from this standpoint the evolutionary framework becomes critical

the innovation process. (Jorde & Teece 1990:75).

as a locational factor. Ultimately, any pure substitutional theory (such as Weber's), which is not allied to a specific regional structure, is severely circumscribed in its application (Isard, 1956: 180).

These critics further indicate that, even if the opportunity costs of relocation could be overlooked and plants were completely mobile, the problem is not as Weber portrayed it. In relocating to a centre of agglomeration each unit of production will benefit if it diverged as little as possible from its optimal transport site. The managers of these units of production also possess different bargaining abilities. Therefore, it would be unsurprising if the centre of agglomeration will not be at the over all minimum transport cost point. It would probably lie within the common segment closer to the firm with greater bargaining ability. Moreover, appropriate sets of side payments could be made in order to entice firms that could not otherwise agglomerate to do so, in which case the centre of agglomeration could even lie at a point outside the common segment (Isard, 1956: 180). At the same time, the centre of agglomeration could lie at the site of an already existing production point, assuming that costs of relocation are reintroduced into the problem. This would eliminate one group of relocation costs since in many situations each unit of production could be made better off through an appropriate set of side payments, than if all were to shift Weber's overall transport optimal point.

The preceding analysis forms the core of game theory (Baumol & Blinder, 1998: 290). This theory, unlike conventional microeconomic theory, which provides a theory of decisions under conditions of certainty, hypothesizes that it is by no means obvious what decisions a rational individual should make under conditions of uncertainty and interaction. Consequently, each firm is seen as a competing player in a game of strategy under conditions of less than full information concerning the outcomes of various decisions. In this case, the several participants are the several units of production. These units could be either new units, in which case no relocation costs are associated, or they could be established units faced with relocation costs. Invariably, they interact by participating in wide ranging forms of collusive action. The ensuing bargaining process is complicated, not only because of the possibility of numerous coalitions or combined outcomes, but also because of the varying scales of agglomeration which are potentially feasible for each unit of production (Isard, 1956: 180).

It should be noted that Weber is not particularly concerned with *why* such agglomeration economies

arise. He merely suggested that they are simply external varieties of internal scale economies (Weber, 1929: 126-27). His primary aim was to develop a model explaining how such economies might lead to agglomeration, rather than identify what explains economies themselves. Consequently, his discussion of agglomeration economies was narrow, since it focussed on economies of scale of the industry (localised economies) with a much more limited analysis of the broader and, according to Richardson (1978: 166-7) probably more important concept of urbanisation economies.³

Although Hoover's analysis (1937), as cited in Bergman & Feser (1999: 5), is nearly as imprecise as Weber's, he introduced the now widely acknowledged distinction between urbanisation and localisation economies. Even though there is a fine distinction between the two, the focus is mainly on localisation economies, rather than urbanisation economies, in most of the cluster literature. Other authors identify specific advantages of proximity between firms including, "increased market power through brokered buying and selling, the better availability and use of specialised repair facilities, shared infrastructure, reduced risk and uncertainty for aspiring entrepreneurs, and better information" (Bergman & Feser 1999: 8). Recently Rosenfeld (1995: 20) cites "tailored infrastructure", as a key advantage firms in regional clusters enjoy. He argues that as industry concentration increases, there are advantages to be derived by individual businesses from the development of sophisticated institutional and physical infrastructure that is compatible to the needs of specific industry. Such infrastructure would include: "local product showrooms, foreign sales offices or distribution centres, supply centres, common waste treatment facilities" (Rosenfeld, 1995: 20).

Weber's agglomeration theory can be defended, however, from an entirely different standpoint. If one is presented with a situation where a new area has been earmarked for development by a government

³ "Localisation economies (and diseconomies) are those associated with access to a larger pool of skilled labour, with fuller use of specialised and auxiliary industrial and repair facilities, with large-lot buying and selling through common brokers and jobbers. In urbanisation economies we face all this in a broader context as: (1) economies which stem from a higher level of use of the general infrastructure of an urban area (such as transportation facilities, gas and water mains) and from a finer articulation of economic activities (daily, seasonally and interindustrially) and (2) diseconomies which result from a rise of the cost of living and money wages, in the costs of local materials produced under conditions of diminishing returns, in time-cost and other costs of transportation, and in land values and rents," (Isard 1956:183). Richardson (1978:167) is of the opinion that urbanisation economies and indivisibilities in urban and social infrastructure are stronger inducements than industrial scale economies.

planning authority, technological and other factors will determine, for any given commodity, the range of feasible scales for the units of production. The question would be whether the units should be agglomerated to capture localisation economies or whether they should be spatially dispersed in a bid to reduce transportation costs. This social welfare approach, according to Isard (1956: 182), overlooks both inherited physical structures and the irrationalities and differences among managers in their ability in bargaining. What is required is a comparison between the localisation economies realised at Weber's over-all-transport optimal point (and not at any other point) with the additional transport costs associated with agglomeration at this point. Though this is not empirically sound, this social welfare approach implicit in Weber's theory, gives a useful guide in situations where there is need to transform existing structure in order to realise optimum resource utilisation. From this point of view, Weber's agglomeration theory is relevant.

Weber also made tremendous contributions on the impact of uncertainty on location. As highlighted in the preceding discussion on game theory, a fundamental element is that of making decisions under conditions of uncertainty. The impact of uncertainty on location can be best understood in terms of how it affects economies of scale and transport over space, rather than as a separate influence. Due to uncertainty, plant size is reduced as a result of the reluctance to risk capital, as well as diminishing returns to management decisions (Richardson, 1978: 61). At the same time, within the spatial context, uncertainty is intensified with distances from markets, in which case small firms have to depend more on external services. This consequently reinforces agglomeration in big cities or industrial areas.

Furthermore, uncertainty increases external economies and agglomeration because new firms and industries tend to be uncertain and therefore are inclined to locate in large urban areas where risks are minimised, resulting in the rapid growth of cities. Moreover, since large urban areas are the main centres of innovation, this is instrumental in maintaining cost advantages over other cities, while their communication economies attract more innovating firms. In effect, when one considers individual firm's location decisions, uncertainty reinforces agglomeration due to the risks of peripheral locations, coupled with the greater incentive to co-ordinate decisions (Richardson, 1978: 62). Uncertainty implies that a firm is unsure about his competitor's reactions. Consequently, strict profit maximisation becomes a less

pressing issue as the desire for secure profits becomes more important⁴.

In an attempt to minimise uncertainty, location decision-makers actually reinforce agglomeration. The first possible way to do this is for the relocating firm to replicate previous behaviour either by remaining at the original location or moving only a short distance so as to avoid disrupting contacts with existing suppliers and customers. The second possibility, which applies particularly to new firms, would be to choose a location in the area of maximum familiarity, typically close to the locator's home. The rationale behind this behaviour is that familiar locations imply greater insight into markets, cost and other conditions compared to unfamiliar locations. Emulating the behaviour of a 'successful' peer group is a final way of reducing uncertainty. This clearly depicts locational interdependence, the overall results being successive development in the area (Richardson, 1978: 63). Together with Perroux (1950: 95-6, 102), Hirschman (1958: 183-4) argues that understanding how this process takes place may be very important in promoting regional development, especially at a growth pole.

The preceding analysis has highlighted the fact that many treatments of agglomeration economies rest on cost minimisation due to proximity to inputs or proximity to markets. As will be analysed later in this section (under point iii) these explanations have, however, been undercut by the globalisation of markets, technology, supply sources, easier mobility and lower transportation and communication costs (Porter, 2000: 8). Today, the nature of economies of agglomeration has shifted toward the cluster level, and away from either narrower industries or urban areas *per se*. Marshall however, seemed to have developed an early understanding of this, as will be discussed in the following section.

⁴ Sales or satisficing maximization as opposed to profit maximization objectives emphasize security rather than profit viability with a minimum profit constraint, rather than peak profits, and economizing on time, information and other resources in making a site choice. Locators prefer centres of agglomeration since these tend to be safer than untested isolated sites i.e. offer a higher degree of accessibility to transport routes, near to raw material sources, input suppliers and labour pools. Such centres provide sound location rather than optimal location that is impossible to identify given the amount of time required to conduct detailed revenue-cost calculations to determine such location (Richardson, 1978: 63).

(ii) Marshallian Theory

Marshall (1920: 271) identifies three reasons for localisation. First, if firms are concentrated in a particular area, they offer a pooled market for workers with industry specific skills. This therefore reduces both the probability of unemployment and of labour shortage. Any locality, which has a favourable choice of workers possessing the relevant specialist skills, is bound to attract employers. At the same time, workers in search of employment migrate to places where there are a number of employers requiring such skill as theirs, and where there is a possibility of finding a good market. A common set of cultural and social values often reinforces such a specialised knowledge pool, which is available to all within the cluster. Ultimately this creates what Marshall (1920: 271) termed the local "industrial atmosphere."

Second, once an industry has chosen its locality it is bound to stay long, in which case it is able to support the production of non-tradable, specialised inputs. There is the likelihood that subsidiary industries supplying implements and materials will develop. These subsidiary industries, each devote themselves to one small branch of the process of production. Because they service many of the proximate firms, they are able to keep and make constant use of specialised, high quality machinery, and in effect make it pay its expenses, though its original cost may have been high, and its rate of depreciation very rapid. In such settings in which individual firms could specialise in a particular stage of the production process, a deep inter-firm division of labour occurs. Third, an informational spillover can give clustered firms a better production function than isolated producers can. This is because there is improved communication about market conditions (Marshall, 1920: 273). It becomes feasible to publish information and to make it cheaply available to all when the industry reaches a certain size. The existing firms reap the benefits of cheaper information in the form of lower average costs of production. Growth within this industrial area will imply the emergence of a host of specialised auxiliary industries to service the needs of the parent industry. The effect is to lower costs as a function of the output of the entire industry.

These three reasons formed the basis of Marshall's original exposition of the neoclassical concept of external economies of scale, and most of the literature in this area follows Marshall in identifying reasons for localisation (Porter, 1998: 144; Krugman, 1991: 483-99 and Schmitz, 1992). Marshall (1920: 266)

defines external economies as cost savings accruing to the firm as a result of size or growth of output in industry generally. External economies tend to be characterised by non-rivalry and non-excludability, which can lead to under-investments in a market economy and which is part of a common pool from which every firm can freely draw. Such economies contrast directly with internal economies, which are the source of increasing returns from growth in the size of the plant.

Implicitly, external economies are spatial externalities, which may be defined generally as economic by-products of proximity between economic agents. These can be negative or positive, static or dynamic, pecuniary or technological. Though the static variety is reversible, dynamic externalities are those associated with "the technological advances, increased specialisation, and division of labour that accompanies and/or drives growth and development" (Young, 1928: 527-42 cited in Bergman & Feser, 1999: 9). An example of a static economy enjoyed by a firm in a given industrial district might be lower costs enjoyed for intermediate inputs, because of proximity to its suppliers, e.g. as a result of reduced transport costs. Due to the fact that such an economy does not induce market failure, since it is completely accounted for in the price mechanism, it is also pecuniary. In this context no government intervention is required to encourage geographic clustering. Depending on how such benefits outweigh any costs associated with agglomeration, firms will tend to cluster on their own (Bergman & Feser, 1999: 9).

Dynamic external economies associated with learning, innovation, and increased specialisation are the most relevant in understanding industry clusters. According to Bergman & Feser (1999:9) Marshall illustrated the various facets of (largely dynamic) external economies with his deliberation on concentrated industrial districts, i.e. places where firms benefit from substantial pools of skilled labour available to all of them. There are greater opportunities for intensive specialisation (a finer social division of labour), and the spread or diffusion of industry-specific knowledge and information is intensified. Beyond those dynamics is not just the size of the district alone, but social, cultural and political factors, including trust, business customs, social ties, and other institutional consideration (Fountain, 1997: 3; Piore & Sabel, 1984: 265-7; and Granovetter, 1985:4). It is important to realise that much of Marshall's analysis is relevant to Porter's (1998) discussion of firm structure, strategy and rivalry as one of the four determinants of competitiveness. In effect, Marshall provides some of the first hints as to how

micro-level business relationships might influence growth and development.

From the preceding analysis it can be argued that in the presence of externalities, manufacturing industry tends to cluster in a few regions, leaving others relatively undeveloped. Both Weber and Marshall have argued that such externalities represent economic by-products of proximity between economic agents. Such economic by-products are usually associated with cost savings accruing to firms as a result of the size or growth of output in industry generally.

(iii) Critique of the role of geographic concentration

Marshall (1920: 261-72), Weber (1929: 134-5), and Porter (1998: 144) all base their arguments of geographic concentration on neoclassical externalities. Considerable emphasis is placed on knowledge spillovers due to geographic proximity. It is perhaps surprising that as trade barriers and communication costs fall, and as the internet becomes increasingly important in business, the local environment becomes a more important influence on competitive advantage. Due in part to the above-mentioned factors, and to the globalisation of markets and supply sources, and ease of mobility, several criticisms have been directed towards the role of geographic proximity in clusters.

Krugman (1991: 54) argues that knowledge is invisible. Consequently, it is extremely difficult to assess its impact. Indeed technological and knowledge-related spillovers (examples of dynamic externalities) play an important role in the localisation of some industries, however, one should not assume that this is the overriding reason. At the same time, there is considerable evidence from the literature of neoclassical, static externalities (associated with i.e. lower transport costs due to geographic proximity) as sources of localisation. Krugman (1991: 54) also believes that this could just as well amount to the impact of increasing returns to scale. Again, he made this statement with particular reference to the invisible nature of information. Another criticism of the role of geographic proximity, indicates that there are exceptions to the rule when the assumption that firms must rely on face-to-face communication to remain efficient or innovative is made. Hansen (2000: 4) indicates that "despite these claims, there is in fact abundant evidence that information and knowledge networks that influence business efficiency can be, and often have been widely diffused geographically." Several observers, including Hansen, have argued that geographically proximate firms in a cluster may often attempt to preserve a degree of

secrecy locally, while forming networks with distant partners.

The value of these two criticisms is however reduced by the example of London and New York's financial clusters, which provide evidence of the "continuing value of face-to-face communication" (Norton, 1999: 5). Edwards (1998: 8) as cited in Norton (1999: 5) uses Marshall's analysis of England's industrial districts, and of the role of specialised skills. He argues that a need for clustered financial centres will persist, dependent on the preference by skilled labour to meet in person in order to co-ordinate their work. Norton however, questions the validity of this argument by saying ".....but even if business must be done centrally, why do it near to your competitor?" The answer to this question lies in localisation economies, which Porter (1998: 152-3) argues are important since they facilitate information flows. It was mentioned in Section 2.3.1 that proximity to competitors and suppliers increases knowledge of their operations. This can stimulate innovative activity and even allows firms to headhunt for employees with sought after specialist skills (Norton, 1999: 6).

The notion that proximity is a sufficient condition for spatial spillovers, has also been criticised. Section 2.2 indicated that the nature of linkages in a cluster, are important for the generation of spillovers. This last criticism has resulted (as also indicated in Section 2.2) in a related but distinct concept of regional industrial networks within clusters. This particular concept formed the core of the first non-neoclassical theories of externalities pioneered by Piore & Sabel (1984: 265-7), and later extended by Saxenian (1995: 1-17). Piore & Sabel (1984: 265-7) developed the New Industrial District theory which was distinguished by an emphasis on trust (a common, binding element in Italian industrial districts) and flexible or post-Fordist production systems. They emphasised the merits of the "third Italy" and its industrial clusters, specialising in high fashion and design-intensive goods. They argued that networks (based on trust and social interaction) developed among firms, which managed to cooperate around activities of mutual benefit such as

training, marketing and research. At the same time, small firms in clusters can use their inherent flexibility to obtain cost savings by co-operating with other specialised firms in such areas.

2.3.2.2 Co-operative Competition

In similar perspective to Marshall, Schmitz & Nadvi (1994: 4-6) are of the opinion that industry clusters can be identified by their geographical concentration and intense set of backward, forward, horizontal and labour linkages. These linkages are based both on market and non-market exchanges of goods, services, information and people, as well as a network of private and public local institutions supporting the economic agents in the cluster. He further argues that the widespread availability of external economies and co-operation effects arising from the above features are commonly seen as the key factor making small firms in a cluster economically viable and internationally competitive. In other words, this allows the cluster to reach a high degree of collective efficiency. Schmitz (1992: 65) defines collective efficiency as "the sum of unplanned or incidental consequences and planned or consciously pursued effects."

Also in similar fashion to Marshall (1920: 261-72), Rabelotti (1998: 244) takes the definition of collective efficiency a step further, as he introduces the distinction between static and dynamic co-operation effects. Similar to external economies (see Section 2.3.2.1), static co-operation effects impact on the level of productivity of the system, whilst dynamic co-operation effects impact on the system's capability to grow and innovate. These co-operation effects are a result of explicit and voluntary co-operative behaviour. Schmitz and Rabelotti's arguments have many parallels to one of the predominant themes in the industry clustering literature - "co-operative competition." The idea is that the most competitive firms find ways to work together even as they compete fiercely in the development of new products and the battle for markets. This seems to override the notion that companies minimise risks and maximise their competitive position by strictly regulating any information exchange with direct competitors.

Co-operation effects differ from external economies in that they exhibit characteristics of excludability and compensation. According to Rabelotti (1998: 244), mechanisms allowing compensation govern the rational interest of firms to cooperate among each other. In the event that such co-operation takes place, the resultant co-operation effects would lead to an increase in the collective efficiency of the system. Monetary exchange, exchanges of information, technology, know-how or human capital, and building up a reputation which can become beneficial in future interactions, are ways in which

compensation can take form in the long term (Rabelloti, 1998: 225). The existence of such procedures for compensation, allows the introduction of excludability in the exploitation of collective advantages, which are derived from co-operation effects.

It is interesting to note that a non-neoclassical approach to clustering (see Section 2.3.2.1) suggests that modes of co-operation based on trust, family ties, and tradition, are believed to be one means by which small and medium-sized enterprises seek to counter internal scale economies enjoyed by their larger competitors. These are mostly described for industrial districts in "Third" Italy. Outside of the industrial districts literature, however, examples of co-operation, based on trust, between enterprises in given clusters are few. Doeringer & Terkla (1997: 227) give two examples in which co-operation among co-located firms can payoff. One is when just-in-time inventory and delivery systems are used. They cite the joint location choices of Japanese manufacturers and their suppliers, which are often necessary to make JIT truly work, as evidence of how co-operation drives regional industry clustering. Companies are more likely to identify niche markets and new specialised products when there is more frequent and rapid interaction with suppliers.

The problem with both of these examples is that they apply primarily to end market producers and their suppliers, rather than to *competing* end market producers. As Enright (1996: 199) notes, the distinction between vertical and horizontal types of co-operation is important, since the potential costs and benefits to each type vary significantly. He identifies lobbying; foreign market research; joint export promotion; trade fairs; design; training; projects on technology and specialised infrastructure investments as typical areas in which competing producers might cooperate. Co-operative behaviour in clusters can also be seen in the sharing of specific information within groups of firms linked by some explicit forms of formal or informal agreements. On the other hand, they tend to compete in the areas of marketing, production, and sales, new product development and process improvements. This clearly contrasts with the view on industrial districts, which although focussing much attention on co-operation in production, such co-operation specifically relates to collective efforts to solve joint production problems i.e. with suppliers. Ultimately (as will be discussed in Section 2.4.5), the "social embeddedness" of firm relationships means that internal dynamics of regional industry clusters are likely to vary widely between countries, and often within them (Enright, 1996:199).

Given the limited emphasis in the literature on co-operation between competing end market producers, and the effects thereof, the following model will endeavour to illustrate how this is achievable.

(i) A model of equilibrium and profit-maximisation in an industry cluster

How do firms align the possibility of industry co-operation yet still compete against each other in order to maximise their profits? Without extensions, neo-classical oligopoly models are not much help here as they discuss horizontal co-operation almost exclusively in terms of standard cartel theory. Co-operation is considered with suspicion in both literature and policy discussion. Contrary to the usual assumptions made in most of these models, relations among firms are seldom of a wholly co-operative or non-co-operative type. As evidenced in the preceding sections, in many situations firms compete in some fields, while they cooperate in others. Hence within an industry cluster, firms would commit themselves to a joint profit-maximising level of research and development (R&D) in an "precompetitive stage" but remain fierce competitors in the product market (Enright, 1996: 200).

The merits of co-operative research are based on the fact that it allows the participants to overcome barriers imposed by exorbitant costs of development. It also eliminates the duplication of effort since independent research activities usually develop along identical or near identical technological paths. Waste associated with independent R&D efforts can therefore be minimised if research plans are co-ordinated (Kamien *et al*, 1992: 1293). Thus, even if each firm in this collaborative arrangement were to contribute less than it would spend if it conducted its own development, the collective effort might result in the development of technology at a lower total cost or one superior to what could be achieved by individual efforts. The fear that participating firms in such a collaborative arrangement will tend to "free-ride" on each other, or reduce the potential for competition in other spheres of their interaction, seems to diminish these alleged advantages (Kamien *et al*, 1992: 1293).

This situation could arise when firms undertaking R&D investment are unable to completely appropriate all of the benefits from their R&D projects, which have spillover effects. Hence the worst possible scenario would occur if the collaborative research efforts actually impoverished development efforts as

compared to non-co-operative R&D, and in the event result in increases in product prices brought about by the participants curtailing competition (Kamien *et al*, 1992: 1293). However, as highlighted earlier in this section, mechanisms for compensation in a cluster allows the introduction of excludability in the exploitation of collective advantages derived from co-operation effects. Moreover, the literature also indicated that trust (and the benefits thereof) in Italian districts, seems to mitigate the disadvantages of collective action. Section 2.4.5 will discuss this further. It is therefore important that the participants in a cluster focus on how to achieve the alleged advantages of a collaborative research agreement while avoiding the potential disadvantages.

▪ **The industry in equilibrium**

Once again game theory can be used in an attempt to establish a balance between the advantages and disadvantages characteristic of collaborative research agreements. As highlighted earlier, the essence of this theory is that decisions are made under conditions of uncertainty. Consequently, each firm is seen as a competing player in a game of strategy under conditions of less than full information concerning the outcomes of various decisions. Thus in the product market each firm's managers proceed on the assumption that their rivals are extremely inventive decisions makers who will always make the most profitable counter moves to any they make (Baumol & Blinder, 1998: 290).

A two-stage game with n firms participating as players can be used to analyse how firms can achieve and maintain their profitability, whilst co-operating at industry level. In the second stage of this game, we will make the critical assumption that firms will engage in Bertrand (price) competition, while in the first stage they invest in R&D. A player's payoff or yield is composed of the profits made in the second stage of the game less his first stage R&D expenditure. Though the analysis allows for firms producing differentiated or identical products that share a common technology, in this analysis the focus will be on differentiated products (synonymous with Bertrand competition). In the first stage of the game research efforts are aimed at reducing unit costs. Spillovers (the ease with which each firm can imitate the successful one's innovation) from each firm's research and development efforts to the others will be allowed in this model. We also assume that the results of the R&D stage are completely shared, in which case duplication of effort is eliminated (Kamien *et al*, 1992: 1294).

In essence, the model depicts a research joint venture (RJV) cartel. Its critical feature is that firms share their information completely, eliminate duplication of effort, internalise spillover effects, and co-ordinate their R&D expenditure so as to maximise the sum of their profits at the level of output where the industry marginal cost (**MC**) and marginal revenue (**MR**) are equal. It is important to note that naturally participants in an RJV might not disclose information or might be permitted to conduct some proprietary research, in which case the spillover rate might not be increased to its maximal possible level assumed so far. Taking this into account, our analysis is confined to the case in which firms share all their R&D outcomes.

Within the game theory approach, an analysis of *pure-strategy subgame-perfect Nash equilibrium*, (a situation in which all players adopt moves such that each player's move is its most profitable response to the move of the other) can be used. This discloses that for sufficiently high spillover rates, the reduction in unit costs is greater under RJV cartelisation than under R&D competition (when firms undertake their own R&D efforts). The causes of this difference are two types of externalities created by R&D activities in the presence of spillovers. The first one has an impact on a firm's competitive advantage relative to its rivals. This externality involves a firm deciding its R&D investment level whilst taking cognisance of the impact it will have on its competitor's efficiency. In this respect, the critical realisation by firms would be that for every rand it spends on R&D, part of it spills over to its competitors, reducing their unit costs and making them aggressive competitors. This externality inhibits a firm's R&D spending and is taken into account by the firms in this model. The second externality impacts on overall industry profits and can be either positive or negative. It is usually a result of the impact of a firm's R&D expenditure on the profits of all the firms. This externality is ignored by a firm under R&D competition but is internalised when firms decide how much to spend in order to maximise on the RJV cartel's combined profits.

It is important to note that the total effect of the two externalities is positive when the spillover rate is "sufficiently" high. One finds that in such a situation, unit costs tend to decrease more under RJV cartelisation than with R&D competition, in which case combined profits are higher, and second-stage equilibrium prices are lower. At the same time, both producers and consumers achieve the highest total

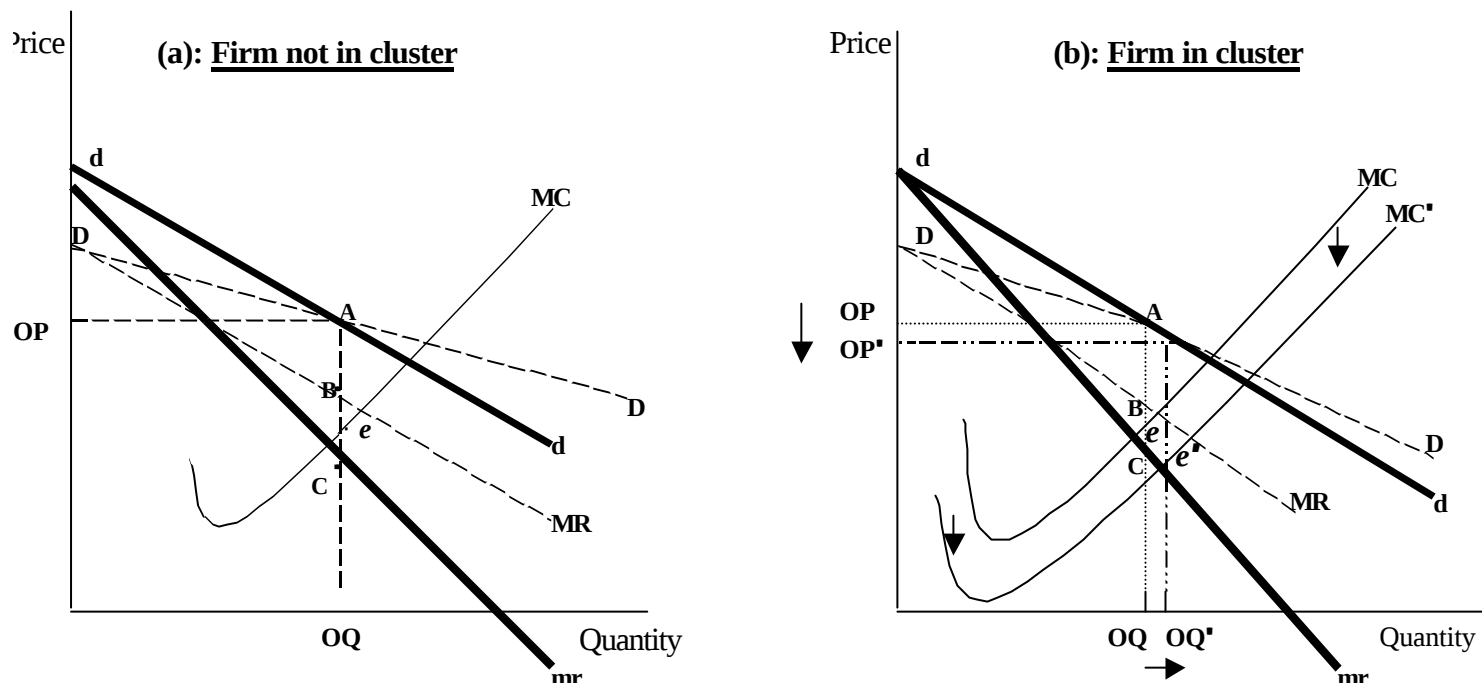
consumer plus producer surplus. One could also argue that large spillovers create a public-good effect through elimination of duplication and hence some implicit economies of scale that make co-ordinated actions socially preferable to unilateral ones (Kamien *et al*, 1992: 1295). If firms decided to conduct R&D individually, these economies of scale are not exploited and the "free-rider" problem dominates.

▪ **The firm in equilibrium**

As discussed in the previous section, one of the advantages of firms collaborating on R&D is that the industry's joint profits are maximised. This might seem an appealing explanation in justifying the collaboration of firms in a cluster. However, it does not fully explain how individual firms can competitively seek to obtain an equilibrium level of output at which they maximize their own profits. The *Bertrand version of oligopoly theory* can assist once more in this regard. Firms are assumed to sell differentiated products, meaning that it is possible for one producer to raise or lower his price without needing to fear either the loss of all his customers, on the one hand, or an immediate response by his rival, on the other hand.

In analysing oligopoly with product differentiation, we will use the kinked average revenue curve. In a sense, there is no revenue function for an oligopolist at all. The amount he sells depends on the prices charged by other producers, and unless these can be specified in advance he cannot know what the demand for his product will be. This kinked average revenue curve is likely to be found mainly where trade is relatively depressed. It is when business is bad that a group of oligopolists will be reluctant to follow a price increase by one of their members. They will feel that if a single firm raises its price, it is likely to lose market share, and profits as well, so that they will be well advised to maintain their prices. It is in these circumstances too, that they will feel compelled to follow a price cut by one member of the group. They will then feel that unless they follow the price cut they will lose market share, and that in the long run at least they will lose profit as well.

FIGURE 2.2 EQUILIBRIUM FOR: (a) FIRM NOT IN A CLUSTER (b) FIRM IN A CLUSTER



Source: (a) Baumol & Blinder 1998:290

(b) Own interpretation of possible outcome

In Figure 2.2 the kinked demand curve is (DAd) and the corresponding marginal revenue curve (MR) that follows the MR down to point B and drops directly to point C . Hence the composite marginal revenue curve facing the firm is ($DBCmr$). The price has settled down at OP (equilibrium at e) and the firm is currently selling the amount OQ . As we have seen, this kind of average revenue curve implies that there is rather a depressed market. If the firm cuts its price, its rivals will follow; if it raises its price, they will not.

If the marginal cost curve (MC) is as shown, there will be no reason to alter price. The marginal cost curve passes through the 'gap' in the marginal revenue curve. Any slight upward or downward shifts of the (MC) curve will still leave it intersecting the marginal revenue curve between B and C and therefore will not lead the firm to change its output decision. Consequently, the price will remain unchanged. This

particular aspect of the kinked demand curve makes prices "sticky" i.e. reflects the uncertainty firms have about competitor behaviour.

However, assuming this particular firm is operating within a cluster, and due to collaborative research efforts unit costs of production within the industry are rapidly falling, and hence the marginal cost curve falls far enough (MC') to cut the marginal revenue curve below C (as illustrated in graph b: of Figure 2.2), it may pay the firm to cut its own price to OP' (equilibrium at e') in which case output increases to OQ' . Even after competitors have matched the price cut, costs may have fallen far enough to leave substantial profits. The danger with price-cutting however, is that rivals may react by cutting their own prices even further, which will eventually lead to a price war. The best way to insure against this, is for each firm to keep its costs as low, or lower, than those of any other firm. To do this, firms can strive to see that by using new production methods and introducing new products, their costs are low, their productivity high, and their products attractive by comparison with those made by other firms.

Thus even though this firm could have collaborated in R&D, which leads to a substantial decline in unit costs of production, (e.g. of dynamic externalities derived from learning and innovation) it is crucial that it still strives to have superior cost-saving manufacturing processes to make its products, or it strives to have a superior service capability. The implication thereof is that if a price war should break out, the firm that has concentrated on using world class technology and is innovative and creative in the process, or one linked to partners who are world class in complementary activities, will be strong enough to survive (Baumol & Blinder, 1986: 248). What is therefore crucial is how effectively individual firms can use the advantages created by an industry cluster (i.e. savings obtained from joint R&D) to enhance their productivity, maximise their profits and in the event to gain greater market share.

Ultimately, firms, which were making losses or just breaking even prior to the establishment of an industry cluster, could see themselves earning abnormal profits. Not only can they benefit from cost-savings in production that could be generated by cooperative research efforts, but also from efficiency gains brought about by external economies of scale, and the international reputation which the cluster

will eventually obtain as its visibility and prestige attracts foreign direct investment.

2.3.2.3 Rivalry

The third core theoretical concept underpinning the literature on regional industry clusters is that of interfirm rivalry. It would seem that the emphasis on interfirm rivalry in Porter's analysis contradicts the view that clusters are strongly characterised with a spirit of cooperative competition. As mentioned in Section 2.3.1.1 Porter (1990: 36) adopts the traditional neo-classical view in arguing that a competitive industry structure -i.e. multiple companies competing in the same industry, such as those found in an oligopoly environment- ensures continued pressure to upgrade technologies, minimize costs and innovate. But a simple industrial concentration index is not a good measure of the degree of rivalry among firms in a given industry or region. More important is the competitive spirit characteristic of the industry (Enright, 1996:200). At the same time, rivalry is likely to be stronger among competing firms that are geographically concentrated in a particular area in which case the depths of competition multiply. Consequently in the same region firms compete not just for customers, but also for labour, capital, publicity, and political support.

Chinitz (1961) as cited in Bergman & Feser (1999: 12) offered one of the earliest analyses of the association between market structure and geographic concentration. He was trying to establish that market structure is a key determinant of agglomeration economies. The foresight in his discussion is evidenced in the present-day focus on how firm and industry organisation influences regional development paths. He draws a direct link between firm structure and rivalry and regional economic fortunes. He also critiques the agglomeration economies literature's emphasis on urban and industry size arguing that "industrial structure particularly influences learning, innovation, and entrepreneurship, giving diverse, and small-firm rich places like New York an advantage over large-firm, single-industry towns like Pittsburgh" (Bergman & Feser, 1999: 12). This has become a significant theme in the Marshallian new industrial district theory as well.

2.3.2.4 Path Dependence

Path dependence is yet another underlying theoretical concept in regional cluster definition. Its origin is

rooted in the various growth theories developed over the years. Authors such as Myrdal (1957); Friedman (1966); and Kaldor (1970) put forward polarization, core periphery and cumulative modes (respectively), which highlighted that regional growth or decline tends to be self-reinforcing (Bergman & Feser, 1999: 12). Disequilibrium in the space economy, with some leading or dominant regions as compared to peripheral regions, is the underlying argument in these models. These early growth theories essentially form the basis of the current new endogenous growth theories.

The 1980s on the other hand, witnessed the dominance of neoclassical theory in mainstream regional growth. Consequently, neoclassical regional growth theory, which might be termed “exogenous growth theory” sees rising output per capita as resulting from externally given increases in the quantities of labour and capital (Bergman & Feser, 1999: 13). Constant returns to scale dominates this approach, in which case growth can be explained using statistics i.e. by increases in the quantities of factors of production. In this case increases in "quantities" of labour is synonymous with increasing education of workers. The assumption is that there is no technological or organisational change, no economies of scale, but only constant returns in an environment affected only by investment and labour force growth. The net effect thereof is that natural market mechanisms will gradually eliminate interregional differences (Bergman & Feser, 1999: 13).

In the 1990s, the debate between equilibrium and disequilibrium views of growth was renewed, with contributions in mainstream growth theory that emphasize the role of increasing returns.

This is due to advances in modelling techniques, which have allowed mainstream economists a more accurate and consistent treatment of growth theories. New growth theory suggests that growth over time implies increasing returns to scale for a region or a national economy (Krugman, 1991: 61). The explanation lies in innovation and in spillovers from external economies of scale that operate over time, enhancing skill and productivity levels throughout the economy. Learning-by-doing within a firm is an important process in new growth theory, which implies that current unit costs are a function of experience. Because of spatial agglomeration, firms can benefit from increasing returns due to the ease of imitation and learning. Consequently, new growth theory propose that comparative advantage established in a region or country, perhaps by accident, chance, distribution of natural resources, other

non-behavioural phenomena is likely to strengthen as a result of such external economies (Bergman & Feser, 1999: 13).

In similar fashion to the new growth theory, 'new international economics' also holds important implications for regional analysis. Clearly trade theory is not now encompassing a geographic dimension; since it has always been a spatial theory (Ohlin, 1967; Krugman, 1991). As cited in Bergman & Feser (1999: 16), Krugman (1990) suggests that including increasing returns models into trade theory indicates the probability of a highly concentrated geographic pattern of development, coupled with sustained disparities in regional income and employment. Similar to new growth theory, the focus appears to be on knowledge-related externalities as sources of increasing returns, especially in technologically advanced industries. Also cited in Bergman & Feser (1999: 13), Arthur (1989: 116-31; 1990a: 235-51; 1990b: 92-9) indicates that when industries that have developed a competitive lead in a given market induce a process of cumulative regional development, this results in a "lock-in effect."

Luck or historical accident such as business acumen can cause the initial lead. Either way, certain 'locational clusters' may be able to develop a type of monopoly advantage over industries in other places, though how likely or sustained such a process would be, is an empirical matter.

Path dependence therefore primarily refers to the general concept that regardless of their quality, technological choices can be dominant over alternatives and is self-reinforcing (Bergman & Feser, 1999: 13). These technological choices are not necessarily irreversible if they are given a significant enough shock. A classic example is that of David's discussion (1985) of the modern keyboard. On account of the fact that business, as a general rule, cluster in space, path dependence can have clear geographical implications.

Krugman (1991: 60) gives the example of the carpet industry in Dalton, Georgia. It was by chance that a young lady developed a technique to make bedspreads and created a local handicraft industry that began selling the items in outlying areas well beyond the immediate vicinity. No carpet technology institute at the local university or cluster of carpet producers existed in Dalton, and there was no history of carpet making among local workers. Nevertheless Dalton developed into a leader in carpet

production and into a carpet industry cluster. Scale economies and externalities reinforced its lead. As a result of the path dependency of technology, development trajectories can become path dependent (Bergman & Feser, 1999: 15). The Dalton story therefore illustrates that the notion of being the first-mover can have far-reaching effects on the ability to achieve success in development efforts.

2.3.2.5 The Innovation Environment

The final theoretical concept underlying regional clusters is that of the innovation environment. The previous sections highlighted the underlying phenomenon of clustering. The discussion established that the conditions for competitive advantage are the most favourable when exchange and flow of information about needs, techniques, and technology among buyers, suppliers and related industries occurs at the same time that active rivalry is maintained in each separate industry.

Although a brief description was given of some of the reasons why such interchange improves competitive advantage, minimum attention has been given to the mechanisms through which it occurs. These are important since effective interchange among independent firms in a region or nation is far from guaranteed. Because the economic interests of firms in a cluster differ and sometimes conflict, (i.e. suppliers and buyers for example, face conflicts over prices and the resulting division of profits), this may hinder effective interchange. At the same time, because of an unwillingness to disclose information, this may bias or restrict information flow among stakeholders in a cluster. As Porter (1990: 152) suggests, it is not a given that effective interchange which has advantages for local firms competing with foreign rivals, will reduce the preoccupation with relative bargaining positions.

Some of the mechanisms that do enable interchange within clusters are conditions that help information to flow more easily. These mechanisms also facilitate coordination through the creation of trust and reduce the perceived differences in economic interest between vertically or horizontally linked firms. For example, personal relationships due to schooling or military service, ties through scientific or professional associations are facilitators of information flow. Community ties due to geographic proximity and trade associations encompassing clusters are also important. In addition to facilitators of information flow are sources of goal congruence or compatibility within clusters. The latter would consist of factors such as

family or quasi-family ties between firms, common ownership within an industrial group, ownership of partial equity stakes, interlocking directors and national or regional patriotism (Porter, 1995: 153).

Far from being isolated from what lies outside them, firms are embedded in networks of social and institutional relationships that shape, and are shaped by their strategies and structures, (Saxenian, 1995: 3). One finds that purely analysing clusters in terms of external economies and therefore drawing a sharp distinction between what occurs inside and what occurs outside the firm, overlooks the complex relations that have evolved with time between the internal organisation of firms and their connection to one another, and the social structures and institutions of their particular locality. Consequently, a *network* perspective brings to the fore these historically evolved relationships (Saxenian, 1995: 3).

(i) "Social Capital" within Clusters

The relationships in networks capture an important feature of clusters' '***social capital***' It is an important element in reducing the extent of conflicting economic interests amongst firms in clusters. "Social capital" refers to "features of social organization, such as networks, norms, and trust, that facilitate coordination and cooperation for mutual benefit" (Fountain, 1997: 2). The concept of social capital extends our understanding of cooperation and collaboration in two significant ways. First, making cooperation synonymous with the economic concept of *Acapital* gives an indication of the investment or growth potential of a group's ability to work jointly. Second, the concept identifies the structure created from collaborative effort as capital.

In a sense, well-functioning networks in industry clusters actually constitute "a form of social capital," found in the resources which are shared and held by individual institutions in a cluster, as well as in the overall structure of the relationship among the institutions. For example, a group of scientists use their collaborative ability gained from collaboration on a relatively small scientific project to propose and to complete larger, riskier research projects. Moreover, they may eventually use their network to address the economic development of their community. As they learn how to collaborate productively and develop reputations for trustworthiness, they may extend their originally small network to members of the political and business community (Fountain, 1997:2). Similar to other forms of capital, social capital

also accumulates when used productively.

This opposite to social capital is the dilemma economists typically refer to as the problem of "**collective action.**" Despite the gains from cooperation, collective action theory argues that, in the absence of an overriding authority to sanction appropriate behaviour or clear guidelines to ensure commitment, individuals will tend not to take the risks of cooperation. Ultimately, no one gains from co-operation and all are worse off. Collective action, which has until recently dominated economic relations, has been considered unfortunate, since policy experts have argued that the coordination costs associated with inter-organizational and inter-jurisdictional arrangements, under cooperation, often exceed the benefits (Fountain 1997: 3). They repeatedly highlight the need for clear lines of authority and strong, centralized governance structures to monitor behaviour and to enforce sanctions against inappropriate actions in order for collective action to be effective.

Nevertheless, an increasing number of policy experts, as well as social scientists from a variety of disciplines, have noted and have sought to explain the proliferation and success of collaborative arrangements in a variety of policy settings. According to Fountain (1997:3), the success of these arrangements can be attributed to the workings of social capital. Trust, norms, and networks are the constituent elements of social capital. Of particular interest is the concept of transitivity of trust which is a key property of social capital, in which case: A trusts C because B trusts C and A trust B. Therefore without close personal contact among all members, relatively large networks may show signs of generalized trust and with time, a social contract is negotiated, in which norms of appropriate behaviour are specified. Reciprocity is a norm, which experts considered being paramount to the development of beneficial relationships (Fountain 1997: 3). At the same time, the norm that stakeholders will forego their immediate self-interest to act not only in the interest of the group but also in their own long-term self-interest is closely linked to reciprocity.

Essentially, a reputation for trustworthiness is fundamental to stakeholders within collaborative networks. Consequently, social capital is maintained through carefully selecting players in the network, and strict sanctioning of inappropriate (network-destroying) behaviour. The boundaries and objectives of the

network must be clearly defined to the extent that the stakeholders may need to define the rules under which they will cooperate. In order to punish inappropriate actions without destroying the network, sanctions must be in place, whilst conflict resolution mechanisms in order to resolve inevitable disagreements need to be developed.

Such measures are necessary because social capital is a powerful resource. Its use depends entirely upon the values and objectives of the stakeholders involved. It is a tool that may be employed for legal or illegal purposes, for good or ill. Trust allows actors to engage in productive collaboration, but trust also provides a necessary condition for fraud and other illegal activities. Though norms essentially decrease transaction costs and regulate behaviour when improperly used, they may hinder the creativity and diversity of opinion necessary for solving novel and complex problems. Nevertheless the benefits that flow from social capital far outweigh the dangers.

Many observers such as Maillat (1991: 103-17); Fountain (1997: 1-14); Dunning (1995: 461-88); and Bergman & Feser (1999: 1-15), have noted the importance of shared information to entrepreneurship and economic growth. Although the electronic media has facilitated open access to information, notably in recent times through the internet, provides a variety of opportunities, informational capital is not a replacement for social capital. Social capital gives decision-makers far more significant benefits than access to the Internet. This is because it encompasses not only shared access to vast amounts of timely information but many positive properties of interdependence: "shared values, goals, and objectives; shared risk, accountability, and trust; and shared rewards" (Maillat, 1991:113).

The ability to build and use informational capital is increased by social capital because trustful relationships increase information flows and brings richer meaning to information. According to Fountain (1997: 6) firms in a collaborative network provide an example of an efficient form of collective learning. The density of interaction within the network increases the speed and ability of firms to learn of new technologies, opportunities, the outcome of transactions and challenges. At the same time the quality of learning is heightened because it is subject to discussion and debate among horizontal firms whose perspectives and backgrounds may differ.

Essentially, dense social networks can encourage experimentation and entrepreneurship among stakeholders because of the mix of collaboration and competition within the network. Network members compete fiercely but also collectively utilise and share information about environmental changes, including markets, regulations, technologies, and opportunities. As mentioned in Section 2.4.1, proximity provides a powerful aid to realizing the advantages of innovation. This is heightened by the presence of "social capital" in network relationships.

The preceding section has highlighted five core underlying theoretical concepts to industry clustering. Although these concepts ranged from theories on external economies to theories on path dependence, they commonly explained the dynamics and synthesis of cluster theory. The following section will endeavour to validate cluster-based policies and will explore the role of government in this regard.

2.4 The role of government in regional clusters

Both national and regional government may play a critical role in affecting the form, efficiency and growth of clusters. The traditional roles of government are being extended to include formulating effective cluster-based policy.

2.4.1 Government and cluster upgrading

The traditional roles of government (i.e. maintaining macroeconomic and political stability, improving microeconomic capacity through quality general-purpose inputs, and determining overall microeconomic rules and incentives governing competition) though pertinent to the development of viable clusters, are insufficient. An increasingly relevant role of government is that of facilitating cluster development and upgrading (Porter, 2000: 13). One of the core elements of clustering is the potential to allow an economy to move beyond factor cost competition, a process which requires relevant, cluster-specific government policies. This will be discussed in Section 2.5.2.

Rather than being concerned with the business environment, cluster-specific policies are required from government. Its fundamental role should be to challenge clusters to innovate and upgrade, although this

should not merely consist of responses to the short-term demands of clusters. For example, due to spillovers and externalities in clusters that encompass public entities, government involvement is essential.

Moreover, government needs to encourage the formation of micro-regional cluster development, although it is important (as will be indicated in Section 2.5.2) that business drives the overall process (Dunning, 1997: 119; Porter, 2000: 13; DEAET, 2000: 11). It can do this by modifying its policies and practices, as well as motivating, facilitating and providing incentives for collective action by the private sector.

Porter (2000: 13) indicates that in its upgrading endeavours, government needs to recognise that as much as every cluster contributes to national productivity, it also affects the productivity of other clusters. He made this observation with specific reference to traditional clusters such as agriculture, which in his opinion should not be neglected in the upgrading process. Although the upgrading of clusters should be a sequential process, the ultimate objective should be to eventually include all clusters.

At the same time, it needs to be understood that job losses might be inevitable as firms endeavour to be more productive. In the event of such job losses, it is essential that markets and not government determine the clusters that will fail or succeed (Porter, 2000:1).

Both Porter (2000: 13) and DEAET (2000: 11) indicate that clusters must not be developed or created from 'scratch' within the context of declining markets and industries. This is one of the main pitfalls of cluster-based industrial policy (see Section 2.5.1). Rather, the emphasis should be on reinforcing and building on established and emerging clusters, not creating entirely new ones. As Porter (2000: 13) puts it, "there should be some seeds of a cluster that have passed a market test before cluster development efforts are justified." At any rate, most clusters usually form independently of government and sometimes in spite of it. Ultimately, the process of cluster upgrading involves the realisation that a cluster exists or has potential to, in which case government needs to remove any obstacles, relax constraints and eliminate inefficiencies which frustrate productivity and innovation in the cluster (Porter, 2000: 13). Although some constraints (human resources, infrastructure etc) can be resolved by the private sectors, others (government regulations, basic infrastructure, education, training policies) are a result of government policy and therefore require its intervention. Essentially, any government policy that results

in increased costs with no potential for long-term competitiveness or social benefits needs revision. This clearly highlights the need for government focus to go beyond improvements in the general business environment.

Traditional government policies focus either on specific industries or broad sectors. Modern competition rules against such policies, favouring those policies aimed at the cluster level. The focus on the industry level implies that some industries are better than others in which case competition can be distorted or limited. On the other hand, a focus on sectors is too broad to be of any significance for competitiveness, whilst according to Porter (2000: 14), “distinctions such as manufacturing versus services, and high tech versus low tech, no longer hold meaning.”

Finally, as will be discussed in Section 2.5.2, externalities, linkages, spillovers and supporting institutions are factors that are significant to modern competition, and this is emphasised and highlighted by clusters.

Ideally, when firms, suppliers, related industries, service providers and institutions are grouped together, government initiatives and investments are able to resolve problems common to all without government threatening competition. Therefore in this capacity, government should encourage the building of public or quasi- public goods that are relevant to many linked businesses. The point to take note of is the merit in government investment in improving the business environment in clusters (i.e. higher returns) as opposed to a focus on individual firms or industries or at the broader economy (Porter, 2000: 14).

2.4.2 Cluster-based policy

According to the DEAET (2000:10), clustering and networking is fundamentally a “bottom-up, market-induced, and market-led process.” The traditional perception of the primary role of government has been to encourage and facilitate dynamic markets whilst ensuring that cooperation does not result in “collusive behaviour” which curtails competition. As indicated in Section 2.5.1, cluster studies have identified the need to revise and redefine government’s role as a, “facilitator of networking, catalyst of dynamic comparative advantage and institution builder,” (DEAET, 2000: 10). This is a role that demands the creation of efficient incentive structures aimed at eliminating inefficiencies in systems of

innovation.

It is important to realise that the fundamental principles of industrial and cluster policy are unique to each. Industrial policy is basically aimed at improving the functioning of the systems of innovation. Hence the tendency to target for support, those industries considered as being desirable in obtaining favourable competitive outcomes for a nation. Under industrial policy, increasing returns to scale are highly significant in determining competitive advantage (Porter, 2000: 14). With such a focus on scale, government tends to subsidise and protect “infant” industries from imports and foreign investment. Industrial policy also tends to use central intervention at the national level. Cluster policy on the other hand is based on a broader and dynamic view of competition based on the growth of productivity. More important in cluster policy is productivity growth, rather than the scale of individual firms as envisaged under industrial policy. Because all clusters are important to an economy, owing to their contribution to prosperity, cluster policy emphasises the importance of how nations or regions compete rather than what they compete in. Consequently, cluster policy advocates against targeting particular industries since all existing and emerging clusters justifiably qualify for attention.

Most economists and development practitioners agree that the effort to identify industries, which are considered to be potential failures from those which are likely to succeed, is generally a mistake (Anderson, 1994: 26-32; Porter, 2000: 1-24 and Dunning, 1997: 114-31). Such efforts usually turn out wrong and governments often inappropriately subsidize industries that they expect to be winners. However, identifying industry clusters is different - it is a process to assess the "revealed preferences" of business communities and linkages among associated industries (Anderson, 1994: 27). As will be seen in Section 2.6, this process is useful in providing guidance to industry attraction programmes with limited resources. It is also useful in highlighting areas for improvement in infrastructure and other resources needed by dominant industry clusters. It may, however, be appropriate to subsidize natural or created assets to foster cluster formation in the case of countries seeking to catch up with their established foreign competitors (Dunning, 1997: 123). For example, some temporary cost-reducing or tax incentives can be offered to firms, conditional, for example, on their locating their activities in certain regions, or on their achieving a certain level of performance.

Due to the improvement in externalities and productivity, as well as contribution to local employment and investment that foreign firms confer on the local business environment, clustering policy encourages the acquisition of foreign creative assets via foreign direct investment (FDI) and alliances which are cluster sensitive (Dunning, 1997: 122). Protecting the local environment from imports is undesirable as far as cluster policy is concerned. Imports are essential in enhancing competition and rivalry, efficiency, providing inputs and upgrading local demand conditions (Porter, 2000: 15). In contrast to industrial policy, which, as indicated earlier, tends to centralise intervention, cluster policy advocates the importance of initiatives at state/regional and local levels. Such a process should encourage the different levels of government to incorporate competitive strategies into their policies.

Finally, unlike one of industrial policy's objective of distorting competition in favour of a particular location, cluster policy emphasis is on the eradication of obstacles, constraints and inefficiencies in productivity and productivity growth (Porter, 2000: 15). Ultimately, cluster policy's underlying principle of competition is that, an increase in productivity and trade should expand the market, in which case many locations have the potential to become viable if they become increasingly productive and innovative.

Although cluster policy approaches may differ, there are two main ones: the bottom-up approach (BUA) and the top-down approach (TDA). The bottom-up approach is rooted in market induced initiatives, with government taking on the role of 'facilitator and moderator', without establishing national priorities (DEAET, 2000: 10). In the top-down approach government engages in dialogue with industry and research agents. Before starting the dialogue process it establishes national priorities, develops a challenging view for the future, and decides which stakeholders should participate in the dialogue process. Though in this particular case government initiates the process, this should eventually evolve into a market-led process (private sector driven) without much government interference.

Although cluster-based policy has innumerable advantages, if not properly implemented it can have a detrimental effect on the economy. According to the DEAET (2000: 11), the following are some of the pitfalls in the implementation of cluster-based industry policy:

- it should not be a government-driven effort, it should result from market-induced and market-led initiatives;
- government should not have a strong orientation to direct subsidies to industries and firms or to limiting rivalry in markets;
- government policy should shift from direct intervention to indirect inducement i.e. public market interference can only be justified if there is a clear market or systemic failure;
- government should not attempt to take a direct lead or ownership in a cluster initiative, it should just act as a catalyst, bringing stakeholders together;
- cluster policy should not ignore small and emerging clusters, nor should it focus on 'classic' and existing clusters;
- clusters should not be created from 'scratch'.

The following section will highlight how clusters can be used in economic development strategies.

2.5 Industry Clustering for Economic Development

The previous five sections have defined the concept of industry clusters and described the dynamics of these clusters. In this section, clusters will be presented as possessing potential to lead economic development initiatives. According to Porter (2000: 5), "economic development seeks to achieve long term sustainable development in a nation's standard of living, adjusted for purchasing power parity."

Not only can clusters be used to enhance the performance of individual companies, but they can also be used as a tool for better understanding the economy, and therefore drive economic development. This is because the use of clusters provides a powerful set of tools for analysis, policy formulation, and regional organisation and implementation to increase the effectiveness of economic development strategies (Le Veen, 1998: 5). For example, industry clustering can improve short-term industry attraction efforts through identification of prospect sectors and definition of specific advantages. In addition, industry clustering is useful in defining medium-term strategies for retaining, establishing and growing regional industry and in organising long-term strategies to sustain regional growth.

In relatively short time periods, the attraction of companies to a region is the only means by which a region can realise significant growth in employment opportunities. But, there is a need to balance this with strategies to retain and expand existing industries and strategies to establish new enterprises and clusters (Anderson, 1994: 27). Attraction efforts are most effective when they depend on the opportunities inherent within existing clusters, and the advantages the region offers to firms similar to those in the industry clusters that already thrive in the region. For example, strong clusters are likely to attract higher quality inward investment (Botham & Downes, 1999: 12). Such methods are more effective in the short-term. They are more likely to produce lasting results than are attraction efforts focussed on types of firms that are outside the region's existing clusters. Similarly, attraction efforts that rely on generic characteristics and advantages such as tax incentives and training subsidies are less effective.

Porter (2000: 11) considers that many new businesses are created in existing clusters as opposed to isolated locations. One of the reasons for this tendency is that within a cluster there is better information about opportunities. Such opportunities are more easily perceived in clusters, for example, new gaps in products, services or suppliers to fill. At the same time, barriers to entry are usually lower in clusters than they are elsewhere (Porter, 2000: 11). For example, the required assets, skills, inputs and staff often are readily available at the location, and are assembled more easily there. Moreover, local financial institutions might require lower risk premiums on capital due to their familiarity with the industry in a cluster. At the same time, established clusters can also reduce the perceived risks of entry, especially if there are foreign-based cluster participants. This may be compared with Weber's location theory in Section 2.3.2.1.

In the medium term, existing clusters are important in defining development strategies that require longer periods to pay off. Current literature centred on the dynamics of economic development, stresses the importance of helping small companies to become established in a region. It also discusses the importance of competitive foundations such as, "work-force preparedness and research institutions in sustaining economic growth" (Anderson, 1994: 28). Nevertheless, initiatives to establish new firms and

enhance economic foundations will require two to five years to begin producing tangible results. The important factor in defining these strategies is to establish which types of small businesses to target for support and which foundations to improve in order to sustain and support the growth of industry in the region. In this case the analysis used in identifying attraction targets and defining attraction strategies is also relevant, though the applications are different. Here, the strategies will be more indirect. In order to realise longer-term economic goals, the focus should be on initiatives that enhance the region's ability to maintain, establish, and develop industry.

By helping new companies to become established either to fill gaps in existing industry clusters or to extend the existing clusters into new markets, in the long term, a region can strengthen its economy and create new employment. The region can also undertake efforts to address gaps and limitations in the economic foundations that support the ability of regional industry to compete in global markets (Anderson, 1994: 29). Such efforts will be directed towards sustaining the economic base of the region. Moreover, a region can achieve significant leverage in the efforts to accomplish the goals by defining strategies that address a variety of objectives within integrated initiatives such as cluster initiatives (see Section 2.2). Again, the key to defining these strategies lies within the region's existing industry clusters.

Inherent in the concept of industry clustering that has been put forward by Porter (1998: 148-157) is the existence of a set of core competencies that are shared throughout the cluster. Once a region has identified a significant regional cluster, it can use interviews and analysis by industry specialists to identify the core competencies that are critical to the cluster's success. Identifying those core competencies that are not as strong as industry executives would wish, it can then define strategies to strengthen them. Such strategies can be structured in such a way that they support the establishment of new companies that specialise in these areas of competence. At the same time, the strategies can take advantage of opportunities to extend these core competencies into new markets through diversification of existing companies and establishment of new companies. They can also support the retention of existing companies by strengthening the region's ability to support these areas of competence (Anderson, 1994: 30).

The most valuable application of industry clusters in achievement of these long-term goals is in developing an organisational framework and process that can sustain ongoing development efforts. The basis for significant changes in the region's economic base is a continuous process of interaction between private corporations and public institutions (Anderson, 1994: 30). Consequently, the organisational framework can be derived from leadership from within the existing cluster in a region. Such a framework can determine and implement development strategies, constantly reviewing and refining these strategies as new challenges and opportunities arise.

Industry targeting - that is, the identification of specific industries or types of enterprises for emphasis in economic development activities - has become an important element in regional development strategies. This is because it enables the developer to focus on a specific goal in order to increase efficiency and leverage efforts (Botham & Downes, 1999: 13). Industry clustering can be used as a means for improving targeting efforts. This is due to the fact that clusters capture the economic relationships among specific industry sectors. This provides a far richer source of information about regional dynamics than is available in the type of specific industry sectors inherent in the Standard Industrial Classification (SIC) system (Anderson, 1995:30).

2.5.1 Evaluation and Critique of Industry Cluster Policies

In discussions of the importance of existing industry clusters to a region's economic development, one objection is frequent: *does this approach mean that a region is forever limited to the industry that it presently possesses?* The response to this is that over a longer period a region can give rise to a completely new set of industry clusters and can significantly change its economic base. As Anderson (1994: 31) points out, economic development professionals should not ignore the long term in defining their strategies, because with sufficient time, the potential exists to reshape a region's economic base. Identification of present industry clusters can also be an important analytical and process tool in defining long-term goals and implementing long-term development strategies. The important point is that dramatic changes can literally require decades, but they start within the existing clusters of the region.

The other criticism directed towards cluster-based policy for economic development, is the concern that

they encourage over-specialisation in the economy. According to Botham & Downes (1999: 13), "focussing on specific clusters does not mean more of the same." To the contrary, a cluster approach is actually beneficial in diversifying the economy. It does this in two ways: firstly, such an approach is likely to target (for inward investment) a range of industries in the cluster. These would include critical gaps such as supply industries or customers. Ultimately, because of its focus on innovation and upgrading, a cluster helps generate new industries. Secondly, a cluster approach offers the opportunity to diversify away from assembly and manufacturing into a wider range of functions such as R&D.

Another criticism questions the reality of industry clusters being more applicable to small, specialised firms. It is argued that this is questionable, particularly due the level of trust and co-operation required for a successful cluster (Le Veen, 1998: 6). Harrison (1993) as cited in Norton (1999: 4), disputes "the idea of a new wave of economic development led by clusters of smaller firms." He argues that multinational corporations set the rules and determine the course of advanced economic development. For example, in a core-ring network strategy, large firms at the core benefit from flexible production systems, while making use of a dependent exterior ring of smaller firms employing low-wage workers.

Fujita & Child Hill (1998: 184), also cited in Norton (1999: 4) are in agreement with Harrison (1993) as they argue that this corporate-dualism theory of economic development differs from the industrial-district theory in its perspective on what is happening in spatial clusters. The fact that large multinational companies dominate the current economy undermines the trust that is required for a cluster to be effective. There are enough examples, however, from Latin America and Asia, to suggest that clustering is of growing significance to the industrial organisation of small scale manufacturing (Schmitz & Nadvi, 1994: 41). For example, clusters in intermediate cities, have managed to achieve great depths in terms of the concentration of industry-specific skills, coupled with specialised ancillary and support structures.

A final criticism of cluster policies is that it seems to imply the exclusion of rural areas. This is because the focus is on urban areas, whilst rural areas seem to be marginalized because they lack the necessary scale of a cluster. Schmitz (1995: 546) agree that clustering is predominantly an urban feature.

However, he gives an example of how clustering can be a feature in rural industrialisation such as in Indonesia, where one can find specialisation of entire villages.

There is also little mention in the literature on the effectiveness of industry cluster policy in generating economic development in regions (Le Veen, 1998: 6). The number of new jobs created and tax revenue generated are the traditional measures of economic development. There is however no literature available that uses this criteria to assess the effectiveness of cluster policies. Rosenfeld (1997: 3-23), as cited in Le Veen (1998: 6) provides a number of measures that could be used for evaluating the overall efficiency on industry clusters. These include: "the number of new spin-off businesses firms in the cluster have generated, the development of new technology, increased R&D capacity, the improvement of labour force skill, and the intensity and quality of firm networks created."

2.6 Conclusion

This chapter presented a set of working definitions, a summary of Porter's (1990; 1998; 2000) important contribution, and a discussion of five core theoretical concepts that are frequently cited in the literature as forces driving cluster change or as justifications for cluster policy. A microeconomic framework illustrated how clustering has potential to reduce costs and increase output for firms. Clearly this demonstrated how clustering could be a potentially powerful strategy.

A prevalent theme throughout this discussion was the dynamic nature of industry clusters. This is primarily due to the high level of interaction and the consequent formation of relationships, not only within industry, but also with the wider community. Consequently, a distinct characteristic of clusters is that of "social capital" which is derived from such interaction and which is essential for the creation of effective clusters. The discussion also highlighted how cluster policy could be an effective economic development strategy. It would seem that economic development policies that target individual firms or industries are no longer the most viable option for regions. Due to the increasing attention to clusters and to the need for such a shift in policy, the role of government was also seen as changing more towards providing "tailor-made" policies to the business environment.

The discussion also indicated that the concept of cluster initiatives has received relatively little criticism to date. Yet as highlighted there are some fundamental empirical and policy questions. Note was made of the failure in growth centre applications. Similarly there is some indication of the misapplication of cluster policy. For example cluster policy has been used as a sector-based approach and has even been applied to underdeveloped regions with no inherent potential. Such applications of cluster theory disregard the fact that it is based on different theoretical concepts from growth centres. However, this seems to be countered by regional cluster initiatives, which seem to indicate a policy led attempt to strengthen regional concentrations. This bears well for industries that are most competitive when geographically clustered.

In the following chapter, the theory surrounding industry clusters will be analysed in case studies of successful international clusters from such countries as the USA and Brazil. An attempt will be made to use both the theory of clustering and experience from these successful international clusters, to assess the application of this concept to the Eastern Cape's automotive industry. Special emphasis will be placed on trying to apply the concept whilst taking cognisance of existing constraints and regional priorities in the Eastern Cape.

CHAPTER 3

INTERNATIONAL EXPERIENCE WITH INDUSTRY CLUSTERS

3.1 Introduction

The previous chapter indicated that clusters generally consist of spatially concentrated and sectorally specialised enterprises, characterised by a set of forward and backward linkages. These linkages are based both on market and non-market exchange of goods, information and people. A common cultural and social background also links economic agents, creating recognisable behavioural standards, which are sometimes explicit but often implicit.

This chapter will begin with two case studies of 'natural industry clusters' from the United States of America (USA) and Brazil, followed by a case study of clusters, which are a product of direct intervention in Arizona in the USA. The reason for including Brazil is that it is a developing country like South Africa where clusters are becoming increasingly relevant. They are common in a wide range of countries and sectors, and more importantly, clustering has helped small firms to overcome well-known growth constraints and to sell to distant markets, nationally and abroad (Schmitz 1999:1629). Using Porter's "diamond" and underlying theoretical concepts developed in the previous chapter, this chapter will try to establish to what extent the theoretical framework of clustering captures the reality of various case studies, and to what extent joint action is essential for responding successfully to major challenges.

3.2 Silicon Valley in the USA

3.2.1 Introduction

Silicon Valley in the United States of America (USA) is an example of an industrial cluster, which developed without direct intervention, a 'natural' cluster. It is one of the best-known examples of high performing industry clusters in the computer industry, and is considered a global city-region that has become the world's leading new economy (DEAET, 2000: 14). There are at least seven key industry clusters that drive growth in Silicon Valley's economy. Four of these clusters -semiconductors, computer/communication, defence/space, and business services- have long been the backbone of the Valley economy and can be considered to be *stabilizing* or *transforming* clusters. Three others are

emerging with strong potential for future growth -software, bioscience and environment. Together the seven clusters account for 30% of employment in the four-county Silicon Valley area (Alameda, San Mateo, Santa Clara and Santa Cruz counties) and over 50% of output (Joint Venture Silicon Valley, 1993: 11).

It is clearly an example of regional clusters in which member firms are in close geographic proximity to each other, and exhibit market and non-market links between themselves and local institutions. The links enable cooperation among suppliers and competitiveness on business processes, purchases, investments and technical research (Fountain, 1997: 9). At the same time, many of the clusters exhibit a strong *technological* dimension. According to the theoretical literature this dimension implies a collection of industries that share a basic technology due to their technological relatedness and synergy - it can be considered as an electronics cluster or set of electronic clusters (Kenney & von Burg, 2000: 2).

Closely linked to this technological dimension of Silicon Valley clusters, is a *lateral* dimension in which one finds that different sectors with certain capabilities that can be shared could result in economies of scale, which can lead to new combinations. This is typical of multimedia clusters such as those found in Silicon Valley. One also finds numerous buyer-supplier relations and subcontracting characteristic of vertical clusters, as well as horizontal clusters made up of industries that share common markets for end products. This multitude of cluster-types certainly enriches the usefulness of analysing Silicon Valley as a typical case study on the dynamics of clustering.

3.2.2 Factor Conditions

The previous chapter indicated that factor conditions could be divided into basic and advanced (or specialist) factors. The former include raw materials; literate, numerate labour force; and transport and communication infrastructure, whilst the latter includes cluster-specific knowledge and know-how. It is important to realise that contrary to conventional wisdom, simply having a general workforce that is high school or even college educated represents no competitive advantage in modern international competition. To support competitive advantage, a factor must be highly specialised to an industry's particular needs; hence the greater significance of specialist or advanced factor conditions. These factors are scarce, more difficult for foreign or local competitors to imitate and they require sustained

investment to create (Porter, 1990: 78).

In Silicon Valley there is evidence of cluster-specific programs, effective knowledge and technology transfer. The region also has a highly skilled workforce, coupled with high and guaranteed quality standards, image, specialist information, and know-how relating to for example world markets (Joint Venture Silicon Valley, 1993: 15). The theoretical foundations of clustering make the important qualification that advanced factor conditions are created. Consequently, 'factor creation mechanisms' such as universities, research institutions, technology centres and trade associations play an important role in successful clusters. Stanford University in Silicon Valley supplies research and researchers to industry. It led to the formation of Hewlett Packard, one of the Valley's main firms, as well as many other firms (Fountain, 1997: 11). Other universities with dedicated research centres include Berkeley and Santa Clara.

The inclusion of such leading research universities or laboratories in Silicon Valley like Stanford has a tremendous impact on enhancing potential scientific innovations. Moreover, it has considerable influence on the culture of Silicon Valley. This is partly due to the fact that business leaders together with venture capitalists maintain strong ties to the university, government and with one another. This permits a relatively consistent supply of scientists and technical experts, an essential element of national competitiveness, (Fountain, 1997: 10). Community colleges have also played an instrumental role in the success of Silicon Valley. For example, they rendered private teaching services to employees of many of the local firms. In turn, local firms participated with these colleges to develop electronics curricula tailored to their specific requirements (Saxenian, 1994: 42). Essentially, educational systems at all levels provide a consistent supply of high quality, skilled labour as well as training and development of technical staff with specialist skills related to industry in Silicon Valley.

Business associations have also played an important role in developing cluster specific factors in Silicon Valley's clusters. Examples of these include the Santa Clara County Manufacturing Group (SCCMG), the American Electronics Association (AEA) and the Semiconductor Equipment and Materials Institute (SEMI). SCCMG pioneered public, private and community partnerships in the late 1970s, aimed at resolving social and political issues facing the region (Saxenian, 1994: 47). Due to its initial successes,

co-operation between industry and government became the model for local policy making. Unlike traditional trade associations, these associations explicitly avoided lobbying and pressure group politics. The theoretical literature (Section 2.3.2.1) indicated that the overall objective of business associations is to move away from campaigning for subsidies from government, towards improving the innovative capacity of cluster participants. Hence both AEA and SEMI focused on nurturing network relationships between firms, the wider community and government.

Frequent seminars and monthly meetings of company presidents presented opportunities for informal exchange of ideas, expanding contacts and therefore reinforced network relationships. At the same time, SEMI made a tremendous contribution to the establishment of technical standards within the industry (Saxenian, 1994: 49). A host of industry professionals volunteered in an exercise to set these standards, resulting in an annual publication containing the different standards and specifications. According to Saxenian (1994: 49) the participants valued the importance of such standards, though they considered that the greatest benefit from this exercise was the emergence of closer relationships between suppliers and end-users. Other services provided by these associations included regional trade shows, conferences providing updates on research and technological advances, as well as seminars to encourage interaction between their members, customers, capital providers and university faculties.

3.2.3 Supporting and Related Industries

Another key dimension of Porter's "diamond" is the presence or lack of related and supporting industries. This dimension fundamentally suggests that spatial proximity of upstream and downstream industries facilitates the exchange of information and promotes a continuous exchange of ideas and innovations. In this respect, Silicon Valley exhibits an extensive supply of materials, components, specialised services and equipment manufacturers, which is adaptable to the needs of a host of clusters in the region. This is typically a product of industrial growth, and clearly a form of static economies of scale in that it has resulted in lower costs as a function of the output of the entire industry.

There is a high degree of interaction between firms along the value chain (e.g. with respect to vendors of development tools and of final products), creating learning-by-interacting advantages that enhance product development. This can also be seen in terms of non-software inputs such as editing and

publishing of manuals and advertising. Essentially, Silicon Valley exhibits an unparalleled broad, highly proficient, high technology supplier base (Joint Venture Silicon Valley, 1993: 12; Fountain, 1997: 10). All of this is aided by proximity to a wide range of sophisticated customers and potential customers. What is important to realise is that networking among first-users, suppliers and companies in related industries has always been a defining characteristic of Silicon Valley.

The Valley exhibits a highly collaborative local business culture between rivals (Fountain, 1997: 9; Saxenian, 1994: 46). Non-proprietary, professional and technical information is often shared among employees and companies. Regular use of the telephone and e-mail is made by professionals to offer their counterparts assistance with specific technical problems. At the same time, social gatherings are platforms for professionals to discuss technical issues. Saxenian, (1994: 32) gives the example of the Wagon Wheel, a Santa Clara 'watering hole' where engineers and other technical specialists from sometimes competing companies gather to drink and exchange information casually. Nevertheless, among competing firms and professionals, the level of competition is fierce.

Supporting industries in the region are composed of service providers specialising in the problems of the technology industry - venture capitalists, law firms, investment banks, market research, accounting and recruitment firms. This list also includes the organisations dedicated to nurturing new firms (startups). One set of characteristics that is unique to Silicon Valley, distinguishing it from many regions, and according to Kenney & von Burg (2000: 2) creating difficulty for most theoretical explanations of industrial clustering, is the region's ability to constantly develop new industries and clusters. At the same time as the renewal of existing industries occurs, employees venture into new similar operations or perhaps develop entirely new types of firms.

Section 2.3.2.4 highlighted the increasing significance of path-dependent evolution of social and economic arrangements (Kenney & von Burg, 2000: 2). These arrangements are the environment within which organisations are located and operate. Evidence of this can be found in the organisations and institutions in Silicon Valley dedicated to both the formation and fostering of new firms. From quite informal or even personal business concerns, these institutions have developed into organisations devoted to the provision of specific services for new firms. One finds that the success of each startup

sustained and reinforced earlier developments leading to growth in the economy. More important, an abundant group of diversified specialists, offering services to new firms emerged. Such an abundance of specialist firms contributed to greater successes resulting in positive feedback mechanisms operating in the region (Kenney & von Burg, 2000: 2).

Usually, the startups are specialists organised to develop technology or ideas into the basis of an operating company with products and customers. There is a wide range of sources for these ideas, and there is a wide variance in the founders. The most common source in electronics are engineers and managers within established firms whilst in biotechnology, they are staff members of university faculties and students. What is important to appreciate is that many regional industrial clusters possess the resources for firm formation, but few are characterised by an entire entity devoted to the formation of new firms (Kenney & von Burg, 2000: 5). This represents a high degree of cluster-specific knowledge, in this case relating to startups. As discussed in Section 2.3.1.1, such knowledge is difficult for competitors to replicate and forms an essential basis for competitive advantage. Moreover, such knowledge is rooted in learning-by-doing processes in which stakeholders continuously endeavour to improve their performance. The diffusion rate and intensity of such knowledge is aided by the geographic concentration characteristic of Silicon Valley's clusters. This has led observers to argue that the inherent, fundamental feature of Silicon Valley is the cluster of institutions designed and devoted to creating firms.

Consequently these observers have proceeded by arguing that there are two 'economies' in Silicon Valley. 'Economy One' is comprised of conventional economic activities of existing organisations. These are activities of currently operating firms and other organisations such as universities and corporate research laboratories. The other economic activity is within the structure of institutions aimed at promoting and fostering new firm formation. This set of institutions comprises 'Economy Two' and constitutes the supporting industry to the technology firms. According to Kenney & von Burg (2000: 5), "these two economies are interlinked by organisational histories, personal relations and the technological trajectories, yet they are conceptually distinct."

Indeed entrepreneurs, their ideas and efforts are a fundamental input to 'Economy Two', but so is capital, the second essential input for a firm. Sufficient capital enables the combination of the necessary

human and other resources to establish a firm around a potential market opportunity. Venture Capital is an institution that is relevant in this context, in which case venture capitalists invest in new firms with potential for high growth rates, coupled with a possibility of high capital gains in return for a partial ownership stake. The organisations of 'Economy Two' possess tremendous experience in new firm formation as well as knowledge of the processes required to rapidly mobilise the resources needed to develop new firms (Kenney & von Burg, 2000: 6). Encountering similar issues related to startups, these local organisations developed expertise, which was tailored to the needs of high technology startups.

The success of local firms and the consequent capital gains enhanced the capacity for greater expertise and this accumulation of experience accelerated the startup process and the success of the new firms. Consequently, positive feedback mechanisms were created, resulting in a lowering of startup barriers. This further improved the probability of successes. According to Marshall (1920: 266), these are clearly external economies, since these institutions lowered entry barriers, eased the costs of entry, and most importantly speeded up the process of building a viable firm. Porter (2000: 11) also indicates that barriers to entry are usually lower in clusters, as evidenced in Silicon Valley. He cites assets, skills, inputs and staff as often being readily available and easily assembled in a cluster. This is clearly embodied in these institutions, which nurture startups (Porter, 2000: 11).

Further sources of external economies of scale in Silicon Valley include legal firms which not only perform legal tasks, but are also important intermediaries reducing the uncertainty firms frequently experience in their negotiations with venture capitalists. Over the years, Silicon Valley law firms have amassed considerable expertise in dealing with the unique issues encountered by high-technology startups. Another part of 'Economy Two' are the investment banks in the San Francisco Bay Area, which are specialised in managing initial public stock offerings and analysing high-technology firms. Despite the fact that some of these investment banks have recently merged with larger financial institutions looking for favourable stakes in the high technology industry, their core assets remain their expertise and links to venture capitalists and entrepreneurs, (Kenney & von Burg, 2000: 6). The founders of these investment banks established close relationships with entrepreneurs and venture capitalists during the initial stages of Silicon Valley. The presence of these high technology investment banks, actually strengthened 'Economy Two's' capacity through its local expertise on the financial details

and protocols required when going public (Kenney & von Burg, 2000: 7). Proximity led to the emergence of relationships and saved time. It was no longer necessary to travel to New York to get advice and assistance. Specialisation, proximity and personal relationships with venture capitalists and entrepreneurs enabled these investment banks to appropriate business from their more experienced New York competitors.

There are also marketing organisations that specialise in assisting startups. The most well known of these is the McKenna Groups, which played a leading role in the development of the early Apple marketing strategy and the design of the Apple logo (Kenney & von Burg, 2000: 7). Another common feature of the Valley is recruitment firms, which source managers and executives for companies. They are particularly beneficial to both expanding and startup firms as they facilitate through rapid hiring processes. Accounting firms also have special practices located in Silicon Valley focussed on the unique requirements of startups and venture capital partnerships. Moreover, the Silicon Valley offices have developed into the accounting firms' global expertise centre for high-technology accounting issues. Often they will charge startups at below market rates with the expectation of securing future business. At the same time, landlords are often willing to negotiate relatively low lease rates to startups, whilst office-furnishing suppliers will give preferential rates.

Ultimately, the region has developed into a socio-economic structure that acknowledges and focuses on the distinct needs of startups (Kenney & von Burg, 1999: 7). Silicon Valley is also a clear example of what Marshall (1920:120) termed an "inter-firm division of labour." For example, there are consultants whose sole objective is preparing corporate executives for their presentations to stock analysts before the company undertakes its initial public offering (IPOs). At the same time, there are specialised firms that liquidate failures. The fact that firms specialising in liquidations are small, seems to reduce the validity of critic's scepticism towards the reality of industry clusters being more applicable to small, specialised firms (see Section 2.5.1). According to Kenney & von Burg (1999: 8) this reflects the manner in which these small firms are developing a recognisable entity. Before the 1990s, physical assets such as office furnishings and computers were the focus of most liquidators. Often, these could be recycled into new startups. In the 1990s, there were signs of a new type of liquidator who sold any intellectual property the firm might have developed, for example patents. This increased level of

specialisation and division of labour is a clear example of dynamic external economies of scale that accompany and drive growth and development.

3.2.4 Demand Conditions

The theoretical literature highlighted that the nature, rather than the size of local demand is important (see Section 2.3.2.1). Basically, the more demanding the consumers in an economy, the greater the pressure firms face to constantly improve their competitiveness, via innovative products and through high quality for example. Silicon Valley has a host of sophisticated end users, especially of electronic products, whose demand drives innovation. Silicon Valley firms usually assume the role of 'innovative first users' of other local firm's products. This renders a distinct increase and improvement in product development strategies of local firms (Joint Venture Silicon Valley, 1993: 12).

In addition to selling their products and services locally, cluster firms sell globally and generate income from other areas into the region. This income boosts the regional economy through purchases of products, by firms from other sectors in the area. Their employees also consume their salaries at local stores and restaurants, and purchase local homes. This 'multiplier effect' of high-technology industries is therefore extremely strong within the region (Joint Venture Silicon Valley, 1993: 11). It has been estimated that for every \$100 in sales, cluster firms can generate nearly \$300 of sales throughout the local economy as they buy local goods and services with income 'new' to the region (Joint Venture Silicon Valley, 1993: 11). Consequently, as they experience constant changes in the global market place as well as aggressive competition for other regions, all sectors in the region are induced to maintain viable clusters.

3.2.5 Firm Structure, Strategy and Rivalry

Meyer-Stamer (1996: 1) notes that one characteristic which is common to competitive economies is a distinct level of vigorous competition among national firms. Due to the influence that dynamic conditions have on competition, advantages of scale are relatively insignificant due to their static nature. Essentially, direct competition induces firms to improve productivity and innovations, rendering sustainable competitive advantage (Meyer-Stamer, 1996: 1). In this context competition drives intense rivalry, which is increased when competitors are spatially concentrated as is the case in Silicon Valley. Porter

(1998: 120) indicates that the more localised the rivalry, the more intense it becomes, increasing prospects of innovation and its rate of diffusion. "The overall effect is to cancel out static locational advantages and to compel firms to develop dynamic advantages" (Meyer-Stamer, 1996: 2). A flow of new entrants (e.g. new firm formation) is also essential to maintain competition and the stock of companies. Hence the presence, of previously analysed specialist institutions (see Section 3.2.2), which foster startups, is highly indicative of the potential level of competition in Silicon Valley.

In terms of firm structure and strategy, Silicon Valley has three different, but highly interrelated structures: firm, industry and institution. These three entities exhibit high levels of interaction, which account for the distinct levels of efficiency, adaptability and innovation, which characterise the region (Fountain, 1997: 9). The system illustrates significant compatibility among the internal firm structure, the manner in which the network is organised, and the wider institutional structure in the region (Saxenian, 1994: 56; Fountain, 1997: 11). For example, one usually finds that management structures at the level of the firm are aligned to utilise advanced information technologies. Differences in management levels have been reduced, whilst cross-functional teams are awarded autonomy and greater decision-making and responsibilities, (Saxenian, 1994: 50,52). At the same time, there is a fluid division of labour, with a striking level of mobility among employees, coupled with task specialisation that illustrates a high level of job enrichment. Such enrichment is achieved through the use of workstations as well as re-engineered business processes and firms being organised by business unit as opposed to function (Fountain, 1997: 9). At the level of the organisation, these structural characteristics allow increased flexibility as well as an increased capacity to absorb innovation. They also result in a more efficient use of human and technical resources. Due to the high degree of out-sourcing for inputs that occurs, one finds that at the industry level, networked systems reflect low levels of vertical integration. Simultaneously, one encounters a greater number and type of linkages among producers, suppliers, and customers within and across related sectors, leading to the creation of a dense network among stakeholders.

In order to give a comprehensive illustration of this key dimension in Porter's "diamond", Saxenian (1995: 1-17) compares firms in Silicon Valley and Route 128, which is located on the east coast of the USA. Her important point of departure in the literature on the dynamics of industrial location and

resultant clustering, is that she suggests that there are limits to the concept of external economies and proposes an alternative *network* approach to analysing regional economies and their clusters. She maintains that the common notion of external economies is based on an assumption that the firm is an, "atomistic unit of production with clearly defined boundaries" (Saxenian, 1995: 1). Distinguishing between what occurs inside and what occurs outside the firm ignores the complexity of relations that have developed with time between the internal organisation of firms as well as their links to one another and the community in which they are embedded. The network perspective can explain the divergent performance of apparently comparable regional clusters, such as Silicon Valley and Route 128. This provides important insights into the local sources of competitive advantage.

Whilst many authors (Porter 1990;1998; 1988; Kenney & von Burg, 2000) agree that Silicon Valley and Route 128 are classic examples of external economies derived from industrial location, this approach cannot fully account for the divergent performance of the two regional economies. In spite of their common origins in post-war military spending and university-based research, Silicon Valley and Route 128 have responded differently to intensified international competition. Whilst both regions experienced economic decline in the 1980s, Silicon Valley recovered quickly from the crisis facing leading semiconductor producers, whilst Route 128 showed few signs of reversing a decline. The concepts of agglomeration external economies account for regional stagnation or decline through references to "diseconomies" of agglomeration or accumulation of negative externalities. According to Saxenian (1995: 2) if such diseconomies are associated with the overall size of a regional cluster, the degree of congestion, or the costs of production growth there should have been a more rapid decline in growth in the more densely populated Silicon Valley, long before Route 128. The implication thereof is that spatial proximity is an insufficient measure of the ability of firms to respond to rapidly changing markets and technologies characteristic of contemporary international competition.

Although variations in corporate performance have multiple causes, the firm's organisational structures and their relationships to their respective regions help explain these differences in Silicon Valley and Route 128. Silicon Valley has a regional network-based industrial system that promotes learning and relationships among specialist producers of complex and of related technologies (Joint Venture Silicon Valley, 1993: 12). As highlighted earlier in this section, loosely linked team structures encourage

horizontal communication among firm divisions and with outside suppliers and customers. At the same time, mention has been made of the functional boundaries within firms, which are "porous" in the network-based system, as are the boundaries between firms and between firms and local institutions such as trade associations (Saxenian, 1994: 50). Self-sufficient corporations that internalise a wide range of productive activities, in contrast, dominate the Route 128 region. Secrecy and corporate loyalty governs relations between firms and customers, suppliers and competitors. This reinforces a culture that promotes stability and self-reliance. Use of corporate hierarchies is made to maintain centralised authority and the vertical flow of information. The social and technical networks that do exist are mostly internal to the firm. At the same time, well-defined boundaries between firms and between firms and local institutions exist, exhibiting the independent firm-based nature of the system (Saxenian, 1995: 3).

Two startup firms in the 1980s (Sun Microsystems and Apollo Computers) in Silicon Valley and Route 128 respectively, illustrate the differences in firm structure, strategy and rivalry. In the late 1980s, Sun Microsystems was ahead of Apollo in both sales and profitability (Saxenian 1995:4). The important differences between the two firms lay in their management styles and organisation. Like many Silicon Valley companies, Sun Microsystems developed decentralised organisational forms in its efforts to preserve the flexibility and enthusiasm of a startup even as it grew. Corporate strategy was generated by discussions among representatives of autonomous divisions rather than dictated by a central committee, and Sun Microsystems's culture encouraged informal communication, participation and individual initiative (Levine, 1988: 115). Taking a cue from the successful startups in the 1980s, established producers such as Hewlett Packard in Silicon Valley, began to decentralise their operations, creating interfirm production networks. These were built on the region's social and technical interdependencies, and strengthened its industrial system (Saxenian, 1994: 56-7). Ultimately, the collective learning process was formalised. Existing practices of informal co-operation and exchange were institutionalised, thereby cementing the formation of sustainable "social capital." Local firms redefined themselves by participating in local production networks, and the region as a whole organised to create new markets and sectors.

In contrast, the CEO of Apollo initiated a traditional risk averse management team, which emphasised the need to impose controls on financial and quality controls, cutting costs and diversifying the firm's

customer base (Saxenian, 1994: 128). This was clearly the type of commitment to formality, hierarchy and long-term stability, which characterised more large Route 128 companies.

3.2.6 Social capital in Silicon Valley as a means to Economic Development

Silicon Valley also holds testimony to the salient feature of clusters, i.e. self-regeneration. Moreover it illustrates how “social capital” can lead to effective clusters, and in turn can be useful in economic development. The theoretical literature (Section 2.3.2.5) indicated that well-functioning networks in industry clusters are actually a form of “social capital”. Shared resources held by individual institutions in a cluster, as well as the overall structure of the relationship among institutions, represent “social capital”.

It is important to realise that although “social capital” in clusters can emerge from socio-cultural identities, it can also emerge from purely commercial and business relations in a cluster. The latter applies in the case of Silicon Valley.

What began in 1992 as a concern about job losses led to a renewed understanding of the requirements for building a successful economy and community. Consequently, "Blueprint for a 21st Century Community" was established in 1993, resulting in a collaboration of more than 1000 business, government and community leaders. Through Joint Venture Silicon Valley, companies and the community launched 13 major initiatives that provided a blueprint for continuous improvement in the region's ability to compete globally and enjoy a high quality of life. These initiatives were led by working groups, which included representatives from different stakeholders in the cluster:- large companies, new companies, suppliers, service providers, universities, and government. In addition to identifying specific infrastructure needs and developing specific collaborative initiatives, each cluster assessed its regional assets and developed a vision of the future achievable through continuous collaboration (Joint Venture Silicon Valley, 1993: 8).

The fast growth trajectory of Silicon Valley took a turn for the worst when it experienced a major downturn in job growth in 1984, a trend that reached its peak in 1992. At the same time, costs of conducting business were escalating as the infrastructure was deteriorating (Joint Venture Silicon Valley, 1993: 6). The "community infrastructure" was not meeting the quality requirements in terms of customer satisfaction, cycle time reduction and flexibility (Joint Venture Silicon Valley, 1993: 6). This was

inconsistent with the way the region's companies were changing fundamentally the way they did business.

In the face of intense global competition, Silicon Valley companies were focussing on customer satisfaction, reducing time-to-market, controlling costs, continuously improving product quality and serving niche markets.

To achieve these goals, not only were companies focussing on what they do best, and contracting out the rest, but they also required appropriate world-class infrastructure. Access to highly skilled people, advanced telecommunications capacity, information networks, and other resources were needed and were critical to their success (Joint Venture Silicon Valley, 1993: 6). Previously, the Valley was able to counterbalance the relatively high costs with the superior and unique quality of its workforce and superior supplier base. However, Joint Venture Silicon Valley initiatives found an alarming decline in quality compared to competitors, coupled with rising relative costs. This led to protracted job losses and investment (Joint Venture Silicon Valley, 1993: 7).

The experiences of other successful regions indicate that there is merit in using ongoing collaboration to upgrade a region's infrastructure and link it to industry (Joint Venture Silicon Valley, 1993: 8). Public, private and community partnerships aimed at providing the best economic infrastructure in a bid to make industries successful, are vital to the success of such competitive regions as Austin and Singapore. Moreover, these regions' strong, responsive working relationships develop into a distinct source of advantage, resulting in the formation of "social capital." While Silicon Valley has stable, viable clusters which form the core of the region's industrial base (see Section 3.2.1), coupled with a large talent base and an extensive network of technology resources, in 1993 it realised that it had not exploited all these resources effectively for mutual productive gain. A culture of conflict and blame hurt the ability of public and private sectors to work together to solve major problems.

This has led authors such as Harrison (1993) as cited in Norton (1999: 3) to question the value of Silicon Valley as a case study in regional networks. He considered regional growth to be based on proximity, which led to experience and trust, which ultimately enabled collaboration to result in enhanced regional growth. He did not think Silicon Valley measured up to his criterion of trust, given the fact that

Valley firms sued each other at every opportunity, usually over intellectual property rights. According to Harrison (1993) cited in Norton (1999: 3), "this ruled out this particular cluster as an example of post-neoclassical trust and harmony." In his opinion, if firms depend on each other through informal agreements and cumulative collaboration they do not engage in legal battles. Joint Venture Silicon Valley realised therefore that the inability to organise regional assets and build a "collaborative advantage" through strong working relationships was a major reason that Silicon Valley had not reached its full potential.

Consequently, Silicon Valley set itself to develop strong relationships (which resulted in the creation of "social capital") between business, government, education and the community to provide world-class economic infrastructure of skills, technology, financing and the tax and regulatory environment required for success in a global economy. It was around these issues that the initiatives started by Joint Venture Silicon Valley were centred, as well as the resultant working groups. By 1998, Silicon Valley's economic indicators improved and remained positive. Strong job growth continued in 1998 for example, whilst the region's exports were the highest in the nation (Joint Venture Silicon Valley Index, 1998: 1). Since 1992 more than 200 000 jobs were added, with an estimated 53 000 jobs being added in 1998. The software and computers/communication sectors experienced considerable growth, which drove employment gains. There was an improvement in the quality of life measures, with high school dropout rates declining from 3,1% to 2,4% in the 1996-97 school year. SAT scores (USA high school scoring system) among the region's students improved, child immunisations steadily increased since 1993 and wages per employee increased by 49% per annum in real terms from \$316 in 1994 to \$470 in 1997 (Joint Venture Silicon Valley Index, 1998: 2).

Some challenges still remain though, such as problems of traffic congestion and housing costs, placing pressure on the Valley's ability to sustain its quality of life, and a disturbing trend to a decline in the number of engineering graduates from Silicon Valley universities. As a result,

Joint Venture Silicon Valley commissioned a group of business, community and government leaders in 1999 to chart a "vision for 2010" (DEAET 2000:15).

Needless to say, Silicon Valley gives sound empirical evidence of the concept of “social capital”, and of using clusters for economic development processes, which are enhanced by geographic proximity. What makes the 21st Century Silicon Valley work is the ability of major institutions in the region to collaborate on community and economic issues. The fundamental issue is that community partners work toward a common set of goals for higher real incomes, increasing quality of life and expanding opportunities (DEAET, 2000: 15). Information technologies invented in the Valley are now employed to make this happen. New relationships sustained by information networks enable new levels of co-operation in addressing education, regulatory, technology and enterprise challenges. Over five decades, Silicon Valley has evolved from a primarily " limited government, market-driven region, into a more business-driven model, characterised by new models of collaboration and networks (DEAET, 2000: 14).

3.3 Sinos Valley in Brazil

3.3.1 Introduction

There is recent, though limited literature, which suggests that operating in clusters in developing countries may help them overcome growth constraints (Nadvi & Schmitz, 1994: 10). In many of these countries small enterprise development has been linked to the industrialisation process, which can gain momentum from clusters. One of the most striking cases of sectoral clusters is in Brazil's shoe industry. Brazil's exported leather shoes are produced largely in the small towns of the Sinos Valley, which is in the state of Rio Grande de Sul. Like Silicon Valley, Sinos Valley developed as a 'natural' cluster with a history in shoe making. By the late 1960s a strong local cluster had formed and had begun to catch the attention of exporters. By the 1990s the cluster was as complete as any in a highly industrialised region (Rosenfeld 1996:10). Owing to the recent interest in industry clusters in developing nations, the literature on Brazil's clusters is scanty, hence the reliance on one main author.

3.3.2 Factor Conditions

As mentioned in Section 2.3.2.1, advanced factors are created and more difficult to replicate. Hence the need for 'factor creation' mechanisms such as universities, research institutes, technology centres and trade associations, which can play an important role in successful clusters. Like Silicon Valley, which had Stanford, and to a lesser extent Berkeley and Santa Clara universities playing a central role in developing cluster specific programs as well as research, Sinos Valley has several schools and centres

which provide similar capabilities. These include:

- (i) the SENAI Tannery School;
- (ii) the Technical School Liberato Salzano for chemistry and mechanics;
- (iii) the SENAI School for Shoe Design and Manufacturing;
- (iv) the Technological Centre for Leather, Shoe and Related Industries CTCCA.

Although the vocational training offered by SENAI exists throughout Brazil, few if any regions or sectors have such a concentration of specialised schools and technology centres. Even though these institutions might not match the standard of Stanford University in Silicon Valley, and in spite of various shortcomings, together they represent a formidable capacity to train, research and advise. These institutions were a direct result of collective campaigning and pressure from local producers and were set up at the onset of the exporting boom (Schmitz, 1995b: 18). Most of the financing for some of these centres as well as the curricula they offered are a result of private sector efforts. To make a direct link between the work of these schools and the increase in exports would be difficult, but according to Schmitz (1995b: 19), “there can be little doubt that together they enhanced the capacity of local industry to respond to the new export opportunities.”

Similar to Silicon Valley, business associations have played an important role in Sinos Valley’s development in terms of creating cluster specific factors. This shows particularly in the period when this cluster ventured into new markets. The 1970s and the first half of the 1980s were the years of fastest growth, primarily due to the increase in exports (Bazan & Schmitz, 1997: 4). Holding trade fairs was critical to the cluster's ability to infiltrate and dominate distant national markets. It was multilateral horizontal co-operation, through industry associations in the early 1960s that gave rise to these trade fairs. In 1963 the shoe organisation FENAC was established. Compared to the tertiary institutions in the region, a more direct connection between export growth and local industry associations can be established, especially FENAC. The main purpose of this organisation is to hold shoe fairs (which were an initiative of manufacturers) as well as components and machinery for the shoe and leather complex. In addition to holding fairs, FENAC together with the local Business Association of Novo Hamburgo (ACI/NH) played a central role in the late 1960s/early 1970s in attracting foreign buyers to the Sinos

Valley and making it possible for local manufacturers to participate in fairs abroad (Rosenfeld, 1996:10). FENAC and the association had good access to the federal government, a link that enhanced the ability of local producers to utilise federal incentives.

3.3.3 Supporting and related industries

One of the most striking features of Sinos Valley is that within a radius of 50km of Novo Hamburgo, the economic centre of the Valley, most inputs are produced: "uppers, soles, heels, insoles, shanks, glue, nails, eyelets, dyes -all of them made to many different technical specifications," (Schmitz, 1995b: 7). In addition, most of the machines to convert these materials and components into shoes are made locally. Such a concentration of suppliers compares favourably with the situation in Silicon Valley where vendors of software are in close proximity to their customers. Similar to Silicon Valley, Sinos Valley is also characterised by the presence of a wide range of specialised producer services. These include: "freelance designer, technical and financial consultants and specialised transport services" (Schmitz, 1995b: 12).

The industry is also served by two weekly papers, which specialise in the shoe trade, and four bimonthly technical magazines. These publications are for the shoe and leather trade nationally, but are produced in the Sinos Valley, adding to the enormous concentration of specialised know-how. Given the geographic concentration of these activities, it is therefore hardly surprising that the diffusion of information and ideas in the valley is rapid and dense, creating potential for extensive dynamic external economies. Klein (1991) as cited in Schmitz (1995b: 12) emphasises that this exchange of information and ideas occur not only in business transactions, but also at social gatherings of friends, family, sports clubs, neighbourhood or church meetings. Parallels can be drawn with the Wagon Wheel in Silicon Valley, which provided an informal platform for sharing information (see Section 3.2.3). Such a diffusion of information reaches its peak during the biannual shoe fairs that are organised by FENAC. None of this is to suggest that all information is shared, but clearly in such a cluster, secrets are hard to keep. Due to the sensitive

nature of some information, it is sometimes a problem for industrial firms to disclose information,

however, it tends to benefit the collective performance of the industry (Schmitz, 1995b: 13).

What stands out most in Sinos Valley is the strong increase in bilateral vertical co-operation, notably between shoemakers on the one hand and their input suppliers and subcontractors on the other (Nadvi & Schmitz, 1994: 15). A majority of the shoe manufacturers in the valley exchange information and experiences on a regular basis and to a lesser extent engage in quality improvement, labour training and marketing with each other (Schmitz, 1999: 1635). It must be noted that tracing such form of co-operation is very difficult. In comparison, multilateral horizontal co-operation, (as will be analysed later in this section) as evidenced in the demise of business associations in the 1990s has proved inadequate. Despite this, one is able to observe a positive relationship between co-operation and performance.

Schmitz (1999: 1637) tested the hypothesis that co-operating firms perform better, by constructing a co-operation and performance index. Thus, firms could be ranked from strong performers or co-operators to poor performers or co-operators. In examining the association between performance and co-operation, the exercise revealed that there was a positive correlation between increases in co-operation and improvements in performance. Generally 63% of firms that reported increased co-operation have also experienced an improvement in performance (Schmitz, 1999: 1637). The majority of firms reporting no change in co-operation did not experience a change in performance either. The performance variable used here is annual sales: firms reporting an increase appear as "strong performers" and those reporting a decrease as "poor performers" (Schmitz, 1999: 1637). These findings refer mainly to bilateral co-operation among clustering firms. Multilateral co-operation (participation in trade associations) increased only slightly, though it reflected a significant positive relationship with performance.

As highlighted in Section 3.3.2, a distinctive feature of Sinos Valley is the manner in which business associations were central in the early export successes. On the other hand, the prominent feature in Silicon Valley appears to be the institutions that nurture startups (see Section 3.2.3.). In these two regions, collective action was institutionalised in associations. Collective action embodies the notion of co-operation effects (from planned or consciously pursued efforts) under the important concept of collective efficiency in clusters (see Section 2.3.2.2). Collective efficiency has positive ramifications for

the creation of competitive advantage. It, however, seems that once channels for exporting were opened up for the shoe manufacturers in Sinos Valley, less emphasis was placed on joint action in marketing for example, and therefore declined. This led to a disintegration of collective action and disunity amongst business associations from the mid -1970s to the late 1980s. Independent export agents became the critical link in connecting South America to the North American market.

Consequently, cluster-wide co-operation, the underlying basis for collective action, almost disappeared in the 1980s. Most of these export agents were outsiders (Americans) and at the same time, there was increasing differentiation by size and specialisation within the cluster (Schmitz, 1995b:19; 1999: 1642). With the rise in shoe exports, conflicts of interest became unavoidable. For example, shoe manufacturers wanted easier access to inputs and equipment from abroad, while local suppliers fought against it. The needs of the large shoe exporters differed from those producing for the internal market. Consequently, in the late 1980s, the tanners, the synthetic component producers, the machinery suppliers, the export agents and the large shoe manufacturers formed five new separate associations. According to Moore & Hamalai (1993: 3), such splitting up into separate associations is a common occurrence and a 'natural' outcome of differentiation in the economy. The problem is that there ceased to be a united voice for the industry in Sinos Valley as a whole. The new associations focused on defending the interests of their own subsectors as opposed to common problems. This occurred partly because conflicts among the subsectors were real (particularly in the short run) and partly because each association sought to project itself (Schmitz, 1999: 1643).

Attempts were made in the early 1990s to develop alliances for upgrading the cluster. In 1991, the six industry associations and the Centre for Technology (CTCCA) formed a working group to discuss what key common problems had emerged, what studies should be undertaken to understand them better and how to co-ordinate lobbying (Schmitz, 1999:1643). Joint projects included a databank and the creation of a permanent forum in which these institutions can work together. These attempts to develop alliances culminated in a project named the "Shoes from Brazil Program" in 1994. This was a joint endeavour of associations representing the entire value chain. The alliance came in the wake of pressure to raise quality and speed, which required more constructive and sustainable relationships between all stages of the supply chain (Schmitz, 1999: 1643). One of its main objectives was to move up the international

value chain with new cluster-specific initiatives in design and marketing.

Although it was participatory and strategic, which meant a good basis for proceeding to the next stage of implementing some of the ideas put forward, this did not happen. Consequently in 1996 the alliance across the value chain was reactivated. However, by 1997 it had become clear that effective joint action would not take place. It failed in the end for two reasons: some key players were more committed to global than to local partners and the state failed to mediate at key points (Moore & Hamalai, 1993: 4; Schmitz, 1999: 1645). Even though progress remains slow, it signals a new awareness of the need to co-operate, triggered by increased international competition and pressure to raise quality. Hence regular shoe fairs still attract buyers. As indicated earlier in this section, two weekly and four monthly technical trade newspapers and magazines keep companies fully informed of structural changes in the industry. At the same time 70 export agents monitor international markets and changing fashion trends. According to the theoretical literature, such improved communication about market conditions can give clustered firms a better production function than isolated producers (see Section 2.3.2.2).

3.3.4 Demand conditions

One can generally observe the presence of relatively sophisticated local customers. The sophisticated customers in this case are shoe manufacturers (i.e. they are customers to suppliers of inputs) who work closely with their suppliers to promote innovation in Sinos Valley. As noted in Section 3.3.3 there is a strong increase in co-operation between shoe manufacturers and their input suppliers and subcontractors in the region. This however, occurs on a smaller scale when compared to Silicon Valley. Nevertheless, the theoretical literature emphasises that it is the nature rather than the size of local demand, which is important (see Section 2.3.2.1).

By the end of the 1960s, a cluster of 400 firms already existed in the valley producing entirely for the internal market, due to a policy of import substitution. There was, however, considerable internal competition. The sectoral and geographical concentration laid the basis for the subsequent export boom (Nadvi & Schmitz, 1994: 7). It did this in two ways: first, between 1969-70, US shoe importers looked

for new suppliers from low-wage countries, which they visited. Because of its already established cluster, which had advantages of specialised local input suppliers, Sinos Valley was able to obtain its first contracts.

Secondly, instead of passively waiting for importers to come, local manufacturers were proactive, as they took collective action through self-help institutions (see Section 3.3.2). A consortium of producers took their products to the US and Europe in search of export orders, a national shoe fair held in Novo Hamburgo was promoted overseas and advertisements to promote Brazilian shoes were placed in foreign papers (Rosenfeld, 1996: 10). All this was aided by newly introduced export incentives by the Brazilian government in 1969-70 (Lücke, 1990) as cited in Schmitz (1995b: 14). It was, however, through collective action that local producers were among the first to access the export incentives. Basically, clustering helped to build the economic and institutional platform on which the subsequent export boom was based (Bazan & Schmitz, 1997: 3). Similarly, in Silicon Valley clusters sell globally, bringing income into the region thereby boosting the regional economy.

The local initiatives together with central government incentives produced results promptly due to the effective manner in which export agents developed links between the Brazilian producers with the US market. These export agents were not merely buyers. In addition to negotiating with the US retail chains, on the one hand and the Brazilian producers on the other, they studied the market. This meant visiting shoe shops in the USA and Europe as well as international shoe fairs. The export agents undertook product development and marketing, and at the same time, they enforced adherence to basic quality and delivery standards (Schmitz, 1995b: 14). Hence export manufacturers concentrated on increasing scale and competing on price. In summary, clustering helped to build the economic and institutional platform on which the export boom was based.

The cluster was strengthened because the export growth increased the demand for local inputs and machinery, thus contributing to further specialisation and deepening of the cluster (Bazan & Schmitz, 1997: 5). On the other hand, as mentioned in Section 3.3.2, collective action became more difficult because the sector became more differentiated, the sheer speed of growth weakened social ties among

local producers. Nevertheless, the Sinos Valley gives a very good example of the notion that an ability to meet local demand creates the ability to serve global markets, therefore strengthening the demand conditions according to Porter's "diamond" (see Section 2.3.2.1).

3.3.5 Firm structure, strategy and rivalry

It is important to realise that competition is also an important element of the clustering model, even though its analysis is often overshadowed by the attention given to co-operation among producers. As Meyer-Stamer (1996: 1) indicated, a common characteristic to competitive economies is a distinct level of vigorous competition among national firms. In the Sinos Valley, competition is fierce even though some market segmentation exists. Competitors are spatially concentrated in Sinos Valley, as is the case in Silicon Valley, a situation in which competition drives intense rivalry.

Intensive local rivalry is likely to continue since entry barriers are low (due to the extensive economies of scale) and setting up a shoe business continues to be one of the main venues for pursuing status and income ambitions. Recently one of the main criticisms from within and outside the industry has been that too much effort goes into competition within the valley and not enough attention is given to competition from abroad (Prochnik, 1992: 40).

When analysing the clusters in Silicon Valley it was mentioned that a key feature of clustering is that most firms specialise in particular stages of a production process, whilst there is a general tendency towards outsourcing (see Section 3.2.5). It would be interesting to explore whether such vertical disintegration (at the firm level) is also prevalent in the Sinos Valley. According to a study by Prochnik (1992:11), there has been somewhat of a tendency toward vertical integration. This conclusion is based on interviews with large Brazilian firms, most of which were located in the Sinos Valley. In some instances these shoe manufacturers had included in their operation a

section, which carried out the final processing of the leather. In other cases, entire tanneries were acquired. There was also expansion into production of rubber and plastic components.

One cannot entirely discern reasons for this vertical integration. There is reference to the need to have

access to a reliable supply of good quality inputs for large-scale production (Prochnik, 1992: 12). Elsewhere, Schmitz (1989: 16) emphasises the need for manufacturers to obtain leather with varied specifications, coupled with the inflexibility of large tanneries to supply them. From interviews conducted by Prochnik (1992: 20), there are undoubtedly difficulties with input supplies despite the large concentration of input suppliers highlighted in Section 3.3.3. He, however, questions whether it is wise that such vertical integration should take place in view of intensified competition in the global market over recent years.

Market conditions have changed due to globalisation as quality, small orders and faster responses have become the order of the day. Other producer countries, such as China, with even lower wages are exerting pressure in the market, and buyers in the US and Europe are imposing standards of quality and speed which would have been thought unattainable a few years ago, at prices they are prepared to pay now. It seems that beating competitors such as China on labour costs is hardly possible, therefore the challenge facing Sinos Valley manufacturers is to increase the rate and quality at which they produce shoes, and to break into new markets and marketing channels (Schmitz, 1999: 1628).

On closer inspection, however, the vast majority of shoe firms are not vertically integrated. There seems to be a high degree of interfirm division of labour in Sinos Valley, which confirms the theoretical underpinnings of clustering in Section 2.3.2.1, and which compares well to Silicon Valley. In particular there are over 200 firms producing components for the shoe industry. Shoe production is comprised of a series of discrete stages, which, from a technical point of view, do not necessarily have to be carried within a single firm. Operations, which require highly specialised equipment and/or skilled labour, are contracted out. Examples are the production of lasts, the creation of new models, or the grading of patterns. The reason for externalising such operations lie in the efficiency advantage of the supplier, these are mostly but not always small firms (Nadvi & Schmitz, 1994: 16). Operations, which are relatively simple and labour intensive, are also sub-contracted. Examples are stitching of uppers, hand weaving of uppers or the preparation of bottoms. By externalising such work, shoe manufacturers save on premises, sometimes on equipment and particularly on labour cost. Fleury & Humphrey (1993: 6) also emphasise the flexibility advantage of outwork. Small firms carry out virtually all such work. When the work is entirely manual it is usually distributed mostly to "self-employed" women working from home

(Nadvi & Schmitz, 1994: 16).

Firm-level observations therefore confirm the extensive use of subcontracting, characteristic of vertical industry clusters. It seems to be particularly common among small firms, but less among the very large firms (Nadvi & Schmitz, 1994: 16). It should, however, be pointed out that variations among enterprises are great, partly because they specialise in different types of shoes and partly because they give different emphasis to control and flexibility. The former is easier in internal production, subcontracting enhances the latter. The size of orders and the response times are shrinking and the number and types of models are increasing. As seen in the case of Sun Microsystems in Silicon Valley, this puts a premium on flexibility and is likely to contribute to an increase in subcontracting. On the other hand, one could argue that the increase in quality requirements, referred to earlier, could potentially pull practices in the opposite direction. Product quality is apparently difficult to maintain or improve when several operations are contracted out (Bazan & Schmitz, 1997: 7). As will be seen in Section 3.3.6, this is why some manufacturers are beginning to change their relationships with their sub-contractors from casual to more regular ones.

Clearly there is an agglomeration of specialists in Sinos Valley and according to Prochnik (1992: 13) the specialisation and interfirm division of labour have increased "....notwithstanding the vertical integration strategy pursued by a small number of very large firms." There are, however, signs that the relationship between input suppliers and shoe manufacturers is beginning to change. Whereas in the past relations led to blame and the switching to different suppliers of customers, as highlighted in Section 3.3.3, there are now some attempts to explore problems jointly. Although a lot of apprehension towards collaboration still exists, they are taking steps toward collaborative manufacture and learning by interaction (Schmitz, 1995b: 16). In the clustering literature, the clustering enterprises both compete and co-operate, hence the notion of co-operative competition. This means that competition does not exclude joint action for solving specific problems, for example in precompetitive areas such as the provision of infrastructure, services or training (Porter, 1998: 449).

According to a survey carried out by Schmitz (1999: 1634), 60% of respondents reported an increase in co-operation with their suppliers of leather and soles. Such increases can be observed both in general

exchange of information and experience, and in specific concerns of improving quality and speeding up responses. In other areas of co-operation - technological upgrading, labour training, programming production - the upward trend in co-operation was less strong. Surprisingly, no association was found between increasing co-operation and firm size. Some authors such as Prochnik (1992: 25) suggested that medium and large firms work more closely with suppliers than small ones.

3.3.6 Social Capital in Sinos Valley as a means to Economic Development

Unlike Silicon Valley (see Section 3.2.6), “social capital” in Sinos Valley emerged from socio-cultural identities. In order to put the observed inter-firm relationships into context in Sinos Valley, requires an analysis of local socio-cultural factors. As highlighted within the theoretical literature and in the case study on Silicon Valley, ties between firms are not purely economic. There exists a socio-cultural identity, which facilitates trust relations between firms and between employers and workers. One of the main points surrounding the debate on clustering and industrial districts in general, is that economic relations between firms are embedded in social relations. This view is most strongly expressed by Becattini (1990: 40) who defines the industrial cluster as “a socio-territorial entity, which is characterised by the active presence of both a community of people and a population of firms in one naturally and historically bounded area. In these districts, community and firms tend to merge.”

As mentioned in Section 2.3.2.5, there are essentially three dimensions to the issue of social embeddedness within the confines of a cluster. First, one finds that specific interrelated historical, social and cultural factors in local areas can generate significantly different processes of development (Saxenian, 1995: 1). This includes a work spirit based on religions and/or cultural attributes, or a non-confrontational social spirit which carries over to intra and interfirm relations, thereby assisting local industrial relations and leading to productivity gains (Granovetter 1985:3). Second, socio-cultural identities provide a basis for trust and reciprocity in inter-firm relations. Usually forming around social networks based upon family, caste, ethnic, racial, religion, educational, political or corporate backgrounds, these identities are multiple and varied (Porter, 1998: 153). At the same time, shared values and norms of behaviour governing relations can emerge from purely commercial and business relations in a cluster. Third, the social milieu or environment, strongly influences and is itself influenced by the process of innovation and technological change (Granovetter 1985: 3; Becattini 1990: 40;

Fountain 1997: 4-7).

In the Sinos Valley, "a strong community spirit developed based on a common German heritage," (Nadvi & Schmitz, 1994: 32). Schmitz (1995a: 559) links this socio cultural identity to the economic success of the region as evidenced by the export boom in the 1970s. This is not to say that the success of the region can be judged purely on socio-cultural or ethnic terms, since this can be countered with examples of other communities of German descent in South America which remained underdeveloped and poor (Nadvi & Schmitz 1994:67). Furthermore, the Sinos Valley experience provides a further example of the vulnerability of the social environment and its associated social relations and processes under conditions of rapid economic growth (Schmitz, 1995a: 559). The speed with which the Sinos Valley footwear cluster expanded during the export boom phase strained socio-cultural ties to the point where they were no longer effective as a foundation for trust relations between firms. As mentioned in Section 3.3.3, the last half of the 1990s witnessed an attempt to return to a greater spirit of collaboration. Trust relations are beginning to reform, although this time not on the familiar basis of socio-cultural identity but on the basis of conscious investments in relationships with suppliers and subcontractors (Schmitz, 1999: 1644). As highlighted in Section 3.3.5, there are indications of a qualitative change in the relationship between shoe manufacturers and their suppliers and consequent new signs of collective action.

One can also identify changes in relationships between employers and their workers. Until the early 1970s, employees had a sense of 'kinship' with employers and felt part of the same community. This encouraged co-operation in the workplace. Due to the fast growth in the industry, these communities began to disintegrate (Schmitz, 1995b: 21). Although socio-cultural ties have not entirely disappeared, where they still exist, a more stratified society has developed in which class differences led to a rise in incidences of hostility outside and within factories. More recently however, some employers began to see the value in more collaborative approaches (Schmitz, 1995b: 21). This is due to economic reasons, which require improved industrial relations in order to achieve increasingly high quality standards and tight delivery schedules. The fundamental point of reason in any cluster is that firms and the local community are inseparable (Schmitz, 1995b: 21; 1999: 1644). In addition, a common social identity is thought to favour codes of behaviour that induce trust and co-operation. This is evident in both the Sinos Valley in Brazil and Silicon Valley in the USA.

3.4 Arizona in USA

3.4.1 Introduction

Unlike the previous two case studies, the following case study provides an example of a series of clusters that developed from direct intervention from both the private and public sectors. There are eleven cluster industries: bioindustry; environmental technology; food fibre and natural products; high technology; minerals and mining; optics; plastics and advanced composite material; senior industries; software/information technology; tourism; and transportation and distribution (Irwin, 2000: 1).

Arizona provides a good example of cluster policy and its application through a series of *cluster initiatives*. These were defined in Section 2.2 as a conscious process of interaction between role players in an industry or region, which can increase the rate at which competitive clusters develop. As noted in Section 3.2.6, Silicon Valley took a similar approach to rejuvenate its economy. The theoretical literature (Section 2.4.2) highlighted that there are two approaches to cluster based policy: the bottom-up-approach (BUA) and the top-down-approach (TDA). The former relates to the private sector initiating the process of developing cluster initiatives, whilst the latter relates to government initiating the process. Arizona is unique in that it provides a good example of a balance between the two approaches, as both were used in its economic development strategies. The cluster initiatives were initiated by the private sector, which then sought the participation of government as facilitator.

In 1988, a variety of firms and organisations assessed Arizona's economy, and decided that there was room for improvement and they resolved to take action. This led to the creation of the Arizona Strategic Planning for Economic Development (ASPED). This strategic planning effort, although initiated by the private sector, was a combined initiative with government. For example the Department of Commerce in Arizona assessed Arizona's business climate and drafted the first statewide strategic development plan in 1989 (GSPED, 1999: 1). Moreover, the funds committed to ASPED were sourced from both the public and private sector. Clearly Arizona combined the two approaches to cluster-based policy, the top-down and bottom-up approaches (see Section 2.5.2). That is, industry took the lead and later sought government's participation. This eventually led to the implementation process, which is known as the Governor's Strategic Planning for Economic Development (GSPED) in 1990 (Fessenden, 2000: 1).

As part of GSPED, industry-working groups, led by business leaders and specific to the various clusters were formed. Each cluster group had representatives of its leading industries and supplier industries in its core membership, as well as representatives from universities and members from economic development groups, chambers of commerce, law firms and marketing firms (Waits, 2000: 6). The goal was to realise long-term growth in industries that provide stable, well paying jobs by concentrating economic development efforts on the cluster areas, which provide a focus for the process (Morfessis, 1994: 81). This was to be achieved by the groups formulating an achievable vision for their cluster's future; identify sources of new growth; identify economic foundation needs, and develop priority initiatives for legislative considerations (Vieh, 1999: 1).

It was essential that critical success factors or key enabling factors were identified and upgraded in order to sustain the economic viability of the clusters. Critical success factors, provide the support and infrastructure that allows industry to flourish (Vieh, 1999: 1). The findings revealed that the quality of Arizona's economic foundations was not yet consistently high enough to sustain competitive advantage (Morfessis, 1995: 84). Each ASPED foundation group developed priority initiatives and assigned implementation roles and responsibilities. It is important to appreciate that the responsibility for building high quality economic foundations in Arizona rests with many parties. Government has a strong role to play, but so does the private sector. As highlighted

within the theoretical literature, state-level and local-level government institutions both have critical roles in the implementation of cluster policies. This will be discussed further in Section 3.4.6.

3.4.2 Factor Conditions

A common thread visible in Arizona's proposed clusters was the need for skilled workers. Work in every cluster and at almost every level needed more and better skills to do their jobs. Consequently, the human resources working group under GSPED, focused on improving Arizona's overall approach to work force development and encouraging new cluster-based training efforts to upgrade workers (Morfessis, 1995: 81). Such cluster-specific training programmes clearly represent advanced factor conditions, which provide a basis for sustainable competitive advantage, identified in both Silicon Valley

and Sinos Valley. This eventually led to a better alliance between the region's clusters and the University of Arizona.

In Silicon Valley, Stanford University played a central role in the development of clusters in that region, whilst in Sinos Valley, various technical institutions took this responsibility. Similarly in Arizona, the University of Arizona was an important component of the clusters' success. The University of Arizona is considered one of the finest medical research universities in the USA. It is also a critical component in developing technology and transferring this technology to the private sector, especially for the bioindustry cluster (Fessenden, 2000: 2). In addition, clusters such as optics and information technology are growing substantially. This growth has been partly facilitated by research from the University of Arizona (Fessenden, 2000: 2).

One of the most outstanding business associations in Arizona's clusters is the Arizona Optics Industry Association (AOIA). In 1992 the optics cluster companies (approximately 145) incorporated as the AOIA. Similar to the associations identified in both Silicon Valley and Sinos Valley, it provides a clear example of the manner in which business associations can be instrumental in developing cluster-specific factors. Together with the University of Arizona, the AOIA created two centres of excellence in optical manufacturing technology, put assistants in eight local schools to promote careers in science, and developed specialised curricula for

community colleges (Waits, 2000: 11). At the same time, AOIA initiated a joint Arizona-Mexico university agreement to develop the long-term export capacity of member firms in the optics clusters.

3.4.3 Supporting and related industries

Generally, the clusters in Arizona have a critical mass of specialised suppliers for inputs and services. The ease and speed of sharing specialised suppliers are enhanced by close geographic proximity characteristic of most clusters in this state. Similar to Silicon Valley and Sinos Valley, this proximity helps reduce the 'transaction costs' that are critical to the success of fast-moving firms, a process which generates obvious static economies of scale. The spatial proximity of most upstream and downstream

industries in Arizona also facilitates the exchange of tacit knowledge within the clusters (Vieh, 1999: 1). Already established in the previous case studies is that clusters provide the means for rapidly shared 'tacit' knowledge in a learning-by-talking-and-doing process. This was clearly seen in Silicon Valley where 'tacit' learning for workers in the clusters took place when personal knowledge was shared at the Wagonwheel restaurant - a popular meeting place in the early days of the semi-conductor industry in Silicon Valley. In Sinos Valley such knowledge is diffused through social functions, i.e. family or church gatherings and more formally during biannual trade shows.

When the various working groups under GSPED endeavoured to improve the clusters' critical success factors, they identified the need to improve the supporting industries in the region. As highlighted in the case study on Silicon Valley (Section 3.2.3) financial capital is a key ingredient for cluster-based economic development. It is also clear that the amount of capital in a region means little if the availability of that capital is constrained. As evidenced in Silicon Valley's venture capital institutions, capital is a critical issue in fuelling the innovation process. According to Irwin (2000: 2), Arizona did not lack entrepreneurial capabilities. It lacked financial resources. The fear was that, if creativity and entrepreneurial activity are not financed, it would relocate. Consequently the cluster-working group dedicated to improving capital resources in the region, focused on making capital accessible and flexible. At the same time, this working group focused on developing a centralised source of information about capital. It also attempted to eliminate

legal constraints to capital investments in Arizona's companies, whilst creating tax and other incentives to encourage private investment in entrepreneurial ventures in Arizona (Morfessis, 1994: 1).

Collective action was institutionalised in industry associations in both Silicon and Sinos Valley. In the latter's case, this collective action seems to have disintegrated with the rapid pace of the export boom. In Arizona's case, participants in the cluster process realized the power of collective action. According to Waits (2000: 10), "the story of Arizona's optics industry is a prime example of the power of the cluster framework for collaborative action." Companies in Arizona in such diverse fields as optical components; optical design software; lasers for medical, industrial, and graphics application; optical telescopes; and digital electronic camera systems, began for the first time to consider themselves as an

industry (Waits, 2000: 10). As indicated in Section 3.4.1, this led to the creation of the Arizona Optics Industry Association (AOIA). Together they undertook research to determine the size of their industry and they discussed common problems.

Consequently, they involved organisations that could either assist or hinder their industry's development, such as universities, national laboratories, and financial institutions. Eventually a strong belief developed amongst these companies that devoting time to developing the region's capacity of support optics firms could establish Arizona into an international centre of excellence in optics technology (Wait & Howard, 1996) as cited in Waits (2000: 10). This would obviously benefit all of them.

3.4.4 Demand conditions

Like Silicon Valley and to a lesser extent Sinos Valley, most of the industry clusters in Arizona have sophisticated, demanding end-users, which make Arizona have some of the most innovative developers in the world (Vieh, 1999: 1). Most firms within the clusters sell their products both locally and on the global market. Similar to Sinos Valley in the 1970s, Arizona currently gives a good example of the notion that an ability to meet local demand creates the ability to serve global markets. For example, it is estimated that in the second half of 2000, Arizona's exports increased to 23,8%. Export growth in this period is considered to have outpaced the national average,

which stood at 13,2% (Vieh, 1999: 1). Consequently, the optics cluster for example, has focused on developing long-term export capacity for its members.

According to Waits (2000: 11), there have been significant results, which include \$5 million in immediate sales. At the same time, an annual industry show has been established in Arizona, which attracts more than 700 domestic and international firms. Moreover, the markets for optics-related firms have generally grown through the cluster activities. This has positive ramifications for increasing demand. Furthermore, a number of optics-related firms have decided to relocate to Arizona due to the increasing recognition of this industry in the region.

3.4.5 Firm strategy, structure and rivalry

Competition between the companies within the spectrum of clusters in Arizona (as in Silicon Valley and Sinos Valley) is immensely stiff, and is intensified by geographic proximity. As already mentioned, this has positive implications for improvements in productivity and innovations (see Section 3.2.5). The various clusters in Arizona are driven by small, but fast-growing companies known as "gazelles" (Vieh, 1999: 2). These "gazelle" companies are relatively similar in size to the small shoe manufacturers in Sinos Valley. The significant difference between the two lies in the high level of technology in the former.

It is interesting to note that these "gazelle" companies are rarely engaged in traditional economic development and leadership circles i.e. to participate in boards or taskforces or to consider lobbying.

Consequently, to promote better networking with this vital part of the various industry clusters, universities, state agencies and economic development boards need to accommodate new industries and these "gazelle" enterprises. Moreover there is a need to reinvent economic development networking by holding informal and flexible meetings in coffeehouses for example (Vieh, 1999: 2). Similar to the situation described in Silicon and to a lesser extent Sinos Valley, this is an indication of the advent of vertically disintegrated company structures, which enable greater flexibility as well as an increased capacity to absorb innovation.

3.4.6 Social Capital as a means to economic development in Arizona

In similar fashion to both Silicon Valley and Sinos Valley, the ability to foster economic development in Arizona is a product of "social capital" inherent in the network approach in clusters, proposed by such authors as Saxenian (1994;1995: 1-17) and Fountain (1997: 1-14). Like Silicon Valley, "social capital" in Arizona developed purely from business transactions and not from a common socio-cultural heritage as was the case in Sinos Valley. As mentioned in Section 2.4.1, what makes a region successful is how it leverages public and private assets, and in turn develops relationships that foster trust and reciprocity, among other things, which keep interaction going.

According to Waits (2000: 10), and as indicated in Section 3.4.3, the experience of Arizona, especially of its optics cluster, illustrates, " the power of the cluster framework for collaborative action." Due to the

elements of trust, reciprocity and developing network norms over time ("social capital"), it was also highlighted in Section 3.4.3. the fact that stakeholders in the optics industry have begun to appreciate the value of contributing time to the development of the cluster's capacity to support optics companies in order to realise mutual benefits. For example, through a three-year combined effort, cluster companies bid together and were successful in landing a huge contract, one which would have been too large for any one the companies to undertake. Furthermore, the various cluster working groups under GSPED provided the basis for the creation of sustainable "social capital" and consequent competitive advantage.

Recent economic development updates on Arizona indicate that it still remains one of the most fastest growing states for the foreseeable future. For the twelve months ending October 1999, Arizona ranked third in the USA in employment growth, with an estimated job growth in 2000 of 28%, indicating that this state could create approximately 62 5000 jobs (Vieh, 2000: 1). The cost of living in Arizona continues to compare favourably with other major cities, a situation backed by the state's ability to foster job-creation. Phoenix, in the state of Arizona, has been estimated to have the second fastest growing US job market over the next twenty-five years, as well as possessing the greatest potential in the nation for attracting and growing business (Vieh, 2000 :4). At the same time, various surveys have recorded Arizona as being fourth in the nation, in terms of income growth.

3.5 Conclusion

Using Porter's diamond framework to analyse the various case studies has made it possible to develop common threads characteristics of industry clusters. Firstly, these case studies have highlighted the dynamism of the cluster approach. Secondly, they have illustrated the importance of spatial proximity, the resultant economies of scale, and their impact on innovation. A third common theme, is the importance of the network approach, which creates "social capital", a crucial element for successful economic development and one, which ultimately breaks down barriers between local communities and firms. Implicitly, while the characteristics of cluster may be present, it is not necessarily an effective cluster if there is no social interaction, trust and a shared vision in order to create the dynamic nature of a cluster.

The current macro and regional policies regarding clustering in South Africa are discussed in the next

chapter.

CHAPTER 4

CURRENT MACRO AND REGIONAL POLICIES REGARDING CLUSTERING IN SOUTH AFRICA

4.1 Introduction

The Industrial Strategy Project (ISP), which was initiated in 1990, was aimed at supporting the development of an industrial policy in South Africa that could focus on and improve the poor performance of manufacturing. It became clear that the South African economy was not well disposed for foreign investment. The poor performance of South Africa's manufacturing sector was one of the major issues that compounded the problems facing the South African economy (CSIR, 1998: 1). The manufacturing sector in particular was noteworthy in its inability to create jobs or to produce commodities that satisfied either the divergent needs of the domestic or the international market. Given the importance of the manufacturing sector for economic development, this is a major cause of concern. Manufacturing has been a critical element of growth in developing countries in three main ways:

- firstly, through economies of scale which increase productivity and therefore wealth;
- secondly, through the positive external effects of manufacturing plants on each other and on the rest of the economy, and through forward and backward linkages in the economy;
- thirdly, through the positive direct and indirect effects of the development of manufacturing on employment creation (Nadvi & Schmitz, 1994: 7).

This chapter will put industry clusters in South Africa in the context of current industrial policy. Its objective is to illustrate the contribution that clusters can make to South Africa's attempt to improve industry performance, expand exports, create jobs and achieve sustainable economic growth, in line with the government's macroeconomic strategy - Growth, Employment, and Redistribution (GEAR). Section 4.2 will provide the background to South Africa's cluster initiative programmes, whilst Section 4.3 will focus on the role played by the Department of Trade and Industry in these initiatives. Finally, Section 4.4 will give examples of cluster initiatives that are showing potential success. The motor

industry cluster is not discussed in this Chapter, but in Chapters 5 and 6.

4.2 Background to the South African Cluster Initiative

Prior to 1994, the manufacturing industry in South Africa was heavily protected from international competition. The import substituting industrialisation (ISI) policies of the apartheid era played an instrumental role in determining the course of South African industry. Coupled with a strong protective tariff regime and the trade isolation of the sanctions era, this has left an uncompetitive domestic industry serving an isolated domestic market (Hirsch, 1997; Joffe *et al*, 1995; Kaplinsky & Morris, 1999). Such factors as, "apartheid's impact on the skills profile of the workforce; repressive and outmoded industrial relations systems and work organisation; technological backwardness; a highly concentrated industrial structure coupled with a concomitantly weak, and repressed small, medium and micro-enterprises (SMME) sector did not prove favourable to manufacturing performance" (CSIR, 1998: 1).

With South Africa's return to the international economy, however, the government has acknowledged global trends towards reduced trade barriers. This is evident in the fundamental shift of trade policy from import substituting industrialisation (ISI) to trade liberalisation, with a strong focus on export promotion (Dunne & Morris, 1999: 3). At the same time, South Africa's current industrial strategy focuses on the economy in two ways: at a sectoral level and at a spatial level. Basically, greater emphasis is placed on certain sectors (industrial 'clusters') and certain areas (spatial development initiatives) - (ISA, 1996: 1). Such an emphasis on sectoral and spatial contexts is considered to complement the shift from import substitution driven industrialisation to an outward orientation (i.e exports) through international competitiveness.

It has been recognised that the country will have to rigorously improve its industry performance and competitiveness in order to fulfil its expected role of leader in Sub-Saharan Africa. Consequently, the competitiveness of South African firms is currently being analysed as part of this process in a bid to penetrate world markets. Policy makers have endeavoured to establish the efficiency and cost effectiveness of the use of resources as well as their upgrading. At the same time, they have also tried to establish those factors that are circumscribing the country's competitiveness in the international market.

The ultimate objective is to determine policy measures to transform these weaknesses into strengths (CSIR, 1998: 1).

An important breakthrough made by these policy makers is the realisation that previous studies had analysed industry in isolation and had not contemplated the extent of its linkages to other related and supporting industries and services i.e. the 'cluster' of firms constituting the total value chain, (CSIR, 1998: 1). On the basis of regional industrial research, writers such as Porter (1998: 15) argue that firm level competitiveness is largely determined by factors external to the firm. These include: arrangements integrating producers with their suppliers and customers; the existence of sophisticated and demanding product markets and shared institutions to promote training and research across companies (Porter, 1998: 15). As highlighted in Section 2.3.1.1, such factors were said to provide a platform, which gave competitive advantage to groups of firms in a particular industry or set of industries, which could not be created in isolation by any single firm.

It therefore seems that there has been recognition that it is impossible for firms to be competitive devoid of the efficiency and stability of the macro environment. Both intra and inter firm restructuring are needed to enhance competitiveness. This results in increased emphasis on the linkages between firms, implying a change in focus from predominantly firm-centred activity to the value chains and clusters within which firms are located (Dunne & Morris, 1998: 2). The implications of this finding are immense, not only for firms but also for government. Government needs to promote co-operation between different industry players rather than engaging with them on a purely individual basis. Consequently, policy makers in South Africa have realised that the role of crosscutting such as transport logistics and the extent of research and development in determining the competitiveness of local firms, were inadequately researched (CSIR, 1998: 1). Flowing from this realisation, valuable research in this field has been done in recent years by various institutions that have the promotion of sustainable and equitable economic growth at heart (CSIR, 1998: 1).

4.2.1 The Spatial Development Initiative (SDI) Programme

Currently the SDI programme clearly represents the strongest link between the tenets and outcomes of

national industrial policy on the one hand, and the industrial performance and potential for success of regions on the other hand (Lewis & Bloch, 1998: 728). This is because the SDI programme (as will be seen later in this discussion) provides a link to the strong emphasis in industrial policy on the manner in which regions are key developing sites for developmental intervention and the provision of suitable economic infrastructure. It is important to take note of the two main underlying theoretical concepts of SDI's, which are rooted in development literature (see Section 2.3.2.1). One of these concepts considers the regional agglomeration of industries i.e the tendency of industry to concentrate in particular geographical locations (DTI, 1998b: 26). This is a result of the dependency of industries on associated institutions and service providers for continued success. The other theoretical concept underlying SDIs is that which emphasises the need for government to contribute to the basic infrastructure i.e. roads, water, electricity, in order to attract private investors to profitable industrial establishments.

Spearheaded by the DTI, SDIs are therefore distinguished by the emphasis on the spatial dimension in their objectives. They are aimed at developing economic potential in specific spatial locations and crowd-in private sector investments. The ultimate objective is to create jobs, grow the economy of the area, and to contribute to restructuring the ownership patterns in the South African economy in line with the objectives set out in the government's macroeconomic strategy - Growth, Employment and Redistribution - (GEAR) (ISA, 1996: 1). It is important to put the initiatives in the context of the shift from a protected approach to economic development towards one centred on international competitiveness based on exports as discussed in Section 4.2. To date there are eleven SDIs throughout South Africa: the Maputo Development Corridor, the Phalaborwa SDI, the Platinum SDI, the West Coast Investment Initiative, the Fish River SDI, the Wild Coast SDI, the Richards Bay SDI, the Durban and Pietermaritzburg nodes, the Lubombo SDI and the Gauteng Special Economic Zones (Jourdan, 1998: 717).

There are two equally significant criteria in the designation of SDIs. They are redistributive in nature. This criterion insists that SDI status should be limited to areas that were disadvantaged by apartheid. One example is that of regional wars, which justify the strong focus on Mozambique in the programme. The impact of Bantustan policy is another, a justification for the designation of SDI status to the Eastern

Cape (Lewis & Bloch, 1998: 729). At the same time industrial policy concerns are given the highest consideration in the SDI programmes' emphasis on the need for 'inherent economic potential' for sustaining investment in industry, tourism or agroprocessing. This is a key criterion for commanding SDI-linked resources. The apartheid-induced disadvantages that a given region sustained together with its relative poverty, is insufficient in attracting the support of the SDI programme. It is important that the region must adequately prove the ability to turn existing inherent, under-utilised potential into measurable development through the injection of SDI measures and resources (Lewis & Bloch, 1998: 729).

The SDI programme uses two main instruments to implement this strategy. Firstly, constraints to investment are removed. These impediments to investment are often infrastructural in nature (roads, ports, and rail). The concept of public-private partnerships (PPPs) has in recent years been vigorously encouraged by government in a bid to enhance the delivery of infrastructure (Jourdan, 1998: 718). Consequently, a number of PPPs, including the Maputo Toll road (the N4 linking Mpumalanga and Mozambique), various other infrastructure projects, as well as tourism projects have been developed. Secondly, the SDI programme identifies strategic investment opportunities in the SDI area. These strategic investments are usually essential in enhancing the performance of key clusters in the local economy and take the form of 'anchor projects'. 'Anchor projects' inherent characteristics attract huge inflows of resources into a region. These anchor projects, "serve as magnets to additional downstream or related investments, thereby expanding the size and scope of the sector in the SDI area" (Jourdan, 1998: 718).

Common ground within these two sets of criteria can be identified in the claim that certain areas of the country have been disadvantaged by industrial policy thrusts associated with the previous regime. As highlighted earlier in Section 4.2, this argument is particularly relevant to the notion that import substitution has benefited sites of investment designed to serve the domestic market. Evidence of huge industrial investment in Gauteng province can be considered to be an indication of the principal concentration of the domestic market. On the other hand, import substitution, it is argued, had a detrimental effect on those regions of the country more suitable, due to their location advantages, to support production for global markets (Lewis & Bloch, 1998: 729). On the basis of these criteria, the

Eastern Cape and Mozambique, given their port facilities, are also eligible for SDI support. As mentioned earlier, private sector investment is a principal mechanism underpinning the SDI programme. This investment will be 'crowded in' through financial support for infrastructural projects and 'anchor' projects. Public sector financial support will be, however, limited. Government's financial investment contribution to the SDI programmes is generally targeted at a maximum of ten percent of the total investment value (Goldin & Jourdan, 1996: 4).

4.2.2 Industrial Development Zones (IDZs)

Industrial Development Zones (IDZs) are also an integral part of the SDI programme. They are deliberately located in SDIs in order to maximise the linkages between the two programmes, and can generally be considered as specialised industrial areas within SDIs. The aim of IDZ development is to establish an environment conducive to predominantly export production, which is attractive to both international as well as local investors (DTI, 1998b: 29). IDZs essentially represent a medium for the development of strategic industries that are resource intensive, as well as the clustering of related industries so these are able to benefit from common services.

As discussed in Section 4.3.1, industrial concentration is increasing in importance in the global economic environment. It is important to realise that IDZs are supported by current developments in numerous countries throughout the world, where it is becoming increasingly difficult to attract manufacturing foreign direct investment (FDI) without offering foreign investors further incentives (SDI, 2000: 1). These incentives include providing a business environment characterised by "speedy decision-making, attractive benefits, high quality inputs at competitive rates and standards of labour, and an environment that gives easy access to work markets" (SDI, 2000: 1). There is growing recognition that it is critical to encourage FDI flows into South Africa to boost growth, employment and competitiveness.

In 1999 feasibility studies for the establishment of IDZs were conducted in six locations around the country at Richards Bay, Durban, East London, Coega near Port Elizabeth, Saldanha Bay and the Johannesburg International Airport. Adjacent to specified sea- and airports, these dedicated industrial zones are comprised of excellent infrastructure, as well as regulatory and supply side interventions (DTI,

1998a: 3). The government has taken tremendous measures to distinguish the proposed IDZs from the traditional concept of export- processing zones. Notably, it has undertaken that exemption from labour market legislation and regulations under export processing zones (EPZs), are not contemplated under the IDZ concept (DTI, 1998a: 4). On the contrary, "proposed labour-related interventions would effectively guarantee union recognition in the IDZs and support this with a dedicated mediation and conciliation facility" (Lewis & Bloch, 1998:731).

Attention will be given to human resource development through co-ordination of recruitment and training services for each zone. In order to create a stable and productive industrial relations environment, a proactive approach to dispute resolution coupled with active human resource development will be implemented within the framework of labour legislation (SDI, 2000: 1). Other benefits that new investments locating in an IDZ will enjoy, flow from the attractive regulatory regime and investment facilitation services provided by zone operators, duty free imports of capital goods and inputs, plus VAT exemption for exports and access to government's incentive mechanisms compliant with WTO guidelines (SDI, 2000: 1). It is important to realise that effective infrastructure which will be able to turn an IDZ location next to an international port or airport into a sustained competitive advantage underpins these benefits.

4.2.2.1 IDZs in the Eastern Cape

To date government confirmed that Portnet would develop the R1,5 billion Coega Port in the Eastern Cape, which forms an integral part of the export-oriented IDZ. At the same time it confirmed Anglo-Dutch consortium P & O Nedlloyd/TCI as the preferred private partner in developing the proposed Coega IDZ (SDI, 2000, 1). Portnet's role will include developing the common infrastructure for the deepwater port such as the breakwaters, quay walls, navigational instruments and all other elements necessary to discharge the functions of a port authority in accordance with international best practice (Hosking & Lloyd, 1999: 41). On the other hand, the consortium P & O Nedlloyd/TCI's proposal includes the development of a container terminal and trans-shipment hub in the Coega Port, together with an industrial park, logistics centres and electronic commerce (e-commerce) business park.

Further afield in East London, Portnet is considering a detailed feasibility study of expanding the port. At the same time, the municipality has demarcated land, which is currently being rezoned for industrial development (Eastern Province Herald, 2000: 7). Forming part of this process is an environmental impact assessment currently being conducted. External and internal infrastructure is expected to be in place by July 2001, with manufacturing commencing in January 2002 (Eastern Province Herald, 2000: 7). Ultimately either an industrial park or duty free IDZ should be developed by January 2001. Already a business plan has been completed for application for IDZ status. What remains to be granted is an IDZ operator's license, which will be granted depending on the economic viability of the proposed IDZ.

4.3 Role of the Department of Trade and Industry in the cluster process

Evidence that indicates the importance of agglomeration economies (which are rooted in the proximity of firms in a particular locale) implies that the 'underlying potential' - a term used in the SDI approach - of a specific region is not simply dependent on pre-given local factor prices. It is actually dependent on the level and quality of existing industrial activity in the region in question (Lewis & Bloch, 1998: 739). This essentially illustrates that industries create regional resources and not the other way round. Moreover, through close interaction of user and supplier firms, innovating firms and clusters develop many of the materials and much of the machinery and labour skills they require. This argument is not attempting to eliminate wages from the location equation, nor should the argument be perceived as relegating the significance of sound physical infrastructure (Lewis & Bloch, 1998: 740). The point being made is that some of the most dynamic industrial regions are not always characterised by low wages, whilst some have inadequate basic physical infrastructure.

At the same time, it can be argued that the 'growth pole analysis' discussed in Section 2.3.1.2, also underpins the SDI programme. The theory suggests that in the absence of agglomeration economies, costly infrastructure or 'propulsive investment' accounts for successful regional industrialisation, growth and development of a region. Initial infrastructure results in what Hirschman (1958: 50) termed the 'centrality of side effects'. These are basically indirect and incidental outcomes of developing infrastructure and drawing anchor firms to a region.

According to Lee (1996) as cited in Lewis & Bloch (1998: 742), three side effects can be identified:

- backward and forward linkages which lead to the development of an industrial base;
- changing behaviour of bureaucracy, especially local government;
- increasing private sector confidence and participation in development process.

The quality of the willingness and capability of local public and private agencies to drive the industrialisation process affects the interaction between these critical factors. More importantly, the character of “social capital”, as noted in Section 2.4.5.1 is fundamental to a region's success. Without the basis of strong 'social capital', a region that has a relatively uncompetitive industry is unlikely to become internationally competitive, regardless of how outstanding its infrastructure is or how many individual large industrial enterprises it has (Driver, 1998: 806). Consequently, to build “social capital” over the longer term is one aspect which the DTI’s regional industrial strategy might focus on in developing industry clusters.

4.3.1 Industrial clusters

In this context, and building on the industrial sector policies that emerged from the Industrial Strategy Project (ISP), an amount of R7,4million was granted to the South African government for undertaking policy studies (using the services of the World Bank) aimed at the improvement of international competitiveness (CSIR, 1998: 2). The DTI supported these policy studies through the Japanese Grant Fund (JGF), which was established and placed in the National Economic Development and Labour Council (NEDLAC) under tripartite control. It was agreed that 45% of the funds should be spent on crosscutting issues, and 55% on sectoral or cluster studies (CSIR 1998:2). The 'cluster methodology' was the primary methodology used to gather information and to analyse it. Subsequently, various organisations such as central government, provincial government, metropolitan substructures, parastatal organisations and private sector companies and consultants became involved with cluster research in South Africa.

Notably, the DTI has played an active role in the forming of clusters in a number of industries. It initiated

a cluster conference on 24 and 25 April 1996, which for the first time assembled the entire cluster and related research projects and enabled researchers to present their preliminary findings. Due to limited resources, it was decided that the DTI should concentrate on a few 'role model' clusters, which would demonstrate the potential benefits of collaborative processes, and in turn secure total commitment from industry stakeholders. This involved setting up joint forums with industry in a bid to collect, share and debate data, and creating an understanding of an industry's development. At the same time, there was a need to identify government or industry interventions, which will enhance this development, as well as to develop a plan for the effectiveness of these interventions (DTI, 1998b :76). Continual revision of objectives and priorities on the basis of new information and experiences was also considered a priority. The principal recommendation thereof was that it was essential to encourage the restructuring of all industry associations so that the government can easily interact with the industry in terms of policy co-ordination and other policy issues (CSIR, 1998: 3). A workshop to facilitate a broad interaction between the cluster process, the private sector and unions was consequently held through NEDLAC in July 1996. This workshop established that the success of the cluster initiatives would be significantly influenced by the extent to which these assume a spatial dimension.

The Department therefore contributes to the cluster process by initiating or conducting the studies of the different sectors, facilitate the meeting of potential role players and monitoring progress of processes as well as the outcome or economic success of the efforts. For example, various officials of the Department were involved with the research undertaken by institutions such as the Industrial Strategy Project (ISP), NEDLAC and Monitor. There are currently ten cluster initiatives at varying stages of development within the DTI. These include clusters embracing petrochemicals; plastics and synthetic fibres; jewellery; electronics; footwear; ceramics; wool and wool products; timber; furniture; pulp and paper, as well as downstream stainless steel, carbon steel and aluminium, and automotive (DTI, 1998b: 76).

4.3.2. Cluster Secretariat

Given the scope and range of cluster activities, it became necessary in 1997 to establish a secretariat within the DTI in order to co-ordinate the various cluster processes and to act as a resource for

information about cluster activities underway in South Africa. Its function was to collect and disseminate information on cluster activities in South Africa and elsewhere in the world, and to facilitate collaboration between researchers and industry stakeholders (DTI, 1998b: 76). This group interacted with other cluster groups in either the provinces, parastatals, or the business sector in terms of sharing information. Through meeting on a regular basis as needed to manage the day-to-day cluster activities, it was hoped that the resultant sharing of information and resources could aid many stakeholders in the area of clustering. It was also hoped that a common vision could cement the process, and ultimately promote faster economic growth with less duplication (DTI, 1998b: 76).

Projects within the Cluster Secretariat obtained funds from the Sector Partnership Fund, which was established in September 1997. The Sector Partnership Fund (SPF) is part of the Industrial Competitiveness and Job Creation Project, which is financed with a loan from the World Bank to the government of South Africa. Its primary objective is to support sustainable economic growth and job creation needs of South Africa by providing financial assistance to partnerships of firms in the manufacturing and agro-processing industries (DTI, 2000: 1). These industries should define and implement collaborative projects related to production and marketing that will enhance their productivity and international competitiveness.

It is important to realise that the SPF is an integral part of the DTI's group of supply side measures. As mentioned in Section 4.2.2, these supply side measures are aimed at supporting the government's development goal of greater economic, export and employment growth by increasing the pace at which South African firms adapt to the current trade liberalisation to compete more effectively in the global market (DTI, 2000: 1). The term 'partnership' as used in the SPF programme does not necessarily refer to a legal entity but to loose associations of firms and organisations that decide to collaborate to realise mutually beneficial objectives. The SPF will support the development of such partnerships through the provision of 65:35 matching grants, 65% from the SPF and 35% from the partnership grant (DTI, 2000: 1). Essentially, grant support for each approved partnership will be limited to an amount of R1 million and they will be made exclusive of valued added tax.

As mentioned earlier, both the Cluster Secretariat and the SPF's primary objective was to assist companies to adjust to trade liberalisation as they create new ways of competing. The SPF is currently operational, though the Cluster Secretariat has since been dissolved. Currently individual sectoral directorates have been given the responsibility for their respective cluster initiatives. Reasons for discontinuing the Secretariat remain unknown. However, with the restructuring of national and provincial government, which aims to rationalise the activities of government and forge closer relationships between parastatals and government, especially provincial government, one might speculate that the Cluster Secretariat could have resulted in a duplication of effort. For example, currently the Centre for Investment and Marketing in the Eastern Cape (CIMEC), is playing a critical role in regional development together with the Department of Economic Affairs, Environment and Tourism (DEAET). CIMEC has been assigned the responsibility of co-ordinating and facilitating cluster activities in the Eastern Cape by the DEAET.

4.4 Examples of Clusters Initiatives in South Africa

4.4.1 Introduction

South Africa's experience with cluster initiatives has been relatively patchy. Similarly, the literature on these initiatives is scanty. At the same time, cluster initiatives are relatively recent, hence few studies, which examine them over time, are available, whilst any available information is, in most cases confidential. There is, however, some information on the essential elements required to develop such initiatives, hence this section will attempt to draw this information together. Due to the limited availability of material on these initiatives, it is inadequate to give a comprehensive analysis of Porter's 'diamond' framework in the respective industries as was done in Chapter Three with international experience with industry clusters. Consequently, this section, relying on the available material on cluster initiatives, should not be interpreted as giving an exclusive coverage of issues of cluster development in South African industries.

Sections 4.1 and 4.2 highlighted changes in the rules determining industry competitiveness. This has been exacerbated by an increasingly global world economy that has transformed the nature of competition, production and consumer demand. The combination of increasingly discerning and

demanding customers, and increased competitive pressure has led manufacturers to reform both internal and external relationships. The intention is to improve their ability in flexibility, innovation whilst accelerating their response rate to shifting and splintering market demand (Dunne & Morris, 1999: 2). Again, as highlighted in Sections 4.1 and 4.2, South African firms are becoming increasingly aware of the change in the dimensions governing international competitiveness.

A concerted effort at industry-wide restructuring is required if they are to remain competitive in the domestic market as well as to establish a presence in the export market. As mentioned earlier, this demands rethinking relationships and patterns of organisation at both the intra-firm and inter-firm levels. But as we shall see in the following case studies, both the South African society and economy have a legacy of high levels of mistrust. Operating in such an environment frustrates any restructuring based on the notion of collective efficiency (Dunne & Morris, 1999: 2; Edwards, 1998: 4). The South African society and economic context therefore does not provide a classic case of trust derived from natural social embeddedness as the literature would suggest (Fountain, 1997: 5; Saxenian, 1995: 2).

The following two case studies will illustrate attempts at developing cluster initiatives in order to improve competitiveness in South Africa.

4.4.2 The Saligna Hardwood Furniture Cluster

The furniture industry in South Africa highlights attempts to improve international competitiveness through co-operating around problems that are hampering efforts to establish a position in the global market. In a bid to achieve this, the industry is clustered both vertically and horizontally along the value chain. As indicated in Section 2.2, the former dimension assumes that firms in adjacent phases in the production process can be present (i.e. buyer-supplier relations), whilst the latter implies that several industries or sectors can be part of the cluster. Of particular interest is the Saligna Hardwood subsector, a relatively small part of the South African timber products industry. It appears that a combination of circumstances have led to the creation of an environment disposed to collective action by sectoral stakeholders.

Throughout the entire Saligna value chain, quality is a problem. This begins with timber not grown to the specific needs of furniture manufacturers, and continuing at the level of saw mills that have inadequate capacity as well as specialised equipment required for producing furniture-quality sawn hardwood. At the same time, end manufacturers are dissatisfied with the inability of mills to make available timber in the specified dimensions. This apparently increases the difficulties as well as the costs of manufacturing processes (Dunne & Morris, 1999: 13). Moreover, quality problems at the level of manufacturing take the form of poor skills and outmoded or inappropriate equipment, which reduce the quality levels in production. Particular attention also needs to be devoted to finishing in Saligna products. For example, finishes that are not environmentally friendly, diminish the environmental credentials of Saligna. Moreover, Saligna is relatively new in the export market, hence there is a need to create an awareness and improve its image in the export market. This exacerbates existing problems of establishing contacts and arranging distribution.

It was around these issues that Saligna stakeholders realised the need for co-operation along the value chain to address the problems they encountered in quality and in exporting. Consequently, stakeholders (forestry planters, saw mills, manufacturers, agents and various sectors in government departments concerned with water, forestry, manufacturing competitiveness and trade) are working together along the value chain to address the wide range of issues that hamper the effectiveness of South African value-added timber product manufacturers in the export market.

The concept of collective efficiency in Section 2.3.2.2 - the mutual benefits to be derived from inter-firm co-operation - seems to have been encouraged over a period of time by a few of the Saligna value chain stakeholders (Dunne & Morris, 1999: 15). It is interesting to note that the concept of beneficial co-operation along the Saligna value chain would have been aborted were it not for the willingness of industry stakeholders to seek a neutral facilitator to encourage the principle of collective action, in this case the Industrial Restructuring Project (IRP). The theoretical literature (see Section 2.2) as well as the case study on Arizona (see Section 3.4), highlighted the need for having a neutral facilitator or consultant in the cluster initiative process. Coupled with a host of other factors, this led to the relative success of the development of a vertical and horizontal example of building collective efficiency in an industrial cluster.

Collective efficiency in the Saligna value chain was initiated by the industry, therefore illustrating the bottom-up-approach (BUA) suggested in the theoretical literature (see Section 2.5.2). Similar to Arizona, it also provides an example of a situation where the bottom-up-approach (BUA) is combined with the top-up-approach (TUA), i.e. industry initiated the process and sought the participation and support of government. The Saligna stakeholders made use of the IRP's credibility to obtain the DTT's support, a move that increased the perception of the process by the stakeholders. The fact that the IRP was neutral was essential in generating relatively positive attitudes towards co-operation, though trust was still lacking and suspicions were rife concerning motives within the sector. Because the IRP was non-aligned, the initiative did not give the impression of favouring specific stakeholders or groups of stakeholders. Essentially, the facilitator's role was to overcome trust barriers, whilst the other support from industry stakeholders lent credibility to the process (Dunne & Morris, 1999: 15).

In the workshops that followed, the stakeholders appreciated the role of interdependence throughout the value chain. Interdependence is central to the concept of collective efficiency (see Section 2.3.2.2). There were issues surrounding developing a common brand image, joint market research and a sectoral quality control policy. These issues offered potential benefits for collective action, and therefore led to the creation of working groups similar to those in cluster initiatives in Arizona and Silicon Valley (see Sections 3.4 and 3.3 respectively). The activities of the working groups were centred on issues that were widely acknowledged as the key drawbacks to success in the sector. Each of the working group included stakeholders throughout the value chain, whilst the information and benefits from each of the working groups was made accessible to all participants.

These working groups included the Young Tree Working Group, which addressed the issue of excess supply of Saligna expected in the future as a result of declining demand for eucalyptus struts for the mining industry. In this case growing Saligna for furniture and other timber products could be a more viable option. The second working group was the Product Matrix Working Group, which was focused on the demands of various Saligna users, i.e. the need for example to have the correct dimensions of sawn timber from the mills. This working group would greatly enhance the demand conditions within the industry. According to Porter's 'diamond' framework (see Section 2.3.2.1) the nature of demand is

more important than the size. Working closely with demanding end-users of sawn timber will induce learning-by-interacting, enhancing innovation processes for both parties. The third working group was the Branding Working Group, which was to examine whether it was feasible to establish a joint effort for the export market through for instance branding of Saligna products (Dunne & Morris, 1999: 18). Being able to present a united front in the marketing of exports within the industry, is essential for creating cluster-specific factor conditions, which according to the theory (see Section 2.3.2.1) are difficult for competitors to replicate.

The Saligna Hardwood Value Chain Cluster is still in its early stages of development, therefore it is difficult to ascertain whether effective collective efficiency will materialise. It does, however, provide some noteworthy lessons for other cluster initiatives in the country. "Broadly speaking, the favourable outcome of the process has been the result of three interacting factors: favourable conditions within the broader sectoral and market environment; the role of internal change agents and the role of intermediaries as external change agents," (Dunne & Morris, 1999: 21).

It is important to appreciate the complex nature of generating co-operation either along a value chain or between competing manufacturers. Such co-operation is embedded in a particular context i.e. in terms of the markets and the sector in which firm co-operate. Moreover, "a collaborative process is only as good as its members" (Edwards, 1998: 4). Implicitly, co-operation depends on the quality of interaction between the industry stakeholders, with the aid of the neutral facilitator. All of this of course takes place against the background of the operating environment, bearing in mind that the facilitator cannot manufacture support for co-operation. According to Dunne & Morris (1999: 21) this has important implications for government. Of particular importance in this instance would be their supply-side support measures. The Saligna Hardwood case study seems to suggest that it is inadequate to merely offer firms an incentive to co-operate.

Government needs to be fully committed and be involved in continued interaction and dialogue with industry stakeholders in responding to their specific needs. It cannot expect to facilitate co-operation if policies are established devoid of the stakeholder requirements. This case study seems to illustrate the

need for active involvement from a wide range of industry stakeholders in order to generate effective co-operation (Dunne & Morris, 1999: 21). Indeed government's presence was evident in the Saligna Hardwood Value Chain Cluster, and it provided credibility to the cluster initiative. However, its role was somewhat limited, i.e. the top-down-approach was circumscribed (see Section 2.4.2). Essentially, if government is to play a more effective role in cluster initiatives, it must widen its scope from merely providing financial incentives to creating a favourable environment for co-operation (see Section 2.4.2). It might also need to identify relevant stakeholders and potential facilitators to drive the process, taking care that it does not assume this role. Without explicitly promoting co-operation, government can induce a process of dialogue centred on key issues pertaining to a particular sector. If the DTI is to play such a role, it needs to take cognisance of these issues.

4.4.3 The Capital Equipment Cluster Initiative

Another cluster that has shown considerable success is the Capital Equipment cluster initiative. Similar to the Saligna cluster initiative, this initiative is a result of South Africa being part of the global market, hence the need to respond quickly and be able to compete viably in such markets. As a result of the lowering of import barriers in line with international trends and other developments, South Africa's traditional markets - domestic and foreign- are under threat from other world producers. Consequently, three companies (Bell Equipment, Weir Envirotech and Boat Longyear) with the help of the DTI established the Capital Equipment cluster initiative in April 1997. It was believed that it is critical to co-operate with other firms in the capital equipment sector to strengthen South Africa's capabilities in order to export competitively and ward off increasing exports (Edwards, 1998: 3).

The initiative has grown from a steering committee with a membership of three firms in April 1997 to a membership of thirty firms in 1998, with an annual turnover of more than R10billion (Edwards, 1998: 4). Similar to the Saligna cluster initiative, the Capital equipment cluster initiative provides an example of both horizontal and vertical co-operation. Hence not only does it consist of both small and large manufacturing companies, it also has raw material suppliers. Furthermore, it embraces all interested parties such as, "industrial associations, labour organisations, government and related support institutions, financing, transport, telecommunications, and research institutions," (Edwards, 1998: 4). Also similar to

the Saligna cluster initiative, as well as those in Silicon Valley and Sinos Valley (see Sections 4.4.1, 3.2 and 3.3 respectively) working groups were established to improve the industry's capabilities in transport costs, skilled workers, marketing and exports. These working groups together with the members of the initiative have access to a wide range of promotional activities such as, "trade

mission seminars, exhibitions, financial assistance and the 'butterfly' strategy which establishes links with untapped markets in Africa, Latin America and Asia" (Edwards, 1998: 4).

Unlike other industrial cluster groups, the Capital Equipment cluster initiative opted to spend less time on research in order to focus and proceed with more practical initiatives such as joint marketing. Again similar to the Saligna cluster initiative, this is bound to strengthen cluster-specific factor conditions that are difficult for competitors to replicate (see Sections 2.3.2.1. and 4.4.2.1). By 1998 this was already yielding results for the industry. The cluster initiative also managed to create an Export Council in July 1998. The ultimate objective is to enable exporters to achieve world-class status in terms of quality products by the year 2003. It is the aim of the cluster initiative to increase exports by 60% by 2003 as well as capturing 50% of all African business and 20% of all business in South America in the same period (Edwards, 1998: 1).

South Africa's new political status has improved the way it is perceived by the rest of the world, and is gaining reputation for its relative technical expertise and know how in Africa. In addition, it is considered a gateway into Africa, not only because of its strategic position at the tip of Africa and its well-established infrastructure, but also because of its knowledge of African conditions. Consequently, there are proposals by the Capital Equipment sector to seek government support for development of new African projects, in which the Capital Equipment sector could witness significant growth during the next five years. A joint cluster-DTI working group has therefore been established to participate in these projects (DTI, 1998c: 2).

The cluster initiative is also focussing on the workplace challenge of training employees and improving employee/management relations. Funds are available, due to levies being paid by member companies,

for training and improving management and labour force relations. At the same time, the CSIR provides members with a R5000 once-off assessment of manufacturing skills. This is supported by inter-factory and inter-company visits, which according to the clustering theory facilitates greater learning, sharing and therefore co-operation. A proposal was also put forward in 1998 by the Warwick/Morgan International Competitiveness Programme to design a process to have a "dual growth path." This basically means that both the company and the individual representing the company in the cluster initiative benefit from the process (DTI, 1998c:1).

It was realised that the cluster initiative, like any other operation whose success depends on people offering their services on a voluntary basis, is bound to encounter questions on the relative time spent in cluster activities in relation to the benefits obtained. Over the course of time, executives representing their firms within the cluster initiative will begin to question what is in it for them. At the same time, there is a tendency for voluntary organisations in South Africa to become completely self-sufficient. This may result in unnecessary duplication and, "is contrary to the notion that from a business perspective "hunting in packs" should be the overriding philosophy when operating in a cluster," (DTI, 1998c: 3).

These realisations led to two initiatives (DTI, 1998c: 3):

- the introduction of the Industrial Doctorate Programme of the Warwick Manufacturing Group of the University of Warwick, United Kingdom;
- the launch of the Make it South Africa© Manufacturing Excellence initiative.

The proposal is aimed at developing an environment in which participants in the Capital Equipment cluster can use their time spent on cluster work towards meeting the requirements of a senior doctorate programme offered through the University of Warwick. This obviously has positive implications for the creation and upgrading of advanced cluster-specific factor conditions (Porter, 1998: 132). It is proposed to design the activities of the cluster working group such that each participant will be able to derive information, which will be both company specific, as well as meeting the individual's needs for the doctorate programme.

The need for individual companies participating in the cluster initiative to achieve 'world class' status was also recognised in this proposal. Hence in order to meet this expectation, whilst also eliminating duplication and optimising the scarce executive resources, it was proposed that the Capital Equipment cluster initiative should become a member of the Make it South Africa© Manufacturing Club (DTI, 1998c: 4). A specific chapter was created in the Manufacturing Club to meet the specific needs of the cluster initiative, one that would be linked with the features of the doctoral programme. Essentially, the cluster has a complete resource base at its disposal. The club will organise various activities as well as provide input and support for the world-class status initiatives. Moreover, in consultation with the CSIR, the Manufacturing Excellence Centre (MEC) within the Manufacturing Club will give access to local and international sources of technology. At the same time, in those areas where firms require assistance in business processes, the MEC has access to some of the highly regarded consulting operations in manufacturing.

Finally, in order for other cluster initiatives to derive lessons from this initiative it is important to take note of the factors that contributed to its initial success. The private sector for example, did not designate its representation within the cluster initiative to low ranking people. Companies that actively participated in the initiative ensured that senior managers occupying executive positions were delegated to participate in the programme (Edwards, 1998: 4). Had low ranking candidates represented their firms in the initiative, this would have delayed the process by representatives having to constantly refer back to decision-makers in their operations. At the same time the people who participated in the various working groups of the cluster invested a tremendous amount of personal and company time ensuring that the cluster makes progress (Edwards, 1998: 4). As already mentioned, the initiative managed to establish an exporting council and set up a doctoral programme in conjunction with Warwick University. In addition, a well-researched, detailed report has been produced and is available to all members at no extra cost (DTI, 1998c: 2). Most companies could not have afforded this type of research individually, and will therefore benefit from its findings.

4.5 Conclusion

The preceding discussion highlighted current industrial policy regarding clustering in South Africa. The DTI was seen as spearheading the cluster programme in South Africa, with the aim of creating internationally competitive industries geared towards exporting. Both case studies analysed depicted the process of developing cluster initiatives in the South African context and provided useful lessons for similar initiatives in the country. However, whilst the first case study emphasised the manner in which collective action can be generated in co-operative arrangements, the latter focussed on mechanisms that can align cluster, company and individual self-interests in order to optimise the benefits from the initiative. Lessons from both international and South African experiences with clusters will be used as a reference point for the cluster initiative in the Eastern Cape's automotive industry, which is the topic of the next chapter.

CHAPTER 5

THE EASTERN CAPE AUTOMOTIVE CLUSTER

5.1 Introduction

South Africa has found itself integrated into the global economy, where powerful trading blocs are instrumental elements. Multinational corporations are increasingly relocating capital and production freely from conditions regarded as less favourable to the more favourable conditions. In such an environment, individual governments have realised that their ability to advocate policies, which encourage local ownership and inward orientation, has become increasingly limited. Ultimately there has been a marked increase in the liberalisation (see Section 4.2) of trade policy in formerly protected economies such as South Africa (Barnes & Kaplinsky, 1998: 1).

In light of these events, recent South African experiences are little different to those of other developing economies. The process of encouraging local production in South Africa began in the 1920s and by the late 1970s there was an extensive amount of protective devices and subsidies for local production and ownership (Bell, 1993: 23; Joffe *et al*, 1995: 6 as cited in Barnes & Kaplinsky, 1998: 2). As in most formerly protected countries, many of these tariffs and subsidies have been eradicated over the past decade.

In South Africa's case, however, there has been a distinct increase in the pace of liberalisation, which has been primarily driven by government. Consequently, South Africa has liberalised its external trade more rapidly than required by the WTO (Padaychee, 1997: 45; Jenkins & Siwisa, 1997: 15 as cited in Barnes & Kaplinsky, 1998: 2). At the same time, the need to source for external savings has increased the desire to attract foreign-owned producers. It is within this context that the automotive industry is increasingly operating.

This chapter is aimed at giving an overview of the current state of the automotive industry in the Eastern Cape. Section 5.2 will begin by giving a brief background of the South African motor industry. Section 5.3 will analyse the Motor Industry Development Program (MIDP), followed by an analysis of the formation of the motor industry cluster initiative in the Eastern Cape in Section 5.4.

The chapter is purposefully descriptive, providing a background to the empirical analysis contained in the following chapter.

5.2 Historical background to the South African Automotive Industry

Ford (1924) and General Motors (1926) established the first automobile plants in South Africa during the 1920s. In 1945 assembly plants were established in Durban and East London, namely Motor Assemblers and Car Distributors Assembly respectively. The Chrysler Corporation established a plant in Cape Town, closely followed by South African Assemblers and Distributors (SAMAD) in Uitenhage in 1948. Consequently, the automotive components industry in South Africa grew out of the first automobile assembly plants. The anticipation of tariff protection was a major factor, which motivated entry by assembly plants (Duncan, 1997: 49). High tariffs on Completely Built Up Units (CBUs) together with a rapidly growing market acted as a magnet to these foreign companies.

These operations, though in many cases highly profitable, were small in international terms, with high unit costs. Production was aimed solely at the domestic market and the assembly plants were isolated from global production networks of parent companies, except as markets for Completely Knocked Down (CKDs) packs (Black, 1998: 1). Although local content remained low, some basic components (batteries, glass, tyres) were obtained locally by the early 1930s. Over the next two decades, the situation remained relatively the same. Although there were 94 registered component manufacturers in 1958, over 60% of total employment was in the tyre industry. At the same time, local value added in automobile manufacture was less than 20% (Barnes & Kaplinsky, 1998: 3). This was due to the fact that most of the domestically manufactured components were produced exclusively for the after-market (i.e. market specialising in car parts).

Owing to these low levels of value added, the government decided to target this sector. This is unsurprising since the motor industry tends to be highly regulated and supported by governments worldwide. This is due to various reasons such as: "it is a massive potential employer; it is a high volume business with high

associated value (in South Africa motor trade turnover is roughly at 14% of GDP); and it demands a very high quality at low prices with many technical and business spin-offs to other industries" (Williams, 2000: 1). In South Africa the rules are currently set out in a piece of government legislature called the Motor Industry Development Programme (MIDP), which will be analysed in depth in Section 5.3. In this perspective, this sector was deemed to have both growth potential and externalities to other sectors. Moreover, it accounted for 15% of total imports in 1960 (Barnes, 1999: 5). Due to these factors, a series of local content programmes (six in total) were introduced, beginning in 1961 and ending in 1995. These involved a combination of tariffs and import permits and each phase was designed to increase the degree of local content and ultimately to develop the local industry. The desire to save foreign exchange was another main motivating factor for increasing local content. Duncan (1997: 49) maintains that the development of the automotive industry in South Africa was also driven by the government's desire to resolve the "poor white problem," although this was no longer a defining feature of the industry by the 1980s.

5.2.1 Local content programme in the automotive industry

The local content programmes were in many ways similar to those in protective regimes in other developing countries e.g. Brazil & India. However, in South Africa from the first programme until the late 1980s, local content was based on the percentage share of final vehicle weight (rather than value) accounted for by local components (Barnes & Kaplinsky, 1998: 3). Consequently, South Africa's incentive system in the 1980s was encouraging firms to use heavy materials at a time when the global industry was beginning to capitalise on higher value added components, together with the use of energy-saving lightweight materials. Inevitably there was a reduction in the share of local content by value, since the diffusion of electronics meant that some light materials were especially high in value added. Highly sophisticated components made it increasingly easy to meet the mass-based local content requirement while increasing the value of imported components.

Government expectations were not fulfilled, however, since rising local content requirements did not reduce the number of assembly operations in the country. Even though there had been some consolidation of production, by the late 1980s there were 7 assembly plants (compared to 16 in the mid-1970s) producing

14 different brands of automobiles. Some assembly plants produced more than one make of car (Black, 1998: 5). Furthermore, the number of models was growing. For example in 1987 the seven plants had produced 20 platforms but this increased to 34 by 1993⁵ (Barnes & Kaplinsky, 1998: 4). Essentially, the protected environment led to a proliferation of vehicles being produced and the low volume, which resulted, has been a major cost-raising factor.

Recognising the problems of high-cost production and low volumes of production, Phase IV of the local content programme was introduced in 1989. It was a first attempt to deal with the problems, which are characteristic of an inwardly oriented industry which was extremely fragmented and which also had low volume output and associated high unit costs. Value rather than mass now measured local content. Local content was also to be on a net foreign exchange usage basis, i.e. exports by an assembler counted as local content and enabled it to reduce actual local content (to a minimum of 50%) in domestically produced vehicles (Black, 1994: 53). The outcome was a rapid growth in exports, particularly components. Firms maintained that the main motivating factor for this rapid growth in exports was the increased availability of incentives, coupled with their desire to increase the scale of production whilst improving product quality. This rapid rise in exports enabled assemblers to gain greater flexibility in their sourcing arrangements.

Although Phase IV managed to achieve a rise in exports, it failed to address one of the problems of the previous programme, i.e. uneconomic volumes and the resulting high cost production structure (Black, 1998: 6). It also failed to address the proliferation of makes and models in the domestic market. This was a major factor, which impacted on the scale of production in the component sector. Contrary to government's expectation, Phase IV actually increased the flexibility of component sourcing and therefore reduced protection on components. Moreover, it maintained high nominal protection levels of CBUs. The effective rate of protection on CBUs increased drastically leading to an increase in the variety of models and

⁵ "Brands refer to different makes of automobiles - for example, Ford, Toyota and Volkswagen. "Platforms" (sometimes referred to as "floorplans") describes the basic size of the car - for example Ford Fiesta, Laser or Mondeo.

makes being assembled locally, in spite of a stagnant market.

Another distinctive feature to the automotive sector and the South African industry in general, was the imposition of sanctions. These sanctions led to the two US pioneer assemblers (Ford and General Motors) to disinvest, as they sold their holdings to local parties. At the same time two new Japanese entrants, Toyota and Nissan, produced in South Africa under franchise. The former, and to a lesser extent the latter, came to have a dominant share in the local market. Consequently, South Africa was unique in having two locally owned producers of major international products market (Barnes & Kaplinsky, 1998: 3).

TABLE 5.1: OWNERSHIP CHANGES AT SOUTH AFRICAN OEMS

South African OEM	Vehicles Manufactured	Present Ownership	Ownership: Early 1990s
Toyota South Africa	Toyota	72.2% local (listed on the JSE with Wesco as main shareholder, 50%), 27,8% Toyota Motor Corporation (Japan)	JSE listed (100% local)
Volkswagen South Africa	Volkswagen Audi	Volkswagen AG	Volkswagen AG
Daimler Chrysler	Mercedes Benz, Honda, Colt (Mitsubishi)	Daimler Chrysler	Daimler Benz (50%) Local (Volkscas 50%)
BMW South Africa	BMW	BMW AG	BMW AG
Ford Motor Company of South Africa (formerly SAMCOR)	Ford, Mazda, Mitsubishi	55% Anglo American, 45% Ford (but has management control)	Anglo American 100%
Automakers	Nissan, Fiat	Sankorp (local) 37%, Nissan Motor Company (Japan) 50%, Nissan Diesel Motor Company (Japan) 4.3%, Mitsui (Japan) 8.7%	JSE listed (87% local)

Delta	Opel, Isuzu	51% local management, 49% General Motors	100% local
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Source: Barnes 1999:6

Two German assemblers - Volkswagen and BMW continued to operate in South Africa through wholly owned subsidiaries throughout the sanctions period. Another German assembler, Mercedes Benz, had a 50% shareholding in Mercedes Benz South Africa (MBSA), now DaimlerChrysler South Africa (see Table 5.1).

After the 1994 elections the two American producers decided to re-enter the industry. They moved into joint ventures with the firms to which they had divested ownership during the 1980s. Ford made this move in 1994, and General Motors in 1997. In 1992 Daimler Benz increased its equity in MBSA whilst Toyota moved in in 1996 and Nissan in 1997. Consequently, by 1997 the largely locally owned and locally controlled assembly industry had been re-incorporated under global ownership. As highlighted in Table 5.1, almost all the domestically owned OEMs have experienced significant ownership changes over the last few years. It seems only the German owned subsidiaries that have maintained their ownership profiles. Almost all domestic OEMs are now at least partly controlled by multinational corporations. Toyota SA has the lowest level of foreign equity at 27.8% (Barnes, 1999:6).

5.2.2 The impact of the local content programmes on the automotive industry

Sanctions, together with the various local content programs created an artificially diverse locally owned automotive components industry in South Africa. Domestically entrenched automotive value chains therefore developed. Although the domestic OEMs controlled these domestic value chains, they were to some extent, mediated by the local content provisions of government policy (Barnes, 1999: 5). The OEMs were encouraged into “partnership” with domestic component firms on two levels: on one level significant levels of protection from global competitors (115% in mid 1995) were given to the domestic OEMs. On another level it was essential that they met government’s local content requirements and therefore purchase much of their inputs from component manufacturers or pay severe excise penalties (Barnes, 1999: 6). In the

final analysis, government's various policy mechanisms forced OEMs into purchasing from uncompetitive domestic firms. Consequently, the components industry was given a level of political economy leverage. A relative *status quo* therefore existed in the automotive value chain from late -1980s to mid -1990s. A study conducted in 1997 and 1998 by the Industrial Restructuring Project Research highlighted that there was minimal new automotive investment during this period. Through difficult economic conditions, established networks maintained their operations, resulting in a stable political economy (Barnes, 1999: 6).

5.3 The Motor Industry Development Programme

As highlighted in the previous section, Phase VI of the local content program was considered a failure. One of the reasons cited for this failure is that it did not reduce the number of models being assembled locally and it was introduced during a time of political uncertainty (Black 1994:65). It was also not in compliance with the General Agreement on Tariffs and Trade (GATT), because it promoted the use of local components over imported ones.

In September 1995, a programme more in line with the (GATT) Uruguay Round agreement (now the World Trade Organisation - WTO) was introduced: the Motor Industry Development Programme (MIDP). This policy programme is aimed at the development of an internationally more competitive and growing automotive industry. Essentially, the industry should be able to provide high quality and affordable vehicles and components to the domestic and international market, and in turn provide sustainable employment through increased production. Ultimately the industry should make a greater contribution to the economic growth of the country by increasing the production and value of automotive products, and achieving an improved sectoral trade balance (DTI, 1999: 2). It is important to realise that the MIDP is extremely compliant with South Africa's current shift in trade policy highlighted in Section 4.2, i.e. a shift from import substitution industrialisation (ISI) to trade liberalisation with a strong focus on export promotion.

The national objectives mentioned above are to be achieved by phasing the industry's integration into the global automotive industry. At the same time, the volume and scale of production will be increased through expanding exports and a gradual rationalisation of models produced locally. In order to promote higher

productivity and to facilitate the global integration process, the industry will be encouraged to modernise and upgrade its facilities.

5.3.1 Policy instruments of the MIDP

There are three main policy instruments through which the objectives highlighted in the previous section are being pursued, namely:

- a gradual reduction in tariff protection so as to expose the industry to greater international competition;
- the encouragement of higher volumes and a greater degree of specialisation by allowing exporting firms to earn rebates on automotive import duties;
- the introduction of a range of incentives, which are designed to upgrade the capacity of the industry in all, spheres (DTI, 1999: 3).

These three policy instruments will be analysed in the following sections.

5.3.1.1 Tariff reductions

Generally, the prices of vehicles in South Africa are high relative to other countries. This is due to the legacy of high domestic protection and local content programmes. Consequently, to make prices affordable, tariff protection has been reduced under the MIDP, whilst subsidies on domestic sales have been introduced. As highlighted in the previous section, the main objective of this policy is to gradually expose the domestic market to external competition through a phased reduction in tariffs. For example the tariffs for CBUs and imported components are gradually reduced on an annual basis down to 40% on CBUs and 30% on components, by the year 2002. A mid-term review of the MIDP gazetted in July 2000 provided for the programme to be extended from 2000 to 2007. Consequently, a further tariff reduction has been proposed down to 30% for CBUs and 25% for components up to the year 2007 (DTI, 2000: 5).

The provision of subsidies on exports and domestic sales is considered to reduce the impact of such competition. As will be seen in Section 5.3.1.2 the subsidy on exports takes the form of an import rebate

credit (IRC) and the subsidy on domestic sales takes the form of a duty free allowance (DFA).

With respect to domestic producers, the ultimate objective is to encourage them to increase volumes and cost effectiveness as will be seen in Section 5.3.1.2, (Furlonger, 1998: 50-51 as cited in Hosking, 1999: 8).

5.3.1.2 Fewer models and higher volumes

Another policy objective of the MIDP is the reduction of the number of locally produced models from the existing 39 to over 15 over an 8-year period. Local motor vehicle manufacturers are entitled to a duty free allowance (DFA) of 27% on the recommended domestic retail price exclusive of VAT, an *ad valorem* excise duty, and a company specific percentage (Hosking, 1999: 9). The DFA is reflected on an import rebate credit (IRC) certificate and can be used by local vehicle manufacturers to reduce the value of duties paid on imported components used in vehicles sold on the South African market. A revision of the DFA arrangements was proposed during the mid-term review in 1999. To qualify for a DFA in the 2000s the OEMs have to achieve increases in market share.

Any registered original equipment manufacturer (OEM), component manufacturer or tooling manufacturer is eligible to earn import rebate credits (IRCs) by exporting goods produced. The IRCs can be used by importers to claim refunds of import duties and sold between participants. It was proposed that the import rebate credit scheme be phased down. By 2007 there will be a significant decrease in the qualifying value of exports of both CBUs and components under the import rebate scheme. In comparison, the qualifying value of exports for tooling components will decrease much more than that of other components.

With these reductions in incentives, the DTI hopes to encourage domestic manufacturers to increase their model volumes and thereby achieve greater economies of scale, a move that will place low volume producers at a disadvantage in the future. According to Furlonger (1999: 45) as cited in Hosking (1999: 10), "the need for greater volumes in South Africa is considered great - total domestic vehicle production in South Africa is less than for a single model in big markets, yet there are seven domestic manufacturers."

In a protected market it made sense for manufacturers to try to increase market share by introducing new models, even at quite low volumes. As protection is reduced, this is starting to have an effect on the way assemblers run their plants. However, there has been little rationalisation so far, mainly because at the same time that CBU duties started to decline, protection on the component sector was also much reduced and local content requirements were abolished (Cartoday, 1999: 4). So there is a risk that the component sector could suffer quite serious damage over the next five years before the industry is rationalised. Government would therefore like to nudge the industry in the direction of higher volumes and gradual rationalisation (DTI, 1999: 6).

5.3.1.3 Upgrading industry capacity

Upgrading the capacity of the automotive industry is the final policy objective of the MIDP. This includes providing assistance to the industry in obtaining technology and provision for a Small Vehicle Incentive (SVI) in the form of a higher duty free allowance for low cost vehicles, although the latter is to be discontinued (DTI, 1999: 3).

5.4 The Automotive Industry in the Eastern Cape

The automotive industry forms the backbone of the Eastern Capes industrial base, with strong linkages into other industries such as industrial textiles and leather tanning. The industry alone adds almost 50% of the total value added of goods manufactured in the Eastern Cape (Hosking, 1999: 8). The two major vehicle manufacturers in Port Elizabeth are Volkswagen South Africa (VWSA) and Delta Motor Corporation (Pty) Ltd. VWSA's plants are in Uitenhage and Sidwell, and Delta's are at Straundale and Neave in Port Elizabeth. The Ford Motor Company of South Africa (formerly SAMCOR) also produces Ford engines at a plant in Straundale, but the Ford cars are assembled in Pretoria. Together with DaimlerChrysler in East London, VWSA and Delta produce about 46% of all passenger vehicles in South Africa, and in July 1999 held about a 30% share of the total South African passenger and light commercial vehicle market (Hosking, 1999: 8).

5.4.1 Delta

Established in 1987, Delta's market share has grown to more than 9%, placing it among the top three companies in South Africa (Eastern Cape Gateway, 2000: 52). It is primarily an assembler of Opel passenger vehicles (the two carlines being the newly launched Opel Astra and Opel Corsa) and Isuzu commercial vehicles. These vehicles are mainly for the Southern African region as part of an agreement with its overseas plants (Eastern Cape Gateway, 2000: 52). It is the biggest exporter of fully built vehicles to Zimbabwe, Zambia, Malawi, Mozambique and Mauritius. This is supported by more than two hundred dealerships in these countries. Besides its manufacturing operation, Delta also acts as the local franchise holder for the import of Swedish Saab vehicles and Japanese Suzukis.

Delta has a modest share of national passenger vehicle exports. It focuses mainly on the exports of original equipment components to the global GM/Opel network. Its subsidiary companies include Precision Exhaust Systems (catalytic convertors and stainless steel stampings) and Sten Precision Components (automotive exhaust components) which are both Port Elizabeth-based. In terms of these component exports, the major market is Europe, but good progress has been made in Australia, Brazil, Mexico and the United States, where Delta expects most of the growth to occur over the next few years. It also exports to India, Egypt and Chile.

5.4.2 Volkswagen

A wholly owned subsidiary of the giant German automobile manufacturer Volkswagenwerk AG, Volkswagen South Africa (VWSA), is not only the biggest motor vehicle assembly concern in the Eastern Cape, but is also the largest employer in Port Elizabeth/Uitenhage, directly employing 5000 people. After Toyota, VWSA has the second largest market share in passenger cars of around 20% (Eastern Cape Gateway, 2000: 53). Besides manufacturing vehicles under the Volkswagen marque, the company also produces cars under the Audi marque and is also responsible for the import of CBUs under the two brands. VWSA managed in the past to secure lucrative contracts to supply vehicles overseas. Between 1993 and 1996 for instance, the company exported a total of 12 500 cars to China. In 1998 the firm was awarded a contract by the parent company to assemble and export 60 000 fourth generation Volkswagen Golf cars to right-hand drive export markets. This contract was extended late in the year to cover the entire lifespan of

the series.

5.4.3 DaimlerChrysler

Successor to Mercedes Benz of South Africa, East-London based DaimlerChrysler South Africa (DCSA) has the smallest operation amongst the three OEMs in the region. The name change was a result of the parent company Daimler Benz AG of Germany merging with American automobile manufacturer Chrysler to form DaimlerChrysler AG. The company manufactures and imports a wide range of vehicles under the Mercedes Benz and Honda marques as well as the assembling the Mitsubishi Colt LDV.

The firm has traditionally targeted the upper echelons of the automotive market, especially in the import of CBUs. In recent years however, there has been a shift to smaller cars, which have a higher volume of sales (Eastern Cape Gateway, 2000: 55). Consequently DaimlerChrysler has registered a modest share of nation-wide automotive sales (7,6%), exporting a number of motor vehicles to the rest of Africa, Australia and Europe. This is mainly a result of integration into the worldwide DaimlerChrysler manufacturing network.

5.4.4 The component sector

It was noted earlier that the component industry generally evolved around automotive assembly plants. This is characteristic of the Eastern Cape motor industry in which for example, component manufacturing is concentrated in Port Elizabeth/Uitenhage, within close proximity to assembly firms. The larger component-manufacturing firms in particular are affiliated to the National Association of Automotive Component and Allied Manufacturers (NAACAM), although several smaller firms also exist. Most of the larger firms are either subsidiaries of local firms or MNCs, or produce under licence from the latter. In addition, the larger firms also operate one or more manufacturing plants within a single town or region.

The nature of operations undertaken by Eastern Cape-based firms range from beneficiation of raw materials through to engine manufacturing, both for the domestic market and export, and a number of firms have positioned themselves to take advantage of incentives and benefits under the MIDP since its inception.

Notably, The Ford Motor Company of South Africa (formerly SAMCOR) has secured a lucrative 1,6 billion contract to supply 1 6000cc fuel injected engines to Ford Motor Corporation's European plants (CIMEC, 2000a: 1). Most component firms export through the vehicle assemblers, and in so doing share or sell export credits earned under the import/export complementation scheme of the MIDP. This is a typical indication that the domestic OEM and after-markets are no longer sufficient for the continued survival of component firms nationally. As highlighted earlier, not only in the Eastern Cape, but also nationally, there has been a trend towards domestic assemblers being used as a conduit for component exports, given that MNCs control international marketing networks.

5.4.5 Impact of the MIDP on the Eastern Cape Automotive Industry

A survey conducted by Onyango (1999: 115) revealed that it is mainly the motor vehicle assembly sector in the Eastern Cape, which has benefited from reduced protection and liberalisation under the MIDP. He maintains that the firms in this sector have managed to establish an intensive export-driven manufacture of vehicles and components. This is supported by Hosking (1999: 12) who cites one of the main benefits of the MIDP to be the increase in export orders from Europe and America for local vehicle and vehicle components. Hosking (1999: 12) also argues that this upsurge in export activity is a result of new partnerships and production arrangements, which have emerged under the MIDP. This has enabled new investments in the industry and improved links between local firms to new production technology and marketing decisions of the major European and American vehicle markets. Firms have taken advantage of the MIDP's incentive schemes and have moved towards establishing markets abroad. Although there is little doubt that the MIDP is putting pressure on the industry to rationalise, export earnings from vehicles have risen sharply.

Onyango (1999: 115) is quick to point out, however, that in the components subsector, most firms are experiencing a decline in profits. At the same time, export activity in this sector is not highly impressive. As will be seen in the following sections, one of the reasons cited by Onyango (1999: 115) for the poor performance of the components subsector is the rapid decline in protection, which has resulted in increased competition from imports. This is coupled with the fact that vehicle assemblers are able to source

components from overseas directly under the import/export complementation scheme of the MIDP.

The following sections will analyse the MIDP's impact on the following variables: exports; imports; investment; employment; labour relations; tariffs; relations between OEMs and component manufacturers, and market characteristics.

5.4.5.1 Exports

Local companies have taken up the challenge to become major exporters. During the first five months of 1999 total vehicle exports in the country numbered 17 638 units as compared to 13 902 during the same months in 1998. Table 5.2 highlights the export flows in and out of the Port Elizabeth harbour during the 1990s. There has been a gradual increase in exports up to 1998 as highlighted by Table 5.2 for both vehicles and components. Up until February 1998, the export of vehicles was mostly done using the Ro-ro loading facility. At this point it ceased to operate and exports of assembled vehicles was done in containers.

In 1995 export mass in containers was about 17% of import mass in containers. At the same time the number of vehicles exported using the Ro-ro facility was about 70% that of imports using this facility. By 1998 the export mass in containers had increased to 19% of the import mass but, as highlighted earlier, exports and imports using the ro-ro facility had ceased (Hosking, 1999: 14).

Most of the increase was due to major export contracts allocated to BMW SA and VW SA (the latter being in Port Elizabeth/Uitenhage) by their parent companies (van Huyssteen, 1999: 1). VW SA during 1999 exported about 50 000 Golf IVs to the United Kingdom, 10 000 less than originally forecasted (Mapholegelo, 1999: 13). It was awarded the VDA 6.1 quality management certification. The certification, which is required by motor companies that export products into the European Union, recognises that the company's employees have the ability to produce at world-class standards (van Huyssteen, 1999: 1).

Ford Motor Company of South Africa was given an eight-year export contract for the full production of a brand new Ford 1.6l RoCam engine, which is valued at R1.6billion. The first phase of the programme will

see 55 000 units per annum exported to markets all over the world. It is anticipated

TABLE 5.2: EXPORTS OF MOTOR VEHICLES AND PARTS 1990-1998

Year	Ro-Ro Vehicles in tons (no. of vehicles)	VW export containers in tons	Completely knocked down (CKD) units in containers in tons
1990/1	71 560	-	N/A
1991/2	230 115	-	37 178
1992/3	207 180	-	51 525
1993/4	256 082	-	61 925
1994/5	277 790 (28 146)	-	56 369
1995/6	283 500 (29 699)	-	131 036
1996/7	356 970 (34 851)	-	74 286
1997/8	205 835 (19 960)	-	154 885
1998/9	-	-	112 354
1999 (April-June)	-	139 246	24 313

Note: the year begins in April and ends in March. N/A= Not Available. Exports of glass components are excluded. The figures in brackets indicated in the second column indicate the number of vehicles exported, whilst those not in brackets indicate the tonnes of vehicles exported. **Source:** Hosking (1999:15)

that during the second phase, production will increase to 85 000 units and then later to 12 000 units per annum (CIMEC, 2000a: 2). South Africa is apparently the second country in the world to produce the new engine. According to van Huyssteen (1999: 2) this is not solely a Ford programme, as it relies heavily on support from local component suppliers. The engine's local content currently stands at 65%, but Ford Motor Company of South Africa is aiming to increase this to 90%. A significant investment has taken place in the plant, which will continue into the future as Ford Motor Company of South Africa is now part of

Ford's global strategy. Delta has a R100 million-export order to Brazil and a R20 million order to Germany. It currently exports R500 million rand worth of components and vehicles a year. The company expects its exports to increase to R1,2 million per month by the year 2001 (CIMEC, 2000a: 1). Further afield in the Eastern Cape, East London based DaimlerChrysler has announced its intention to invest R900 million in upgrading its production facility. This will pave the way for multi-billion rand export deals for the company (van Huyssteen, 1999: 2).

Other local companies who are currently exporting their products to overseas markets, are component-manufacturing firms. These include Shatterprufe; Willard Batteries; Firestone; Precision Exhaust Systems; Payen Components; Luk Africa; Alloy Wheels; Goodyear; Welfit Oddy; Continental; Industex and Autocat. Welfit Oddy, a Port Elizabeth based stainless steel container supplier is a prime example of an export intensive manufacturer which has made in-roads into international markets. Currently the company accounts for 10% of the world market share for new tank containers entering the world fleet (van Huyssteen, 1999: 2). Luk Africa during the last quarter of 1998 won a contract to supply original equipment clutches to Audi of Europe. This has boosted their exports to R43 million. The company expects by 2001 to have increased this figure to R80 million per annum (van Huyssteen, 1999: 2).

Industex expect to earn R120 million per annum exporting its goods while another manufacturer Autocat currently exports 90% of their catalytic convertor production (van Huyssteen, 1999: 2). Port Elizabeth based Continental Tyre is the biggest exporter of tyres from South Africa. The buy-in by Continental will see foreign sales grow by another 50 000 units a year and Goodyear which became a wholly owned American subsidiary in 1998, having been exporting extensively to Europe (East Cape Online, 1998: 1). Forecasts for component exports in 2000 have been estimated to reach an all-time high of about R11 billion, of which the Eastern Cape component manufacturers will form a substantial part of.

These massive export orders, such as Volkswagen's R5 billion export order and East London based DaimlerChrysler's multi-billion rand contract have significant spin-off effects for component manufacturers in the region. As a result approximately 70% of South Africa's companies, predominately from the Port

Elizabeth/Uitenhage region are currently supplying components to Volkswagen. Shatterprufe for example will be supplying 60 000 to 75 000 sets of door glass to Volkswagen as part of a spin-off of the vehicle manufacturer's export order (van Huyssteen, 1999: 2). Delta's export order to Brazil has also resulted in major benefits for local component manufacturers. Dorbyl Automotive Systems will manufacture 300 000 metal frame seat sets while Johnson Controls will assemble and supply the seats on a just-in-time basis (van Huyssteen, 1999: 3). The assembly of the seats will also have a positive spin-off for local industry in terms of tooling and steel supply. The harbour will also benefit from handling two containers a day.

5.4.5.2 Imports

TABLE 5.3: IMPORTS OF MOTOR VEHICLES AND PARTS

Year	Ro-Ro Vehicles in numbers of vehicles	Containers - vehicles, aircraft & boats in tons	Completely knocked down (CKD) units in containers in tons
1991/2	-	170 238	103 168
1992/3	-	164 842	135 790
1993/4	-	151 321	216 563
1994/5	-	13 376	341 885
1995/6	40 065	17 644	723 608
1996/7	51 910	12 509	734 549
1997/8	42 605	8 456	419 287
1999 (April-June)	-	20 944	576 522
	-	8 344	452 485

Note: Year begins in April and ends in March. Imports of glass components are excluded. **Source:** Hosking (1999:16)

Not all the evidence from Port Elizabeth and East London, on the automotive industry has been positive.

While new investments and exports have been announced, there has been an increase in the amount of imports entering through the port of Port Elizabeth as highlighted in Table 5.3. Import mass has been substantially higher than export mass. Table 5.3 clearly shows an upward trend in the volumes of completely knocked down (CKD) imports into the Eastern Cape

5.4.5.3 Investment Trends

All the main vehicle manufacturing firms in the Eastern Cape are making major investments in order to comply with the technological and plant capacity requirements to service most of their export orders. For example Volkswagen's capital investment programme is valued at R160 million. The company has spent R104 million on upgrading its tools and production facilities. Further investments were made in upgrading their workshop - R31 million, and information systems - R25 million (van Huyssteen, 1999: 4). Delta's export order to Brazil has resulted in investment plans of about R1,2 billion during the next 5 years. Much of the capital expenditure will be spent on the upgrading of their assembly plants, as well as tooling for new vehicle projects.

The Ford Motor Company of South Africa spent in excess of R300 million on its engine plant (van Huyssteen, 1999: 4). Daimler Chrysler's R1,3 billion in upgrading its East London production facility will see the plant become the sole supplier worldwide of Mercedes C Class four-door right-hand drive sedans. In terms of component manufacturers, Shatterprufe has notably spent R43 million on upgrading its information technology systems and Willard Batteries has invested R30 million in its high-tech battery plate making plant (van Huyssteen, 1999: 4). Clearly greater investment is required within the components subsector.

5.4.5.4 Employment Trends

Export orders appear to have had a relative positive effect on securing existing jobs and in some cases providing employment for additional workers. Volkswagen's export order secured 400 existing jobs and resulted in the creation of an additional 1000 jobs. Delta's export order to Brazil has created an additional 100 new jobs in the city and the first phase of Ford's Engine plant resulted in the preservation of 250

existing jobs (van Huyssteen, 1999: 5). During the second phase, additional jobs will be created. It is also interesting to note that for every job Ford Motor Company of South Africa protects, jobs in the supplier base are estimated to increase by threefold. The 250 jobs, which it protected, should result in the creation of 750 jobs in satellite sectors. In particular, the engineering sector of the economy will benefit from the company's export order. Each job that is created at DaimlerChrysler is estimated to secure another three in related industries in the Eastern Cape. This will bring growth to the region and employment for an estimated 10 000 people (van Huyssteen, 1999: 4).

5.4.5.5 Labour Relations

Volatile labour relations have, however, been working against any positive employment spin-offs from export orders in the region. Consequently, a crucial issue in the Eastern Cape's automotive industry is the impact of these volatile labour relations, and of retrenchments playing a greater role in labour action. Incidents of industrial unrest were witnessed at VWSA's Uitenhage plant in January 2000, in which 1300 dissident workers were dismissed. This apparently illegal strike, which spread to Goodyear's manufacturing plant, was actually a sympathy strike that had a negative impact on exports. Between January and February 2000 exports were down to 6 096 from 6744 units in 1999 during the same period (Cartoday, 2000a: 1).

The speed at which tariffs are reduced is thought to be one of the main reasons for the massive retrenchments in the automotive industry during the past few years. Between 1992 and 1999, vehicle manufacturers cut their workforce from 25 000 to 21 000, whilst component manufacturers cut their workforce from 43 500 to 39 400 between 1996 and 1998 (Richardson, 1999:9). This contrasts sharply with the Canadian experience where a lowering of tariffs actually increased multi-national corporation holdings and employee levels in Canada (Hosking, 1999: 16). At the same time these retrenchments more than outweigh the increase in jobs, which has occurred in the industry due to the spin-off effect of the large export orders (see Section 5.4.2.4).

NUMSA, the largest trade union in the automotive industry agrees with some of government's proposals in the MIDP's mid-term review. It, however, maintains that because of job losses in the local motor industry,

there should be no further reductions in tariffs from 2002 to 2007, a view that has considerable support from employers (Cartoday, 1999: 26). NUMSA has also expressed concern about the growing levels of imported components and the effect this is having on jobs in the component sector. Although it agrees that the number of vehicle models should be reduced, it argues that this should be done in such a way that it does not lead to job losses. Attempts were made in April 2000, through a summit meeting between the key players in the industry, to lay a new foundation for improved motor industry labour relations. Basically, the South African motor industry's future is tarnished by highly disruptive industrial action. International experience has shown that good relationships between labour and management drive performance.

5.4.5.6 Tariff Reduction

The rate at which tariffs on automotive imports have been reduced under the MIDP is a cause of concern for various stakeholders in the Eastern Cape (Bell & Cattaneo, 1997: 25). As highlighted in the previous section, the rapid reduction of tariffs has been blamed for the massive job losses in the industry. Brazil has been cited as one of the many countries which has been able to use high import tariffs and local content programmes to attract investment. Without such a strategy, it probably would have never had a local motor industry (Cartoday, 1999: 4). As trade barriers come down under the WTO agreement, the South African motor industry now faces new challenges as they become exposed to cheaper imports from countries. Most of these countries have achieved significant economies of scale and have highly developed work forces coupled with large capital bases.

A domestic producer faces the greatest competition from a manufacturer of the same product in another country. The exchange rate and the level of local content are two other factors, which play a part in the export competitiveness of a country. In January 1999, the devaluation of the Brazilian currency caused a number of manufacturers to boost exports (Cartoday, 1999: 4). South Africa has, on the other hand, price-competitive exports due to its relatively weak currency. However, the export advantage gained by a low exchange rate is partly offset by the higher cost of imports, should the exports have a high imported content. At the same time, the higher the imported component of exported goods, the more significant reasonable labour costs become to the local value-added contribution.

Some motor industry commentators are of the opinion that successful South African motor industry manufacturers are likely to have a high level of local content in their products to maximise the amount of value added locally (Cartoday, 1999:5). This is true to a certain extent, as evidenced by the spin off effects of VWSA, Delta and DaimlerChrysler's export orders (see Section 5.4.2.1). Other commentators on the other hand, argue that there has been a rapid decline in local sourcing within the industry. According to Barnes & Kaplinsky (1998: 13) over the next five years there will be a significant decline in the proportion of components sourced locally from 50% to 40% of total needs. The primary reason for this erosion of domestic supply is the effective removal of almost all protection from the component sector. A secondary factor and one of growing importance is the updating of models - the newer the model the less likely it is to incorporate South African specific modifications (Barnes, 1998: 13). The final product portfolio of most of the assemblers is now jumping three generations, and this poses a major future threat to local component sourcing.

5.4.5.7 Relations between OEMs and component manufacturers

There is also growing reluctance to source from locally controlled firms. This is a factor emerging from the changing strategic policies of assemblers. The primary element of this is the extreme and growing reluctance to source from South African firms using local technology (Barnes, 1998: 14). At most, the assemblers are prepared to source from local firms using foreign technology licenses, but they prefer to source from joint ventures or best of all wholly owned subsidiaries of international component suppliers.

The MIDP, together with the ownership changes discussed in Section 5.2.1, have seriously influenced relations between OEMs and component manufacturers in South Africa (Barnes, 1999: 7). The presence of OEMs in the global industry is undergoing a rapid reorientation, and by implication their position within global value chains. Consequently, there are ongoing operational pressures on component firms by the OEMs, which no longer tolerate poor performance. Business is simply transferred from a South African company to a foreign operation if there is failure to conform to specified performance targets. At the same time, OEMs are also demanding different equity relations. Most South African component firms had

licensing agreements with multinationals. They manufactured products according to the design specifications of foreign companies on the basis of royalty payments, which at times were exorbitant (Barnes, 1999: 8). These products could however, only be sold in the South African (or Southern African) market. Consequently, the South African manufacturers were prevented from competing against the designers of the technology they were using.

The OEMs no longer prefer this situation. They increasingly want their domestic suppliers to have an equity relationship with the owners of their designs. This is a result of three main reasons stemming from changes in the global automotive industry:

- at the global level, OEMs have been forced to concentrate on overall vehicle design and systems integration. A simultaneous process of model rationalisation (reducing the number of platforms each company makes) has brought this about. Consequently, the first tier MNC suppliers are taking increasing responsibility for the technological content of their subsystems, and for the upgrading and control of their own supply chains;
- the OEMs are forging global sourcing relationships with these first tier suppliers in order to facilitate the growth of scale economies and technological capabilities amongst them. The implication thereof is that suppliers serve the needs of the OEMs throughout their global operations;
- to avoid the build-up of global inventories, a necessary complement to this process of global sourcing is the development of follower supply relationships. Such relationships refer to the manner in which the first tier (and sometimes the second tier) suppliers either locate greenfield plants in close proximity to final assembly plants throughout the global operations of their OEM customers, or alternatively purchase existing operations in countries where the OEMs operate, thereby ensuring a global presence (Barnes, 1999: 8).

There is also a growing desire to reduce the number of suppliers. For example, Delta plans to cut the number of local suppliers it uses from 182 to 110 and all local assemblers are stressing the importance of forming linkages with global supply networks (CIMEC, 2000a: 2). While assemblers too are in the

components business (Delta in particular has successful subsidiaries in exhaust systems, trim and logistics), there is a move to a consolidation among assemblers as well. As highlighted earlier for example, is the fact that VWSA recently out sourced its seat production to a new Johnson Controls investment in Port Elizabeth. VWSA rates only 34 % of its local suppliers as A-grade (out of a target of 60%). Dorbyl alone predicts the number of South African suppliers could fall to as low as 30 (CIMEC, 2000a: 2).

Essentially, the productive effectiveness of the South African component sector does not look encouraging. The ability of domestic component manufacturers to supply components not only at the appropriate price, but at acceptable quality levels; delivery reliability and with flexibility of supply; conforming to specifications; packaged adequately and produced with firms in whom the assembler has confidence that there is a long-term innovative capacity and financial viability, is questionable. Generally, South African component suppliers are not competing adequately with foreign suppliers except with respect to flexibility and delivery reliability. Both of these advantages flow from their proximity to the assembly plants.

The general relationship between OEMs and component suppliers highlights the critical need for automotive manufacturers to forge close relationships with their suppliers, not only in the Eastern Cape but also in the rest of the country. This relationship is of a complex nature, because ultimately the efficiency of suppliers drastically impacts on the efficiency levels of the automotive manufacturers. This issue is explored further in Chapter 6.

5.4.5.8 Market Characteristics

The sufficiency of the local market as a base from which to export to Europe has been questioned (Richardson, 1999: 9). Indeed a key factor determining the success of the MIDP and the local industry is for South African manufacturers to secure significant and sustainable export contracts. Without these contracts, vehicle model rationalisation could fail, because fewer models need higher production volumes. Given the small size of South Africa's vehicle market, higher levels of production necessitate export contracts. However, an economic slowdown in Western Europe - a primary export market - could make

export contracts more difficult to come by and pose a threat to the local vehicle manufacturing industry. For example, in 1999 Volkswagen AG announced that it would cut production in Germany by 20% (Cartoday, 1999: 3). In addition, the ability to deliver products on time, at the right quality and price once export contacts have been secured, will determine the likelihood of receiving further contracts.

Shifting Japanese production patterns could be an indication that the best way to exploit a market is by producing in it. This is a fundamental reason why US automakers have invested US\$15 billion in Brazil over the last five years, instead of exporting vehicles from the US and Japan's four largest automakers, a move which has increased overseas output by 16.6% in May 1999 (Cartoday, 1999: 3). It is important not to overlook the fact that large investments by automakers are determined by the size and potential of the market in which the investment is made. A secondary consideration in making a decision to invest is that of exploiting export markets. A country first needs to have a viable local market before it can be considered a potential export base and should not have to rely on export markets to ensure its industry's survival.

Consequently, the sufficiency of the local market as a base for an export business has been questioned in the light of other attractive options for locating this type of business in Brazil for example, which has a domestic market about seven times as large as South Africa (Hosking, 1999: 16). As a result, economies of scale are more easily realised in Brazil than in South Africa. Despite the financial turmoil and a 24% fall in car sales, 1,8 million cars were sold in Brazil in 1998 (Cartoday, 1999: 3).

South Africa exported 18 342 of the 195 554 passenger cars it produced in 1998 (9,4%), whereas Brazil exported 279 400 of the 1 240 00 vehicles it produced in 1998 (22,5%) - (Hosking, 1999: 16).

It therefore seems that given the market size and geographical location of South Africa, it is unlikely that it will ever attract the sort of investment seen in Brazil. But this is not to say South Africa's domestic industry is incapable of ever being profitable, because higher volumes do not necessarily imply higher profits as many Brazilian operations have demonstrated. For example, while Ford could make an estimated operating income of about US\$2 billion in North America, it could lose US\$165 million in South America (Cartoday, 1999: 3). Nevertheless, this raises a question of how South African motor manufacturers exporting mainly

to Europe can compete if Japanese and North American manufacturers would rather have plants in growing foreign markets instead of exporting from their productive domestic ones because it is more cost effective. Virtually all authorities agree that the original equipment suppliers will locate their new production investments increasingly on the basis of cost considerations alone. Competition in world markets is too intense to allow any other approach (Richardson, 1999: 9).

Due to a fairly significant investment in the South Africa motor industry, it is unlikely that international parent companies would simply withdraw operations. But a turning point for local manufacturers could come if continuous losses outweigh the huge cost of closing plants and potential loss of consumer confidence in the brand. For many years though South African motor manufacturers have demonstrated the ability to survive in tough market conditions, therefore those backed by large international parent companies, which can finance local investment, should stand a good chance of survival. But those that remain will probably manufacture only one or two products for local and export markets, while the rest of their products will be imported.

5.5 Formation of the Eastern Cape Automotive Industry Cluster Initiative

5.5.1 Introduction

As highlighted in Section 4.3.1, in 1997 the concept of developing cluster initiatives in a host of industries across South Africa was considered crucial to the country's economic development. Section 4.2 indicated that the primary tenets of South Africa's new industrial strategy focus on the economy in two ways, namely at a sectoral level and at a spatial level. Greater importance is given to certain sectors (the industrial "clusters"), and certain areas (the spatial development initiatives) - (Jourdan, 1998: 717). This form of targeting is considered to be particularly appropriate in the current period of major shifts in the overall strategy from a predominately import substitution driven manufacturing sector, to outward orientation through international competitiveness.

In light of this new focus in industrial policy, consultations and debates were consequently conducted in 1997 at national level between relevant stakeholders, facilitated by the DTI (Department of Trade and

Industry), the CSIR (Centre for Scientific Industrial Research) and the National Motor Industry Council. A national automotive industry workshop was convened and the outcome was a draft of the industry's vision, mission and critical success factors. The agreed vision was the creation of: "A viable, internationally competitive local automotive industry capable of achieving continuous growth" (DTI, 1998d: 1).

Under the mission statement, the South African automotive industry was deemed to be operating within a context of increasing globalisation and was consequently dedicated to supply vehicles and components to domestic markets, ensuring that these products are affordable and meet global quality standards. In the process, distribution networks, which are committed to excellent customer service, would be improved, ensuring that all links in the supply chain work together effectively. The local technology base would be upgraded and there would be a commitment to on-going development of employees in the industry. Achieving growth to promote stable conditions of employment, whilst simultaneously achieving acceptable returns across all segments of the industry was also considered to be essential (DTI, 1998d: 1).

In order to realise the objectives stipulated by the industry's mission statement, critical success factors were identified as pivotal to the industry's success. These ranged from the need for innovative focused leadership; ensuring satisfaction of customer's requirements; achieving higher growth rates; ensuring that stakeholders share a common purpose and that there is government facilitation in a market environment (Russell, 1998a: 1). The main stakeholders in the industry were defined as the auto-assemblers, component suppliers, raw material suppliers, employees, dealers and distributors, customers and government. Additional stakeholders, supporting organisations and services were defined to include the CSIR, technikons, universities, schools, finance and insurance agencies, capital equipment, maintenance services, logistics support, transport equipment, transport services, quality control and technology support. As envisaged in the theory on industry clusters, within the value chain of the motor industry cluster both the main stakeholders and supporting organisations and services would be included. Through the collective actions of these stakeholders, these critical success factors it was agreed, would be realised.

5.5.2 Regional focus of the Motor Industry Cluster Initiative

As highlighted earlier, within the theory of industry clustering is the notion that the linkage between firms as well as with their specialised organisations can often more effectively be built or co-ordinated at regional level. At the same time, in order for cluster based development to be effective, the leadership of the private sector is critical and this is more easily identified and mobilised at regional level. Hence after the national automotive industry workshop at the end of 1997, it was agreed to develop a regional automotive cluster in the Eastern Cape, which would be located in the proposed Coega Industrial Development Zone as well as the East London Industrial Development Zone. Consequently, the Eastern Cape Automotive Industry Cluster was launched in April 1998. Present at its launch were the industry stakeholders i.e. employers (component suppliers, assemblers i.e. Delta, VWSA, DaimlerChrysler) and 'organised labour' (unions such as NUMSA, CWIU), as well as government (local, regional and national) representatives. The DTI and various independent consultants facilitated the process.

The cluster would be developed under three main phases:

- the **design phase** under which stakeholder interests would be taken note of as well as internal, external and socio-environmental issues. These issues would then be considered in defining the vision for the region. Core strategies and projects would then be initiated to facilitate various issues raised by the stakeholders concerning the region. High level goals and performance measures for each project and process were put into place to evaluate their progress;
- the **implementation phase** under which projects approved by the Cluster Executive were to be implemented, whilst institutional capacity was developed. At the same time, a value-added assessment in terms of quality, quantity, cost, people and environment was to be conducted;
- the **institutionalisation phase**. Basically, at this stage all structures and processes should be well entrenched and stable, and at the same time, the various project scopes should be extended to other regions and sectors.

Under the first phase of the motor cluster, it was therefore agreed that the vision for the motor industry, which had been adopted at a national level, was an important rallying point around which the industry in the Eastern Cape needed to build. Organised labour, however, raised the issue that continuous growth needs to be translated into employment security and expansion of employment levels (Russell, 1998a: 2). Hence the Eastern Cape Automotive Industry Cluster's vision was endorsed as: "to establish a viable, internationally competitive industry capable of achieving both continuous growth and **job creation**."

The realisation of this vision within the Eastern Cape would depend largely upon government, the employers and organised labour's ability to identify major problems frustrating the transformation towards the vision and to make collective use of their expertise and resources in putting plans in place to remove the problems.

This according to the theory on clustering, is an essential ingredient in the functioning of cluster, which would ultimately create a basis for a competitive platform, essential for the synergy required between the respective parties in the cluster concept. The various stakeholders present at the meeting therefore identified pressures, which they perceived to be frustrating the industry transformation.

5.5.3 Objectives of the Eastern Cape cluster initiative

Having established the current state of the Eastern Cape's automotive industry and the desired state of the industry by the year 2000, a number of goals and measures were proposed in order to achieve the industry's vision. The first proposal was that there was a need to have a competitive export orientation and to address high input costs. The overall objective in this regard is to have an internationally competitive environment in the Eastern Cape by: identifying and realising the strategic investments necessary to achieve the motor industry vision; creating internationally cost efficient ports and airports, and having internationally competitive regional or local service tariffs. An internationally competitive export environment would also need to be backed by reducing the costs and improving the quality of raw materials and components. At the same time, there would be a need to identify and optimise generic component technologies within the industry and to provide cost effective support for small or medium suppliers in respect of best operating practice.

Training and development were also identified as other measures required to achieve the vision of the cluster. This means that the industry needs to identify the industry competency requirements to support international competitiveness, and to have the training capacity at universities, technikons and companies and other identified institutions to meet the needs of the industry. It was also agreed that the application of the 1998 labour legislation must enhance labour stability, productivity and competitive efficiency. Collaborative structures and processes were identified as essential to achieving the cluster vision. Optimum collaborative structures and processes need to be in place to secure industry stability and productivity. Finally, employment security was deemed to be important in the restructuring process. Plans to support employees displaced through restructuring need to be put in place.

5.5.4 The structure of the cluster initiative

The stakeholders in the cluster then agreed to the creation of dedicated project teams that would address these high priority issues. These dedicated teams are similar to those employed in the Saligna Furniture Cluster Initiative in Kwazulu-Natal (see Section 4.4.1) and those used in Arizona's cluster initiatives (see Section 3.4). As discussed in Section 4.4.1, the needs and priorities of the Saligna Cluster were the major driving force behind the development of specific project teams, which ranged from those focusing on developing the brand for furniture manufacturers to developing a viable supplier base. Similarly the needs and priorities of the various clusters in Arizona formed the basis of the various cluster-working groups. In the case of the Saligna Cluster Initiative, the quality of the industry's critical success factors were not yet consistently high enough to sustain a world-class industry. Consequently, a set of consistently high-quality critical success factors was required to make the industry competitive at the highest level internationally. For this goal to be attained, the right combination of leadership, vision and strategy from government, business and labour was critical.

It was apparent to all the industry stakeholders at the launch of the cluster initiative that the Eastern Cape's critical success factors were unsound. Hence the dedicated teams created were to focus on those aspects of the region's economy which needed the most attention and which were most critical to the cluster's success. Consequently, four project teams were established to deal with Human resources, Logistics,

Supplier development and Strategic investments project teams. These project teams were formed to primarily identify, facilitate, co-ordinate and implement strategies and projects to realise the cluster's vision. In order to measure their performance, all nominated representatives would attend monthly executive meetings at which the team's activities needed to reflect a measurable value to the industry, and there would be quarterly evaluations of executive teams performance.

These project teams are also required to facilitate the resourcing of projects so that they are not frustrated because of a lack of funds. The general guidelines regarding funding and resources for the cluster initiative indicate that government would primarily fund the facilitation costs of the initiative under the Sector Partnership Fund, whilst industry would primarily fund the costs of the value adding projects based on the projected return. The supply-side measures provided by the DTI would be used to offset or augment the direct costs of the cluster wherever possible, though it was noted that access to supply side support need to be effectively prompted in order to be of any use. Internal stakeholder resources were also to be used where practical.

The project teams also had the responsibility to develop a model, which ensures effective communication between the provincial executive committee, project team, stakeholder constituencies, national, provincial and local government and other important role players. At the same time, they had to ensure that the most senior person in the province on the executive committee effectively represents each stakeholder (Russell, 1998b: 1). Because of the extensive workload, it was decided that each member of the Executive Leadership would nominate an operational representative who would be responsible for all technical work within the project teams.

It is important to realise that the Cluster Executive Leadership, together with their operational representatives ceased their meetings on the 22nd of November 1999. It is not clear whether this was a formal decision to discontinue with the initiative in the region, since in November 1999 a national Motor Industry Cluster was started. The empirical evidence in the following chapter will discuss this further.

5.5.4.1. The Strategic Investments Project Team

The strategic investment project's vision was to identify and realise the strategic investments necessary to achieve a globally competitive Eastern Cape Automotive Industry. This vision is backed by a strategic focus on an integrated public and private sector initiative to create a competitive industry by identifying current available supply side measures and identifying the necessary generic investment to establish a competitive infrastructure. Consequently, the team's objectives focus on improving sources of raw material (in terms of price, quality and supply) and creating globally competitive incentives for regional investment. It's project scope include identifying key supply measures currently available world-wide and bench marking the results to supply side measures in South Africa. In the process, deficiencies in supply side measures currently available in South Africa will emerge and subsequent reviews of these results will be held with the DTI. Also within the scope of the strategic investment team is a detailed investigation of the issue of cost, quality and reliability of raw material supply to the motor industry and the viability of local production of capital equipment, and establishing a highly professional industrial marketing plan for the Eastern Cape Motor Industry as viable regional investment opportunity.

By November 1999 the Strategic Investment project had identified generic strategic investments, which were confirmed by all OEMs. It had also identified the top five supply side measures required by the industry to secure investments. These were also confirmed by all the OEMs and include logistics, human resource development, investment promotion, cash grants and tax holidays (Tshefu, 2000: 1). What has already become clear is that long-term investors are not only focusing on financial issues, but are also seeking assurances from the Government in areas, which are not directly related to financial input. The project has also managed to develop closer co-operation with Investment South Africa (ISA) in promoting investment opportunities, as well as closer co-operation with the Defence Offset Negotiating Team in a common effort to secure the strategic investments required.

At the time of the final cluster executive meeting in November 1999, the strategic investments project team still had key challenges, which include the need to develop a regional strategy that will enhance a co-ordinated effort of attracting investment for the identified opportunities. An integrated investment

opportunity for the Eastern Cape should incorporate other key sectors in the region, particularly tourism and agriculture. The project also needed to establish clear accountability for ensuring that supply side measures are in place and ensuring the full support of OEMs in promotion activities. In November 1999, the proposed way forward was the integration of the Strategic Investment project with the Supplier Development project since the former has a potential to influence the latter as will be seen in the course of this chapter. As the Sector Partnership Fund from the DTI came to an end, to implement phase two of the project, a suitable institution to house the project has to be identified (Tshefu, 2000: 3).

5.5.4.2. The Human Resource Development Project Team

The objective and scope of the Human Resources development project was to provide human resource capacity and development in the Eastern Cape to support the vision of the Automotive Cluster, and to ensure effective implementation of the task team action plan. This overall objective for the human resources development project was a result of the current insufficient human resource development capacity to meet the challenges facing the Automotive industry. Throughout the workshops the general sentiment was that failure to put this necessary competency foundation in place could frustrate the entire cluster process and any early success achieved in the process is not likely to become sustainable. At the same time there was consensus that the project must achieve the acceptance and commitment of all the industry stakeholders particularly that of labour, which should give its full support. The DTI funded the initial stages of the project - approximately R360 000 - and the OEMs, component suppliers and unions would pay for their delegates to attend training courses, which may also be assisted by supply side measures (Russell, 1998b: 3).

Three major reasons motivated this project:

- it was discovered that workers' skills are limited and underdeveloped due to the legacy of apartheid education, resulting in inadequate numeracy and literacy abilities;
- management lack the leadership capacity and experience to react to the new challenges;
- the protected history of the motor industry has inhibited the exposure to international trends, methods and techniques in modern vehicle manufacture.

In implementing its task, the human resource development project team developed guidelines, which they would adhere to. One such guideline was that there should be co-ordination between training providers and industry to ensure that unnecessary expenditure on inappropriate training does not occur. This principle was formulated on the basis of a sentiment in the task team that training institutions did not meet the needs of the industry. Another guideline was the integration of various initiatives that were presently under way in the industry to ensure that existing knowledge, processes and expenditure could be more effectively leveraged to generate broader change within the sector. The final guideline is one, which seeks to avoid duplication. Whilst the two preceding principles go a long way to avoid duplication, it was felt that there was a considerable amount of duplication in the activities of tertiary institutions. Consequently, a need to encourage specialisation within the context of a broad Human Resource Development strategy was identified.

The task team identified three specific, but interrelated areas, which will be targeted to improve the capacity of human resource development in the Eastern Cape Automotive Industry. These areas of target were at a strategic level, middle leadership level, and operational skills level (Russell, 1998b:10):

- at the **strategic level**, the programme would be aimed at encompassing all the stakeholders in the industry in the appreciation of the challenge facing the South African motor industry, understanding the international framework and alignment of what it will take to become globally competitive;
- the **middle leadership level** would mean leadership development at a middle management level and shop steward level of modern automotive techniques and manufacturing concepts;
- at this **skills level**, skills training and development at shop floor level would cover all the skills required in the OEM and component industries.

The alignment of the three areas discussed above was deemed essential in ensuring that training and development is optimised. There was agreement in that before embarking on the strategic, middle leadership and skills level programmes, it was necessary to conduct a needs analysis of the key stakeholders and an

audit of current training and development activities. The stakeholders included national government, regional Eastern Cape government, universities, technikons, and other institutions, OEM's (DaimlerChrysler, VWSA, Delta), component suppliers and organised labour. Furthermore, it was decided to develop a competency framework at these three levels based on their needs and analysis and linked to the cluster vision and to develop training and development programmes to support this competency framework. Eventually an assessment tool to assess individuals against the competency framework and the needs analysis to ensure feedback on the success of the training programme, would be developed.

In order to ensure that the programme is put into operation rapidly and to obtain as much leverage as possible, it was proposed to commission professional co-ordinators to implement the plan. A recommendation was put forward that strategic and leadership strategies be implemented and co-ordinated by the ICMD (International Centre for Management Development). For skills development, it was proposed that the East Cape Training Centre be commissioned to co-ordinate this module of the project. The Eastern Cape Training Centre has had considerable experience in this area, has adequate facilities and is tied into national training initiatives such as the "Workplace Challenge". This is one of the supply side measures provided by the DTI, which is aimed at promoting an improvement in competitiveness and improved productivity performance across a number of different industrial sectors of the South African economy.

By November 1999, the Human Resource Development project had completed an audit of the industry competency levels and regional education institutions' ability to deliver internationally competitive services (Tshefu, 2000: 1). The executive also agreed on human resource development priorities for the next three years on. These include a strategic development programme; first tier leadership development programme; shop steward/union leadership development programme and a programme to retain displaced employees at all levels (Tshefu, 2000: 3). The unions are in the process of developing a proposal to establish a worker leadership college in consultation with their European Trade Union partners. The institutional capacity to support the trade unions is an important part of the human resource model (CIMEC, 2000b: 11).

Again at the final cluster executive meeting in November 1999, the key challenge for this project team was to finalise a business plan in terms of what specific training is required and formally link up industry with education institutions and decide on the way forward (Tshefu, 2000: 3). At the same time funding for the project had to be identified (since the DTI's Sector Partnership Fund had come to an end in November 1999) as well as the key people who will facilitate co-ordination by giving support and input from industry, government, unions and regional education institutions.

5.5.4.3. The Logistics Project Team

The logistics project established a vision to create an internationally competitive logistics delivery system for the motor industry in the Eastern Cape, which can be replicated in other regions. The logistics team recommended that the three OEMs in the Eastern Cape needed to formulate a mission, "which resembled an optimisation, control and co-ordination of predetermined logistics and information for the motor industry in order to facilitate its own growth and prosperity in local and overseas markets and in order to pave the way for replication of similar initiatives in other Eastern Cape industries and the country as a whole" (Tshefu, 2000: 1).

The overall objective of the logistics team was to improve the global competitive position of the Eastern Cape's OEMs and suppliers. This involved a number of sub goals ranging from realising an improvement in delivery accuracy and consistency; reducing lead times; reducing inventory levels; optimising logistics costs; improving utilisation of infrastructure and increasing revenues and volumes. Consequently, the project scope for the logistics team included ensuring that internationally competitive ports and airports are at the disposal of the automotive industry, as well as well-developed and maintained road and rail networks. It also included developing a customer focused warehousing and distribution network and customs legislation, which ensures optimal enforcement of existing processes. This project team also had the responsibility to ensure that adequate information technology existed to support its processes, and that it negotiated competitive rates and service tariffs. The team also undertook the responsibility of realising low cost, high

quality and reliability of raw materials such as steel.

In 1998 the team found that though currently the three OEMs were performing well logistically through their own individual efforts, they were literally dealing with a few hundred suppliers, sub-contractors and service providers at any one time. Not only does this increase the complexity of logistic relationships in the industry, it can also be quite costly. In South Africa's 1998 depressed economy, a new approach to logistics management was therefore needed and the DTI and business in the Eastern Cape looked at the OEMs to provide initiative for economic upliftment in the region. A combined logistics effort would not be restricted to the OEM, its effect would be experienced throughout trade and industry. An alliance would not imply survival only, but it would amount to growth and prosperity for the automotive industry and the Eastern Cape region.

Three possible scenarios were considered to potentially rectify the drawbacks to logistics within the industry. The first scenario was one, which maintained the status quo, in which case the OEMs would choose to operate independently as they are currently doing. The second scenario would be on one in which an *ad hoc* process would be adopted. Regular informal liaison between the three OEMs logistics legs would investigate and co-operate on an ad hoc basis. The final scenario incorporated the cluster, in which case a fully operation alliance of some sort would plan and co-ordinate the total process of logistics optimisation in the Eastern Cape.

The logistics team and the rest of the stakeholders in the cluster initiative were in full support of the cluster scenario because it had greater advantages compared with the other two scenarios. For example, in no way would the cluster negatively affect or impact on the individual efforts of Delta, Volkswagen and DaimlerChrysler. It should actually result in a non-aligned logistics organisation with equal or multiple shareholding and responsible to its shareholders only. This organisation would at all times enhance rather than impede the logistics efforts of the OEMs. Staff would be appointed by the Cluster's Executive Committee and would be totally non-aligned to any individual shareholder. As an independent entity,

normal rules of confidentiality would apply. The organisation would function similar to a logistics department of any of the three OEMs and its focus would be on logistics optimisation for all shareholders.

Essentially policies, procedures and tasks to be performed and results to be obtained would be determined by the shareholders in consultation with the organisation's employees. Consequently, the logistics project has been formalised with the creation of a Section 21 Company, the Motor Industry Cluster Logistic Company (MIC) to facilitate the operations of the project (Russell, 1999: 4). Members to the MIC initially included the three OEMs i.e. Delta, Volkswagen, DaimlerChrysler, and two component manufacturers i.e. Shatterprufe and Dorbyl Automotive Technologies. The Ford Motor Company of South Africa has since become a member. Because the magnitude of this project has increased, there has arisen the need for a legal entity to manage this initiative and create constant improvement programmes.

The MIC has managed to appoint land and airfreight carriers for participating OEMs. Care was taken to start small, structured with the initial focal points on local land-freight and airfreight from Germany. Consequently, an alliance consisting of Union Transport and Imperial Transport was appointed as the lead logistics supplier for the two mentioned initiatives (Tshefu, 2000: 3). An EDI system, capable of tracking goods on a part-by-part basis, is currently being introduced to the OEM's by these logistics suppliers and will soon be extended to the major suppliers as well. Following the expiry of existing land and airfreight contracts, handovers to the cluster are being negotiated (Russell, 1999: 3). Once local land freight and airfreight from Europe is operating effectively, other initiatives are being considered. These include air freight from the East and other destinations; sea freight from supply source to manufacturing plants in the Eastern Cape and other provinces and streamlining logistics systems. At the same time, other potential cost saving initiatives in: parts and accessories; exports; warehousing; customs clearance; packaging and direct line feed will be addressed (Russell, 1999: 4).

Delegations have been dispatched to Europe to sort out consolidation centres and the most profitable air routes, while the most expedient and profitable land freight routes are being explored. Negotiations with the

Airports Company of South Africa and the Portnet authorities are continuing for runway and infrastructural extensions at the Port Elizabeth Airport, along with the privatisation and custom design of the East London and Port Elizabeth harbours respectively. The road and rail implications for this project are also being addressed. The MIC's most impressive achievement to date is a saving of R23 million, which was realised for the OEMs (Tshefu, 2000: 3); whilst suppliers are now being targeted for freight rate savings.

5.5.4.4. The Supplier Development Project Team

The supplier development project's overall objective was to develop an internationally competitive component industry in the Eastern Cape, in accordance with the cluster's vision. The development of the component suppliers is very important to ensure the future of the industry. Each of the above projects was considered as being able to provide broad-based support to the component suppliers. At a domestic level the primary support is in respect of human resource development, logistical and strategic investment issues (Russell, 1999 :2).

For example, through the human resource development project, the supplier development project aimed to develop an integrated competency framework at strategic, general management and skills level. Again through the Human Resource Development Project, it aimed to ensure the most effective and quality human resource delivery system and training through the appropriate supply side support. Through the Strategic Investment Project, the supplier development project intended to have component suppliers more effectively integrated into the OEM's strategic planning process, and to ensure a transparent common information system so that all suppliers were made aware of component supply opportunities (Russell, 1999: 7). Finally, the supplier development project intended to ensure that component supplier needs are integrated into the logistics project in respect of: import and export; airfreight; sea freight; warehousing and distribution ; forwarding, clearing and services.

Essentially, well-structured projects supported by the key stakeholders were considered to add significant value to the component suppliers' desire to become more viable and internationally competitive. The smaller

suppliers in particular, are not always capable of dealing with the complexity of forming strategic partnerships and alliances with international partners, to ensure the introduction of new technology and resources to meet international industry demands (Russell, 1999: 8). To a certain extent the strategic investments project provided this support hence the decision in November 1999 to integrate it with the supplier development project (Tshefu, 2000: 3).

The achievements of the supplier development project by November 1999 included closer co-operation between suppliers and OEMs; greater understanding of what generic support is required by suppliers, and an appreciation of benefits that could be achieved through strategic co-operation between OEMs and suppliers as a whole. The supplier development project still had key challenges, which included the need to get the National Association of Automotive Component and Allied Manufacturers (NAACAM) support on key issues to avoid a conflicting parallel process. NAACAM could take the responsibility of acting as a communication conduit between the Eastern Cape motor industry cluster and all component suppliers in South Africa (CIMEC, 2000b: 4). Its other main challenge was to ensure that the benefits from progress in the other projects flow to the supplier development project. As mentioned earlier, the strategic investments project had potential to influence the suppliers positively or negatively, depending on the investments, it was therefore considered imperative that the way forward should be the integration of the two projects.

At the final cluster meeting executive meeting in November 1999, at which point the Sector Partnership Fund from the DTI lapsed, the cluster executive decided to discontinue the activities of the project teams with the exception of the logistics project team, which had made the most progress i.e. established the MIC. The reasons for discontinuing the cluster initiative could partly lie with the need to come up with new sources to fund the whole process. The following chapter will provide more insight into why the initiative was discontinued.

5.6 Conclusion

This chapter has given an overview of the South African motor industry, with a particular emphasis on the

Eastern Cape region. More importantly, it has described why the motor industry cluster was initiated, what has been achieved and the current situation thereof. Three of the projects progressed as far as the design phase, whilst the logistics project managed to reach the institutionalisation stage, hence the establishment of the MIC Logistics Company in 1999. It appears that at the final cluster Executive meeting in November 1999, the challenge was to take three of the cluster projects into the next stage - Implementation and Institutionalisation. The following chapter will provide empirical evidence on what the cluster initiative achieved by the end of 1999 and an assessment will be on its impact on the performance of motor industry in the Eastern Cape.

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CHAPTER 6

ROLE AND ANALYSIS OF THE AUTOMOTIVE CLUSTER AS A STRATEGY FOR MANUFACTURING PERFORMANCE

6.1 Introduction

In the previous chapter the primary goal of the literature review on the Eastern Cape's automotive industry, was to develop specific knowledge about the cluster's historical development, its main stakeholders, and the conditions governing its competitive ability. This chapter analyses the impact the Fish River Motor Industry Cluster Initiative and its constituent projects has had on the performance of the motor industry in the region. The analysis is based on the findings of a survey covering both the component manufacturers, affiliated to the National Association of Automobile and Allied Manufacturers (NAACAM), together with the Ford engine plant, and the three original equipment manufacturers (OEMs) based in the Eastern Cape (Volkswagen of South Africa, Delta and DaimlerChrysler).

A total of 27 firms were surveyed using a mail questionnaire (Appendix One). These included 23 component manufacturers in the Eastern Cape affiliated to NAACAM, the Ford engine plant, and the three OEMs. Eight of the surveyed firms explicitly declined to participate in the survey. At least five of these indicated that they did not form part of the cluster initiative, and three revealed that they were not aware of the existence of such an initiative. Information was therefore obtained from 15 firms, which represented 56% of the sample. Interviews also played a major role in developing qualitative, cluster-specific knowledge from key players in the cluster process, building on the general knowledge that was gathered from the literature review. These interviews were conducted with 14 leaders, most of whom were industry specialists and consultants affiliated to the four project teams (human resources, logistics, strategic investments, supplier development) under the cluster initiative, as well as union representatives and government officials from the Department of Trade and Industry. A list of the interviewees is given in Appendix Two.

The analysis is centred on the quantitative data obtained from the questionnaire, with additional commentary based on the insights obtained from the interviews. For the sake of clarity, the analysis is

initially divided into two: Section 6.2 covers the motor vehicle assembly industry and 6.3 covers the component manufacturers. Within these two sections a general overview (based on questions 1 and 2 of the questionnaire - see Appendix One) covers the background and profile of the sampled firms. This also includes an interpretation of general trends affecting the motor industry's economic performance. Since the cluster initiative had been in existence for two years, it was instructive to include this section as it could have had an impact on the variables included. The rest of the analysis in these two sections (6.2 & 6.3) is based on questions 8 to 9 of the questionnaire which are aimed at assessing the impact the cluster initiative had on the industry's operating environment and economic performance. Finally Section 6.4 puts the empirical evidence into the perspective of Porter's "diamond" of competitive advantage. Together with the underlying theoretical foundations it will be used to analyse the overall performance and competitiveness of the Eastern Cape motor industry.

6.2 The motor vehicle assembly industry

As discussed in 5.4 there are three motor vehicle assemblers or original equipment manufacturers (OEMs) based in the Eastern Cape. Volkswagen South Africa (VWSA) and Delta Motor Corporation are based in the Port Elizabeth/Uitenhage metropolitan area, while the DaimlerChrysler manufacturing plant is based in East London.

The three OEMs participated in the survey and reported an annual turnover of over R500 million each, and each had a labour force of over 2000 employees. Again as highlighted in 5.4 VWSA is a subsidiary of Volkswagen AG, whilst Delta has a majority local holding of 51%, the balance (49%), being owned by General Motors, and DaimlerChrysler is a subsidiary of DaimlerChrysler international. The following sub-sections analyse the economic performance of the three respondent firms and their views on the effect of the cluster initiative on their firm performance.

6.2.1 Relationship of assembly firms with suppliers

This part of the survey attempted to evaluate cluster relationships, in this case buyer-supplier relationships, which characterise the vertical dimension of a cluster. The theoretical literature indicates that strong backward linkages have positive ramifications for competitiveness. The spatial proximity of suppliers facilitates the exchange of information and promotes a continuous exchange of ideas and

innovations.

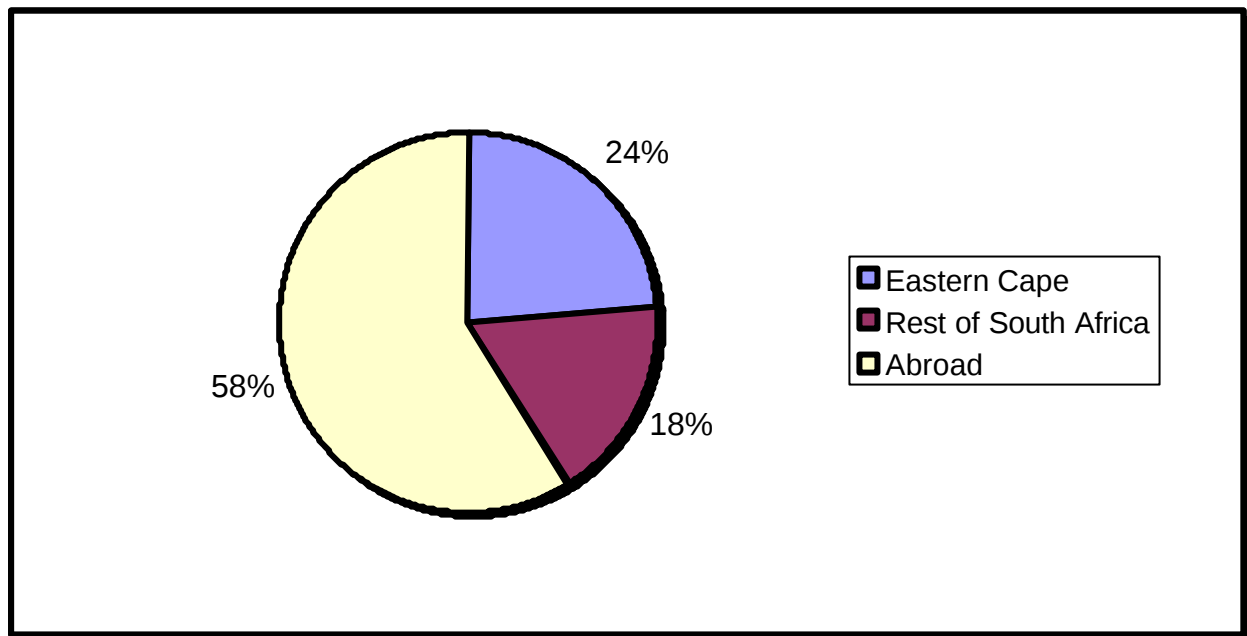
The first question sought to reveal the location of suppliers of raw materials, components and machinery to the three OEMs, given by the percentage of inputs bought locally (i.e Eastern Cape), nationally and abroad. Establishing the location of suppliers gives an indication of whether there is a possibility for firms to benefit from static external economies of scale due to proximity. These externalities would for example exhibit themselves in lower transport costs. Inquiry was also made into the OEMs' perception of the quality of inputs, which they obtained from these suppliers.

Only VWSA volunteered information on the raw materials it purchased, which in this case is steel. It obtained 80% of its steel nationally, whilst almost 20% came from abroad. Generally, VWSA seemed content with the quality requested at least 70% of the time, and the quantity at least 80% of the time. DaimlerChrysler did not give an indication of the raw materials it purchased, whilst Delta indicated that 1% of its inputs were raw materials, opting not to give a split in terms of where it obtained its raw materials. In terms of components, (i.e. electrical, chemical, metallic components) the three OEMs indicated that within South Africa, they obtained most of their components from the Eastern Cape (24%) between them, whilst only, (18%) was sourced nationally. As Figure 6.1 illustrates, for three OEMs combined, the vast majority of their components are sourced abroad (58%).

This substantial sourcing of components from abroad could partly be a result of the reintegration of the OEMs (mainly German) into the global network of their parent companies, and partly a result of the import rebate credit (IRC) scheme under the Motor Industry Development Programme (MIDP) which, as noted in Section 5.3.1.2, allows importers of either CBUs or components to claim refunds of import duties and to sell them between participants. According to a survey by Onyango (1999:105) at least 37,5% of component suppliers in the Eastern Cape shared their duty drawback certificates with assemblers, while 31,3% of them sold these to the assemblers, hence the obvious scope of gaining from imports for the assemblers. Nevertheless, the fact that within South Africa most of the OEMs' components are obtained from the Eastern Cape signifies the importance of creating sustainable relationships between component suppliers and OEMs. When inquiry was made into the quality of components sourced, the OEMs were of the opinion that generally they managed to obtain the required

quality and quantity of components at least 70% of the time.

**FIGURE 6.1 DISTRIBUTION OF COMPONENT MANUFACTURERS
SUPPLYING ASSEMBLY FIRMS**



n=3

DaimlerChrysler indicated that it sourced 20% of its new machinery nationally, whilst the remaining 80% was sourced from abroad. It seemed relatively satisfied with the quantity and quality of its machinery, saying that this was forthcoming at least 80% of the time. VWSA on the other hand, obtained all its machinery abroad, and like DaimlerChrysler, it did not seem to make use of second-hand machinery. Again like DaimlerChrysler, it was generally satisfied with the quality and quantity of machinery it purchased. Delta, however, is the only one that purchases most of its machines in South Africa, (75%) though it could not provide a split in terms of how much is obtained in the Eastern Cape and nationally. The remaining 25% is being obtained from abroad. It also indicated that overall, 98% of its machinery is new, while the balance of 2% is second-hand. Again, it did not provide an indication of how much of its second-hand machinery is purchased nationally or abroad, neither did it indicate whether it was satisfied with the quality of this machinery.

Inquiry was also made into the level of interaction between the three respondent firms and their

respective suppliers. All three firms revealed that their suppliers offer assistance with problems arising from their products, as well as to explain certain characteristics of their products. DaimlerChrysler however, indicated that its suppliers did not ask for suggestions on how to improve their products, though it further indicated additional areas of co-operation with its suppliers in cost savings and improving flexibility. Finally, when asked whether the cluster initiative had improved relations between OEMs and component suppliers, DaimlerChrysler and Delta believed that it did improve relations, though VWSA did not seem to agree.

6.2.2 Market area for assembly firms

This part of the survey sought to establish the market base for the respondent firms. According to the literature on industry clusters, the relative size of local demand and more importantly, the nature of demand is important in driving competitiveness (see Section 2.3.1.1). Basically, the more demanding the consumers in an economy, the greater the pressure firms face to constantly improve their competitiveness via innovative products and through high quality.

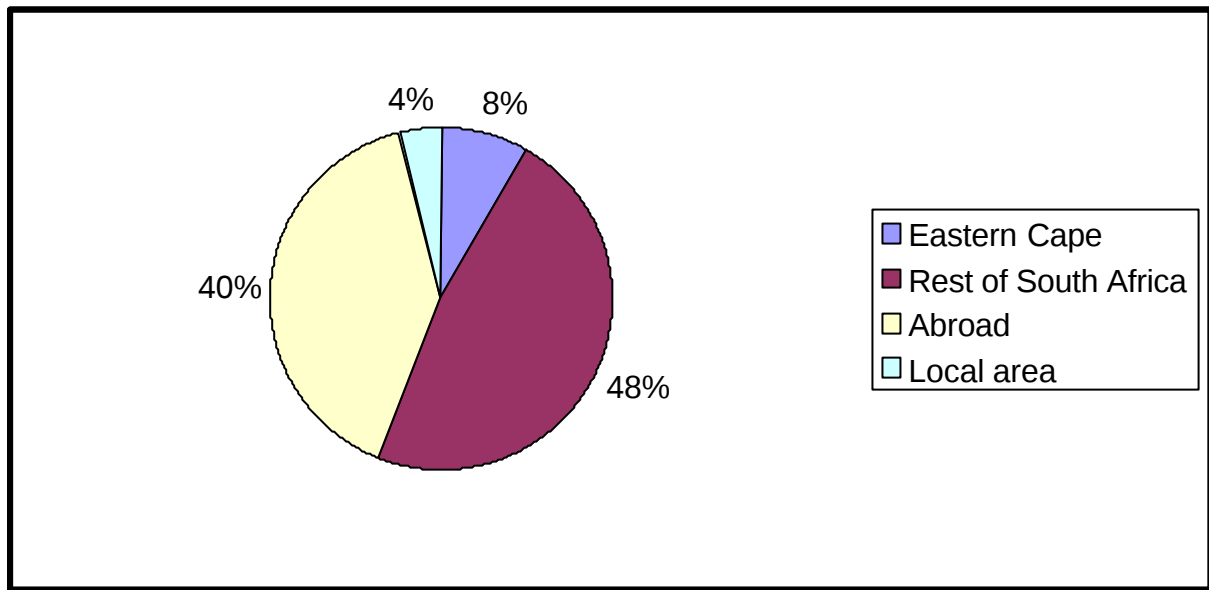
DaimlerChrysler sold its vehicles direct to domestic and foreign dealers, whilst Delta sold 85% of its vehicles through domestic dealers and 15% it exported. WWSA did not volunteer information on how it sold its motor vehicles. Furthermore, in order to obtain an idea of the distribution or concentration of demand for the OEMs, the firms were asked to indicate, as a percentage of total sales, the location of the main outlets at which their motor vehicles were sold:

- (i) local area;
- (ii) rest of the Eastern Cape;
- (iii) rest of the country;
- (iii) abroad

Between the three firms 40% of their vehicles are sold abroad, 48% are sold in South Africa; 8% is sold in the Eastern Cape and 4% within their localities, as illustrated in Figure 6.2. Clearly the domestic market is still significant to the three OEMs, despite the orientation towards increased exports. On closer inspection, however, DaimlerChrysler sells nearly 75% of its vehicles abroad, 20% in the rest of South

Africa: 3% in the rest of the Eastern Cape and 2% within the local area. Again its increasing export drive is evident from these figures. VWSA on other hand sells 30% of its vehicles abroad; 40% to the rest of South Africa; 20% to the rest of the Eastern Cape and 10% within its local area. The high percentage of vehicles sold in South Africa for VWSA again

FIGURE 6.2 MARKET DISTRIBUTION FOR ASSEMBLY FIRMS



n=3

gives an indication of its significant market share for passenger cars (21,4%) as compared to DaimlerChrysler, which has as 8,7% domestic market share. Delta did not give a detailed breakdown of where its main outlets were located in the Eastern Cape. It however, appears to mainly sell its vehicles in the country (85%), and the remaining 15% abroad, a trend which also underscores the significance of the domestic market to Delta. All three firms perceived the cluster initiative to have managed to create a greater understanding of customer needs and market opportunities in South Africa and abroad.

6.2.3 Inter-firm competition

It is important to establish the location of competitors:

- (i) in the local area;

- (ii) in other parts of the country;
- (iii) abroad

Local competitors have the potential to induce innovation and upgrading, compared to internationally more distant ones. The theoretical literature further indicates that the impact of local competitors on rivalry and innovation is strengthened by geographic proximity, (2.3.1.1).

Most of the competitors to the three OEMs seem to be located in other parts of the country, as well as abroad. Delta however, indicated that some of its main competitors were located in the Eastern Cape. Understandably, Delta mainly targets the medium-sized passenger car category with its Opel Astra and Opel Kadett range, which compete fiercely with VWSA's Golf IV, Polo Classic and to a certain extent the Jetta range. At the same time if levels of trim and accessories are taken into account, the small car category for Delta boasts a large variety in which its Opel Corsa competes with VWSA's Citi Golf. DaimlerChrysler's traditional target market has been luxury passenger cars, hence its competitors (mainly importers of luxury cars) are located in the rest of South Africa. It is interesting to note that in recent years, it has made a shift to smaller cars, which have a higher volume of sales (DTI, 1999:7).

The firms were then asked to indicate the three main factors (in order of importance) that they focus on in order to out-compete their rivals:

- (i) price;
- (ii) quality;
- (iii) new designs;
- (iv) delivery

In order to out-compete their competitors DaimlerChrysler's three main factors are quality, new designs and delivery, in order of importance, similar to Delta. VWSA on the other hand, indicated that price, quality and new designs are the three main factors (in order of importance) it uses to differentiate itself from its competitors. Its emphasis on price is visible in the introduction of the CitiGolf range, an inexpensive reliable car, which quickly established a niche for itself in the entry-level range. In its year of

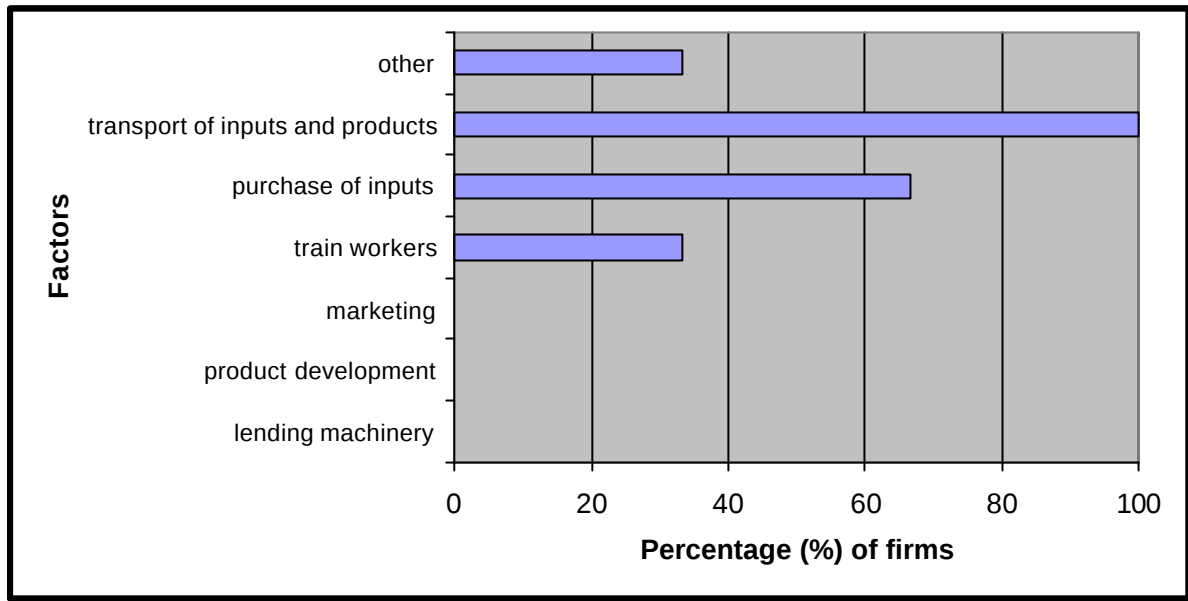
launch, the CitiGolf was billed the most affordable car in South Africa and led to a phenomenal increase in vehicle sales from 1994 to 1995 (Eastern Province Herald, 1998: 5). The CitiGolf is still one of the main ranges for VWSA locally as well as internationally.

6.2.4 Inter-firm co-operation

An investigation was also made into the level of inter-firm co-operation (i.e. co-operation that depicts horizontal, shared-resource and/or end market relationships in a cluster) between the three OEMs. This particular form of co-operation is the one that sets apart industry clusters from industrial districts in that it emphasises co-operation between *competing* end market producers, as opposed to co-operation between end market producers and their suppliers (see Section 2.3.2.2). The firms were initially asked if they had any formal arrangements with other firms. The one response that was given by the OEMs was that of their co-operation in logistics under the Motor Industry Cluster Logistics Company (MIC), which is a joint venture between the three OEMs, Ford engine plant and some suppliers, notably Dorbyl Automotive and Shatterprufe (see Section 5.5.4.3).

According to DaimlerChrysler and VWSA, their informal relationships usually came about from industry associations; whilst Delta's informal relationships were a result of co-operation on projects for mutual benefits, the joint venture on logistics being a case in point. All the three firms were in consensus on the fact that they co-operated with each other in the transport of inputs and products. Given their co-operation in logistics, this is unsurprising (see Figure 6.3).

FIGURE 6.3 AREAS OF CO-OPERATION BETWEEN ASSMEBLY FIRMS



n=3

Delta and DaimlerChrysler also revealed they co-operated with OEMs in the purchase of inputs. VWSA indicated that it co-operated with other OEMs in the training of workers, and DaimlerChrysler also seems to co-operate in benchmarking and exchange of information (considered under 'other' areas of co-operation in Figure 6.3). Generally, the respondent firms appear to regularly exchange ideas or discuss problems and strategies with other local automotive firms.

6.2.5 Associations affiliated to assembly firms

The survey sample was also asked to indicate whether they belonged to an industry association. Industry associations are important for the creation of advanced or specialist factors in a cluster. These are factor conditions such as cluster-specific research and know-how, which are difficult for competitors to duplicate, therefore providing a foundation for sustainable competitive advantage. Sinos Valley in Section 3.3.2 gave an illustration of how trade associations were instrumental in assisting Brazilian shoe manufacturers to break into export markets.

All the three OEMs indicated belonging to an association, namely the National Association of Automobile Manufacturers of South Africa (NAAMSA). In addition, DaimlerChrysler chose to include

the Motor Industry Cluster Logistics Company (MIC) as another association it belonged to. Of the three OEMs both VWSA and DaimlerChrysler seemed to use the association more often. VWSA often used it for information bulletins, and occasionally for advice in legal regulatory matters, information on other enterprises, and for courses and seminars. DaimlerChrysler used the associations regularly for information on other enterprises, whilst occasionally it uses their services in legal regulatory matters; courses and seminars and information bulletins. Delta on the other hand seemed to use NAAMSA less often, using it occasionally for what it termed, “industry matters.”

The OEMs revealed that NAAMSA did not provide any leadership within the cluster initiative. This was further evidenced from the interviews conducted with industry specialists, who argued that the intention was to include NAAMSA once the cluster’s focus had been established. DaimlerChrysler, which had also included the Motor industry Logistics Company (MIC) indicated that it did however, provide leadership within the Fish River cluster initiative. Again this was also established from interviews, which revealed that (as noted in Section 5.5.4.3) the MIC Logistics Company has its origin in the logistics project team, one of the four project teams under the cluster initiative.

6.2.6 Assembly firm’s views on Government Policy

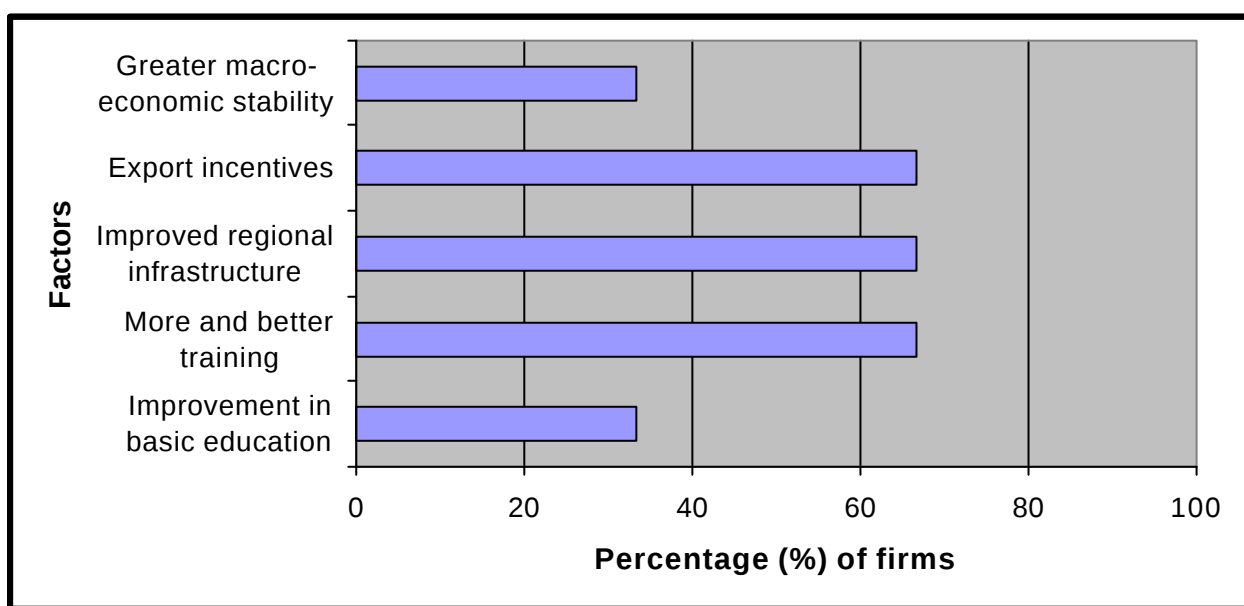
Within the theoretical literature on industry clustering, the role of government as facilitator (see Section 2.4.1) was regarded to be critical to the success of a cluster. Consequently, it was important to establish whether government (in this case national, provincial and local government) was committed, and actively participated in the cluster initiative. Two of the respondent firms (Delta and DaimlerChrysler) indicated that government’s participation was forthcoming in the initiative, whilst VWSA did not share the same opinion. The respondent firms were further asked whether the cluster initiative managed to give better information about, and access to the Department of Trade and Industry’s (DTI) supply-side measures. There appears to be mixed reactions about supply side measures. DaimlerChrysler seemed content with supply side measures from government, whilst VWSA believes that just as government’s participation was inadequate in the initiative, so were its supply side measures. Delta on the other hand, seems to believe that the initiative partially managed to give better information and access to supply side measures from government.

The respondent firms were asked which government policies could have increased the effectiveness of the cluster initiative. The following options were presented to the respondent firms (see Figure 6.4):

- (i) greater macro-economic stability;
- (ii) export incentives;
- (iii) improved regional infrastructure;
- (iv) more and better training;
- (v) improvement in basic education.

Between the three OEMs the most significant policies that could have contributed most to raising the effectiveness of the initiative are export incentives, improvement in regional infrastructure, and more and better training, (as seen in Figure 6.4).

FIGURE 6.4 GOVERNMENT POLICIES THAT COULD HAVE INCREASED CLUSTER EFFECTIVENESS



n=3

On closer inspection however, VWSA for example, considered greater macro-economic stability, as

well as improved regional infrastructure to be fundamental in raising the effectiveness of a cluster. In contrast, DaimlerChrysler considered export incentives, as well as more and better training to be of utmost significance. Its export drive probably underpins its concern with the need for more export incentives from government. It considered greater macro-economic stability, improved regional infrastructure and improvement in basic education to be moderately significant in that particular order. In no particular order of significance, Delta indicated that it considered export incentives; improved regional infrastructure, more and better training, and improvement in basic education to be policies that could have enhanced the effectiveness of the cluster initiative

6.2.7 Impact of cluster initiative on assembly firms

The final part of the survey on assembly firms sought to establish the impact the cluster initiative had on individual firm performance.

One of the stumbling blocks of the cluster process is the desire to keep information proprietary. Consequently, the three firms were asked if this was a problem within the cluster initiative. DaimlerChrysler and VWSA indicated that this was generally not a problem, though Delta believed that initially this was an issue, which was overcome with time as information was freely exchanged. Although the concept of industry clustering endorses co-operation, one cannot underestimate the power of competition. Understandably, for the three firms, which are competitors, they were bound to be initially apprehensive about the cluster process, particularly in terms of possibly disclosing sensitive information about their respective operations. Essentially, the cluster process requires a tremendous change in mindsets, since it implies operating under such a different set of rules.

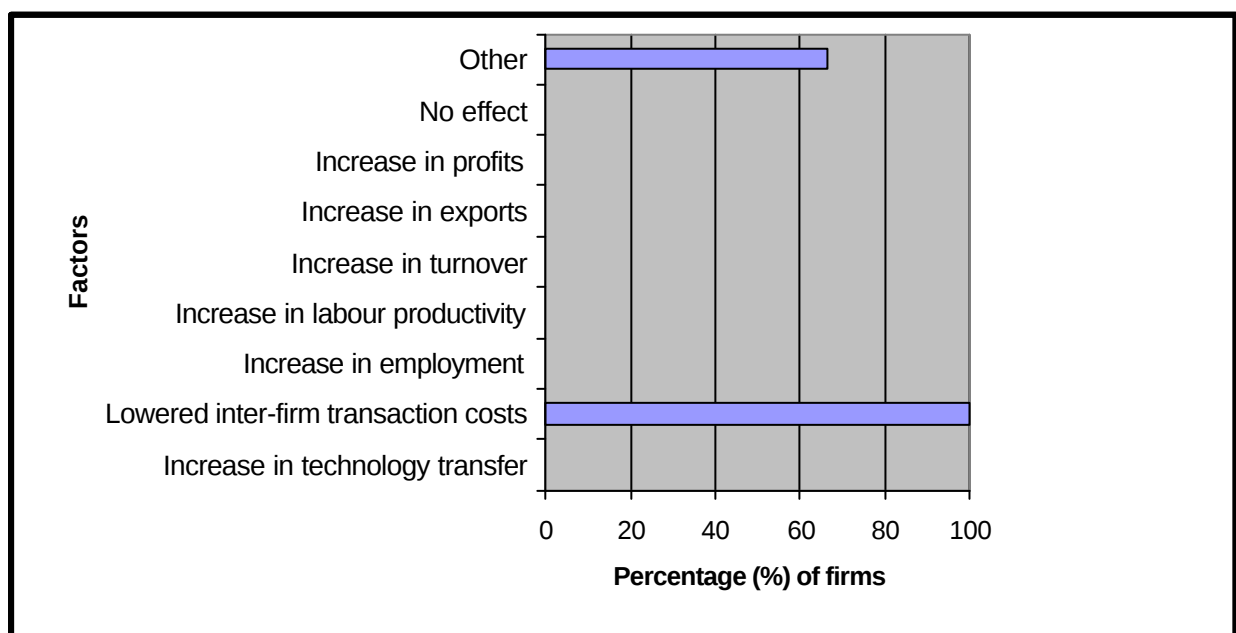
Closely related to the issue of keeping information confidential, was that of the ability of the cluster process in overcoming historical conflict and isolation within the industry and society. Again, two of the assembly firms, DaimlerChrysler and Delta believed that the cluster process managed to achieve this, whilst VWSA indicated that the process only partially achieved this. Again this is a process that requires a substantial change in mindsets and consequent re-education and training, before it can be achieved.

Indeed one of the most important questions related to what benefits had been afforded by the cluster

initiative to the assembly firms. The most striking indicator of manufacturing performance and therefore in competitive advantage, is the productivity of each worker in an industry. Other indicators include turnover, profitability, employment practices and exports. These indicators were used to evaluate whether the cluster initiative has had an impact on the assembly firms' manufacturing performance. None of the OEMs indicated whether the initiative had influenced any of these variables directly (see Figure 6.5).

However, unsurprisingly, the three OEMs were in consensus that the process managed to lower inter-firm transaction costs by eliminating bottlenecks and cost drivers (see Figure 6.5). Essentially, their continued co-operation within the Motor Industry Cluster (MIC) logistics company has resulted in a reduction of logistics costs that account for approximately 15% of their total costs. As indicated in Section 5.5.4.3, the three OEMs with some suppliers are part of a logistics joint venture, which is operated as a section 21 company. Since the establishment of this company in 1999, this has resulted in a saving of R23 million rand for its stakeholders. Through the cluster process, the assembly firms also seem to have been able to reach consensus on the necessary infrastructural requirements for the continued viability of the industry. This is illustrated in Figure 6.5 as 'other' areas in which the cluster initiative has had an impact on the assembly firms.

FIGURE 6.5 IMPACT OF CLUSTER INITIATIVE ON ASSEMBLY FIRMS



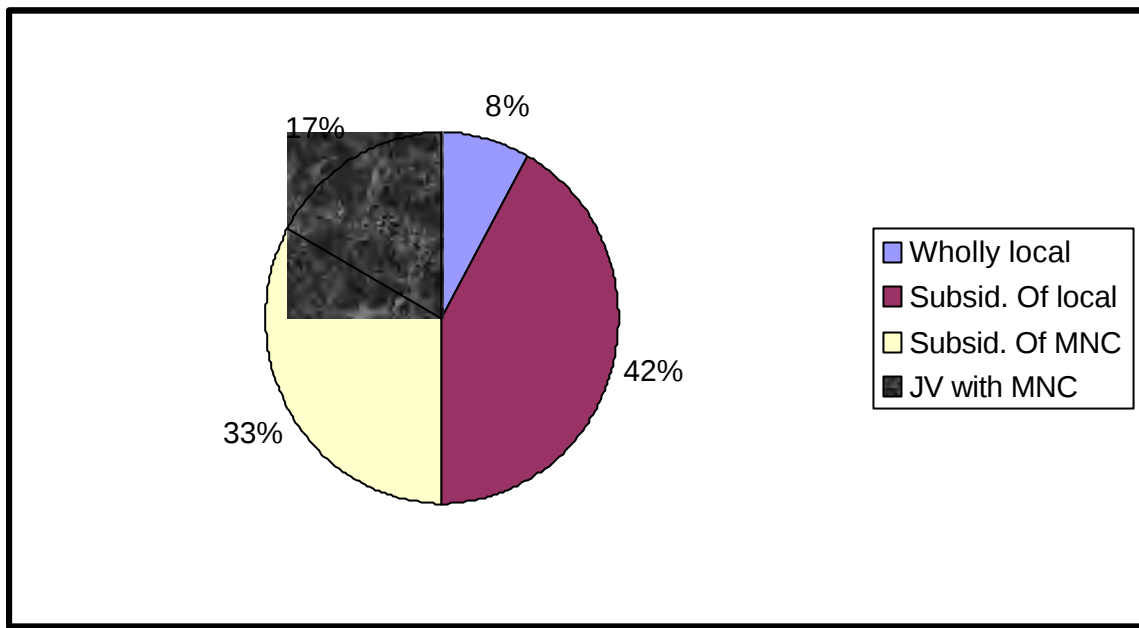
n=3

6.3 The component sector

A vast majority of the respondent firms are located around Port Elizabeth (58,3%) and Uitenhage (25%), while the remaining firms 16,6% are to be found in East London. It was noted in Section 5.2 that there is a general tendency for component manufacturers to be located within close proximity to the OEMs, in a bid to reduce transport costs, in particular costs of bulky and/or delicate parts. Essentially, those firms in the Port Elizabeth/Uitenhage metropolitan area are situated around VWSA and Delta, while those in East London are situated around DaimlerChrysler.

Only a few of the sampled firms were exclusively second tier component suppliers (16,6%). These are usually regarded as component producers who supply first tier, sub-assembly suppliers. The majority of firms (66,6%) are first tier component suppliers i.e. direct suppliers to the OEMs or the component aftermarket, which is not surprising, since the sampled firms are predominantly members of NAACAM. At least 33,3% of the sampled firms indicated that they were both first and second tier suppliers. This trend compares well with component suppliers in Kwazulu-Natal where the large number of firms categorised as being both first and second tier suppliers is in many ways, according to Barnes (1998:2), indicative of: the diverse strategic orientation of the automotive component firms in Kwazulu Natal (in this case the Eastern Cape). It also illustrates the short-term nature of procurement policies of South African OEMs, which tend to source components from a vast number of suppliers, many of who should actually be supplying components to first tier automotive component (or sub-assembly) firms. As with the other criteria explained thus far, there was considerable variance amongst sampled firms in terms of their size, in both employment and turnover terms. Whilst the average

FIGURE 6.6 NATURE OF OWNERSHIP OF COMPONENT FIRMS



n

=12

employment figure amongst the sampled firms was, for example 350, certain firms employed over 2000 people, while others employed fewer than 500. There was also considerable variance in turnover. Whilst the average turnover figure for the sample was R150 million, there were firms with turnover in excess of R500 million. While there was clearly a large number of subsidiaries of local companies (see Figure 6.6), which together with wholly owned local firms represent a huge base of local ownership, there appears to be an insurgence of subsidiaries of foreign multinational corporations (MNCs). This appears to be consistent with the general trend observed by Barnes (1999:7-8) in Kwazulu-Natal whereby the number of local firms with local technology is rapidly diminishing in favour of wholly owned subsidiaries of MNCs. This trend could mitigate the exorbitant royalties which local firms have to pay the foreign MNCs, and increase the scope for technology transfers which for locally owned firms would otherwise be limited and restricted to the design specifications by the MNCs (Barnes, 1998: 7).

It should also be noted that this trend is in line with the fact that OEMs are demanding different equity relations for component suppliers. As mentioned in Section 5.4.5.7, OEMs increasingly want their

domestic suppliers to have an equity relationship with the owner of their designs. As discussed in 5.4.5.7, this is a result of a rapid re-orientation of the presence of the OEMs in the Eastern Cape in the global industry, and implicitly their position within global value chains. Multinational control of international marketing networks makes independent exporting extremely difficult, except in the export of stable technology-independent aftermarket products. Consequently closer relationships with first tier MNC component suppliers and/or use of domestic OEMs as conduits for exports is essential if component manufacturers are to penetrate the export market. The former option can be cited as a possible reason for the increase in subsidiaries of MNCs and joint ventures in the Eastern Cape, many of which have German connections.

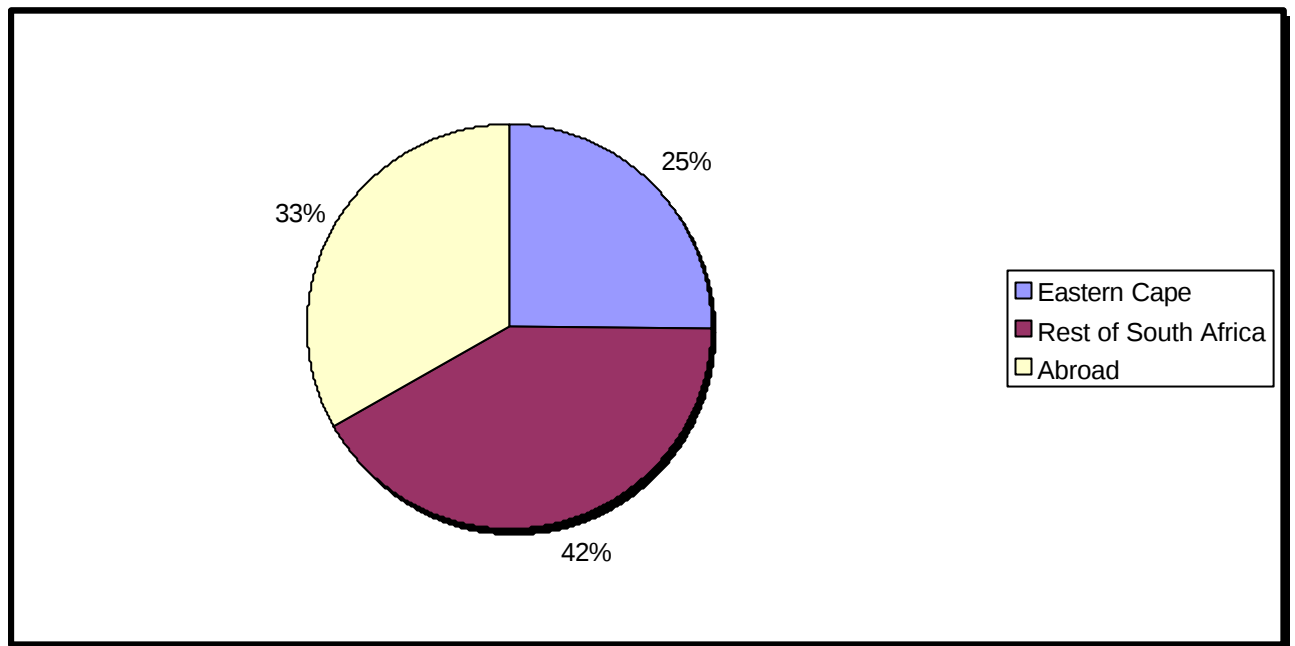
The cluster initiative could have assisted component manufacturers to establish contact in order to form joint ventures with MNCs. Consequently, in the latter part of the questionnaire (question 9.3 - see Appendix One), the component manufacturers were asked if the initiative had enabled them to realise further technology transfers (refer to Section 6.3.7 for responses).

6.3.1 Relationship of component firms with suppliers

In similar fashion to the assembly firms (see Section 6.2.2), the component suppliers were asked to indicate the location of their suppliers, given by the percentage of inputs (raw materials, components, machinery) bought locally (i.e. Eastern Cape), nationally and abroad. Raw material in this context refers to vinyl, lead, plastic, glass and castings used by component manufacturers. As illustrated in Figure 6.7, a vast majority of firms (42%) obtain their raw materials nationally, followed by 33% of firms who purchased most of their raw material abroad. A small proportion of the respondent firms acquired their raw materials locally in the Eastern Cape.

Although nearly 70% of the surveyed firms acknowledged that the raw materials were generally available in the required quantities, 36% of the firms believed that on the whole these raw materials lacked in quality. This trend is consistent with evidence from interviews, as well as the literature on the strategic investments project under the cluster initiative. One of the main objectives of the strategic investments project was to improve sources of raw materials in terms

**FIGURE 6.7 DISTRIBUTION OF RAW MATERIAL-SUPPLIERS TO
COMPONENT FIRMS**



n=12

of quality, price and supply, and in turn create globally competitive incentives for regional investment. It is not surprising that this was one of its objectives, given this general dissatisfaction with the quality of raw materials, which is compounded by the small percentage of raw materials readily available in the Eastern Cape. Consequently, one of the opportunities identified by the strategic investment project team was for investments in new companies in the region specialising in metals and plastics, which could also benefit non-automotive sectors. At the same time, given the fact that a vast majority of firms obtained their raw materials nationally, it was essential that the strategic investment project did not limit its scope to the Eastern Cape.

This explains its involvement in attempting to address the general dissatisfaction of component manufacturers with the quality and high cost of steel available in South Africa for example.

Components in this context refer to such sub-components as separators and foam. Unlike raw materials, a substantial number of firms confirmed obtaining their components in the Eastern Cape (33,3%), whilst 41,6% purchased them abroad, and 25% nationally. Nearly half of the firms were generally satisfied with the quality of components, which they obtained, as well as the quantity. On the

other hand a vast majority of firms (66,6%) obtained their machinery abroad, followed by 25% nationally. Only 8,3% sourced their machinery in the Eastern Cape. Such a trend could be consistent with the need to access more technologically advanced equipment which is not readily available, not only in the Eastern Cape, but in the rest of South Africa. Most of the respondent firms were content with the quality of the new machinery they purchased as well as the quantity available, whereas the few firms that used second hand machinery were not, unsurprisingly, satisfied with the quality.

In order to obtain a better understanding of the relations between the component manufacturers and their suppliers, the respondent firms were asked whether their suppliers approached them to offer assistance with problems arising from their products. At least 66,6% of the firms confirmed that this was forthcoming, and 58,3% confirmed that their suppliers approached them to explain characteristics of their products. Rather disappointing was the low percentage of suppliers (33,3%) that asked for suggestions on how to improve their products, a process that could lead to the development of greater capabilities for both parties through learning-by-interaction. At the same time, a minority of firms (25%) for example, interacted with their suppliers in pricing and logistics.

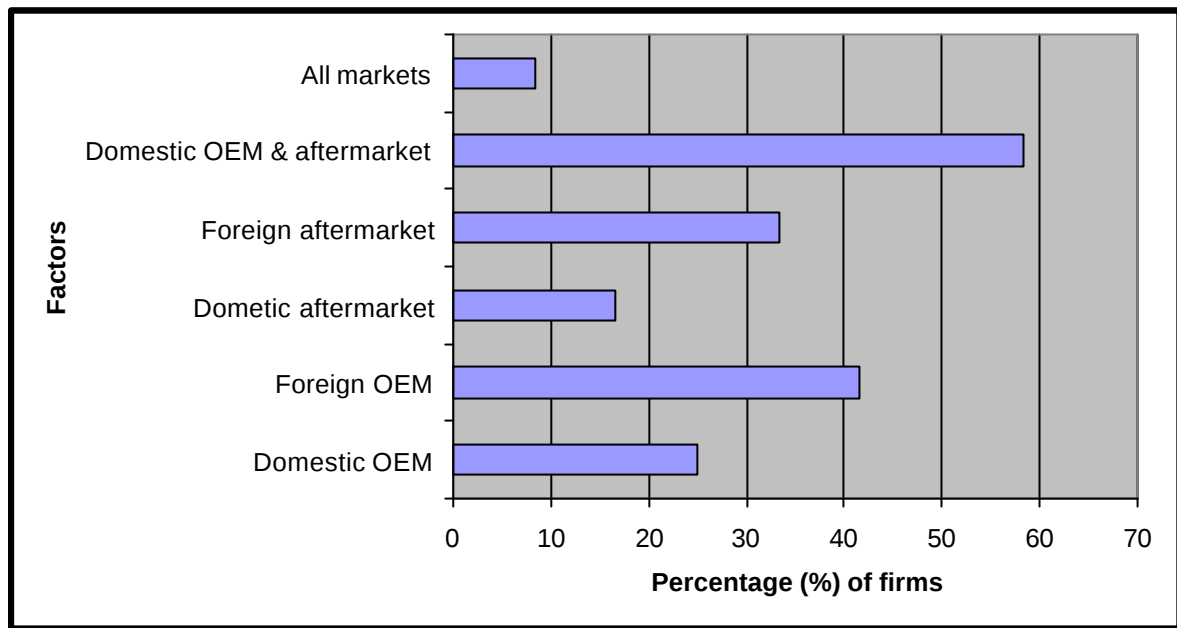
6.3.2 Market area for component firms

Firms were also asked to indicate the destination for most of their output. This seemed to vary, depending on what products the firms produced. Some firms' output was aimed primarily at the domestic OEMs and/or the aftermarket, and other firms targeted either the foreign OEMs and/or the aftermarket. The surveyed sample revealed that 25% of the respondents produced most of their products for the domestic OEMs, while 41,6% was destined for the foreign OEMs (see Figure 6.8). The domestic aftermarket had 16,6% of the firms supplying most of their output, while 33,3% indicated the foreign aftermarket as their main customer-base. Notably, 58,3% of the respondents serviced both domestic OEMs and the aftermarket, with only 8,3% of the firms who produced most of their products for all markets.

These results are generally consistent with a previous survey conducted by Oyango (1999:112). Clearly the customer-base for a significant proportion of component suppliers is the domestic OEMs, hence the need to improve and form sustainable relationships between the two entities. Of growing importance

however, is the potential market-base in both the foreign aftermarket and

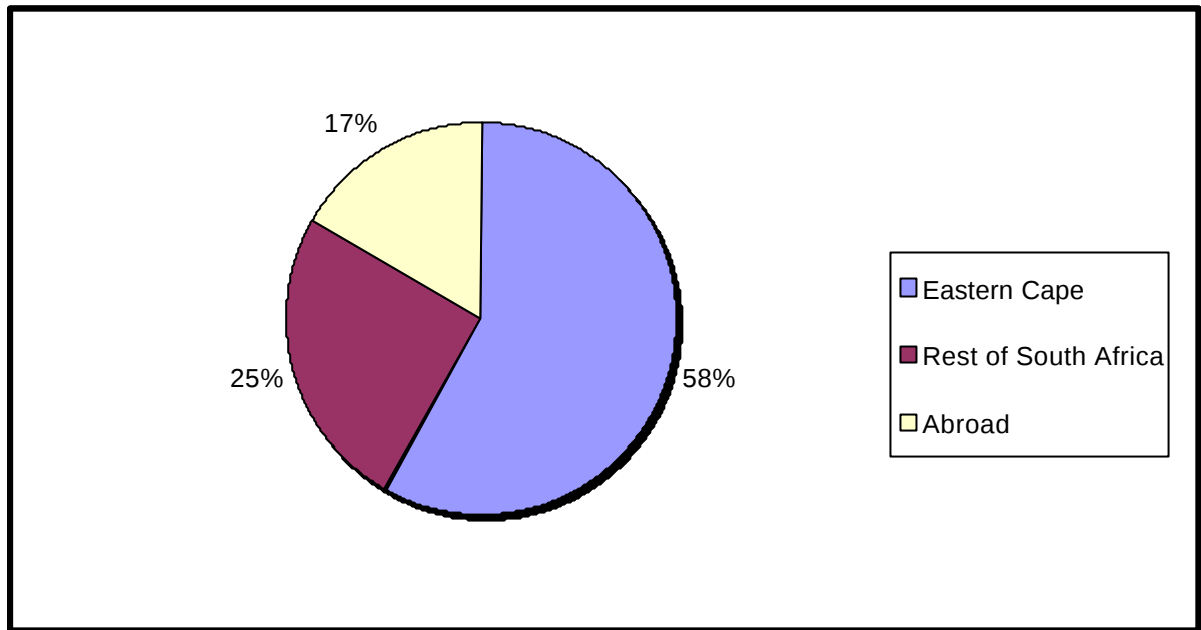
FIGURE 6.8 PRIMARY MARKET FOR COMPONENT FIRMS



n=12

foreign OEMs. Again, in the survey by Onyango (1999:112), the destination for most exports is the European Union and North American markets. He suggests that this is possibly due to the fact that in a bid to ensure continued survival in the face of international competition, most component manufacturers have entered into agreements with overseas (mainly German) assembly firms to supply their global chains. However, the interviews with industry specialists and motor manufacturers conducted for this research, revealed that North American and European markets are becoming saturated in terms of vehicle growth. Some potential now exists in emerging markets in the Southern Hemisphere (i.e. Africa, South America and China) where there is massive growth potential.

The survey also tried to establish the concentration of demand for the components in South Africa. Generally, Figure 6.9 illustrates that the greatest concentration of demand for components produced by the respondent firms (58%) was in the Eastern Cape. This is not surprising, given that after Gauteng, the Eastern Cape has a substantial concentration of OEMs and motor related firms. At least 25% of demand concentration seems to be in the rest of the country, whilst 17% is

FIGURE 6.9**MARKET DISTRIBUTION FOR COMPONENT FIRMS:**

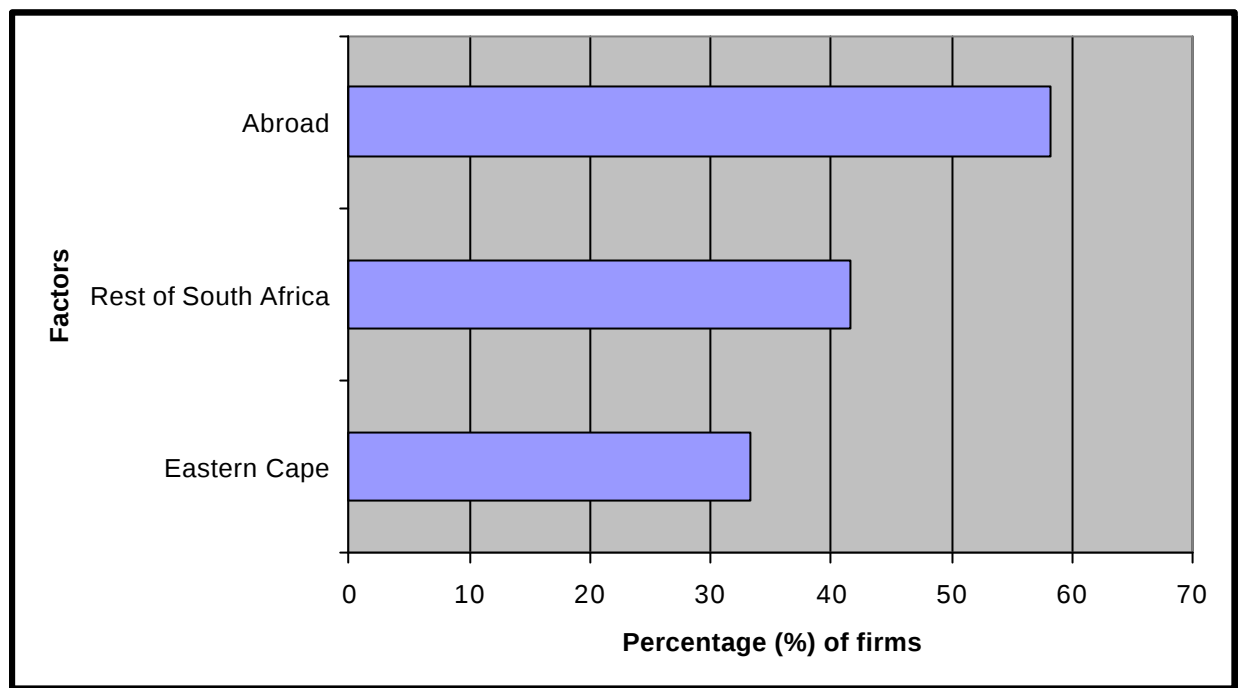
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abroad. When asked whether the cluster initiative had managed to create a greater understanding of customer needs and markets in South Africa and abroad, the response was generally positive with nearly 50% of the respondents confirming this. As will be seen later in this chapter, one of the functions which a number of respondents, (both OEM and component suppliers), thought the cluster initiative had managed to achieve to a certain extent, was creating visibility for the motor industry.

6.3.3 Inter-firm competition

This part of the survey sought to ascertain the level of inter-firm competition. Firms were asked where their main competitors were located. At least 33,3% of the firms indicated that their main competitors are located in the Eastern Cape, whilst 41,6% indicated that their main competitors are in other parts of South Africa. A significant proportion of firms (58,3%) revealed that their main competitors were abroad, a situation that probably signifies an increase in imports, as well an increase in trade liberalisation (see Figure 6.10). This particular finding broadly concurs with

FIGURE 6.10 LOCATION OF COMPETITORS TO COMPONENT MANUFACTURERS



n=12

that of Bell (1993); IDC (1997); Black (1998) and Onyango (1999), who argued that the immediate impact of trade liberalisation is likely to be an increase in imports, with any stimulatory effect on exports being delayed and possibly weak.

When asked to indicate the size of their main competitors, 66,6% of the respondent firms indicated that they were large enterprises (characteristic of most foreign component manufacturers), whilst 16,6% indicated that their main competitors were small enterprises, and 10% were medium enterprises. In order to out-compete their rivals, the three most important factors for a majority of firms were quality, delivery and price. Not surprising, delivery is one of the factors cited by a majority of the component manufacturers due to the upper hand they have (in terms of geographic proximity to their markets) against their large, mainly foreign competitors.

6.3.4 Inter-firm co-operation:

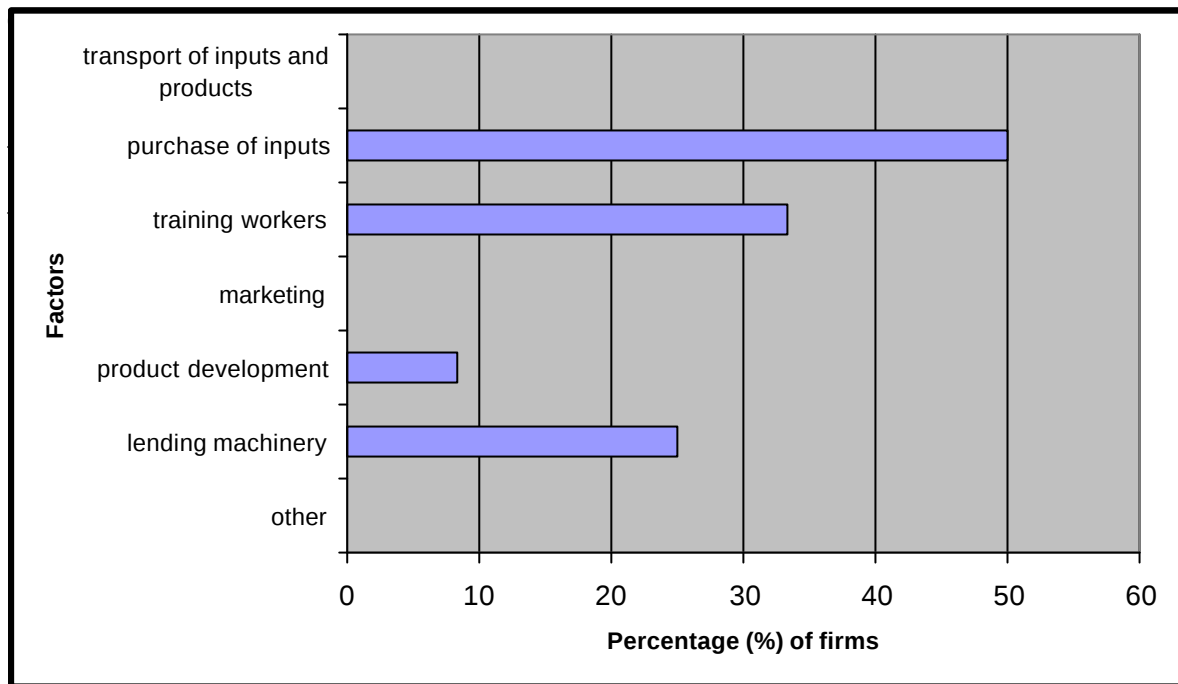
An inquiry into the level of inter-firm horizontal co-operation was also made. This refers to co-operation between firms producing similar or the same products, consequently sharing either a common end market, or sharing common technology/resources in production. When asked if any of them had formal arrangements with other firms, 45% of the respondents affirmed this. On closer inspection however, most of these arrangements were not with local, geographically proximate component manufacturers, but with foreign-based component manufacturers. The respondents were further asked how their informal relationships developed. Nearly 66,6% of the respondents cited industry associations. Given the fact that nearly all the respondents belonged to the industry association NAACAM, this is not a startling revelation. Other firms (25%) cited friends and colleagues from courses offered in the industry as good ways to form informal relationships, whilst 8,3% cited neighbours or spatial proximity as important factors.

The respondents were then asked if they co-operated with local component suppliers in the following ways:

- (i) lending machinery;
- (ii) product development;
- (iii) marketing;
- (iv) training workers;
- (v) purchase of inputs;
- (vi) transport of inputs and products;
- (vii) other

The findings are presented in figure 6.11

FIGURE 6.11 AREAS OF CO-OPERATION BETWEEN COMPONENT MANUFACTURERS



n=12

These categories are by no means exclusive since a single firm could co-operate in one or more processes. As illustrated in Figure 6.11 the survey established that nearly 50% of the respondents co-operated with other component suppliers in purchasing inputs. For 33,3% of the respondents, training workers was their main area of co-operation, while a similar percentage co-operated in transporting inputs and products. 25% of the respondents co-operated in lending machinery, and 8,3% in product development. Clearly there is evidence of some co-operation between component suppliers. Moreover, the fact that at least 66,6% of the firms indicated that they occasionally exchanged ideas or discussed problems with other producers gives further indication of co-operation among the component suppliers.

6.3.5 Associations affiliated to assembly firms

All the component firms belonged to some industry association, the main one being NACAAM. Other firms indicated additional associations such as the South African Battery Manufacturers' Association (SABMA), the South African Tyre Manufacturers' Association (SATMA), and MIC. The survey sought

to establish the extent to which the respondents used these associations for such issues as advice in legal regulatory matters, courses and seminars, and information bulletins.

Generally there is evidence of consistent use of associations, since half of the firms indicated that they often used the services of the industry associations. The predominantly used service is that of information bulletins, a service that nearly all of the component suppliers mentioned as using often, followed by courses and seminars. A majority of the firms also occasionally used these associations for advice in legal and regulatory matters. According to the respondent firms, none of the industry associations, except for MIC (as noted earlier in this chapter), provided any leadership within the cluster initiative.

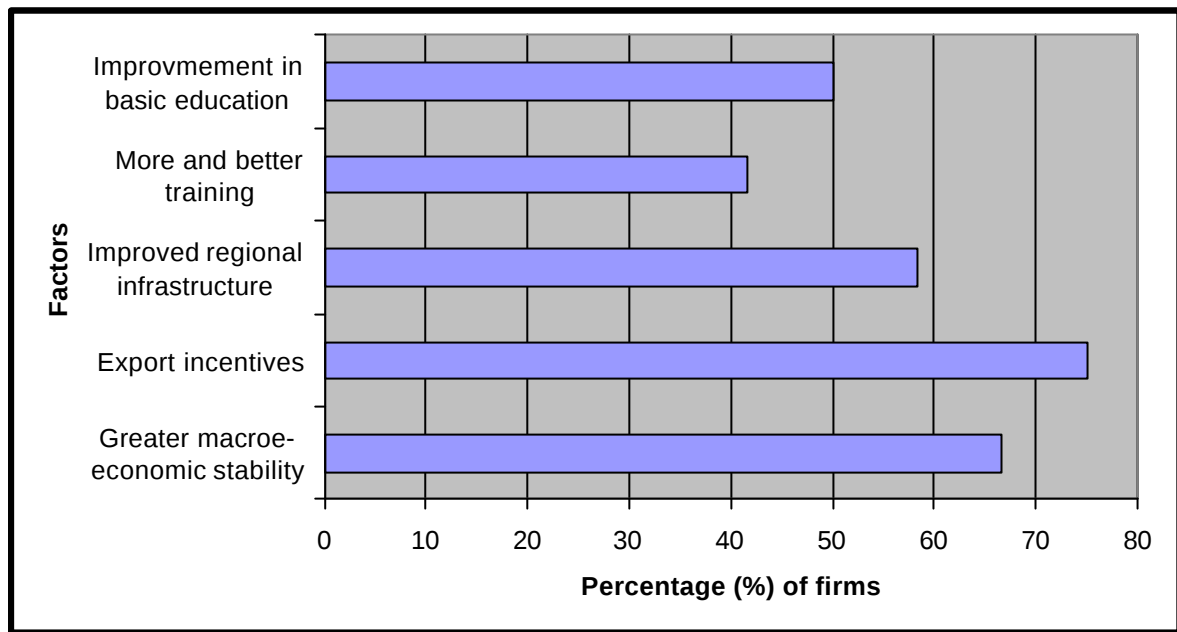
6.3.6 Component firms' views on Government Policy

Most of the respondents (66,6%) were satisfied with the participation of government. However, of these 66,6% some respondents (3,2%) made qualifications to their responses. For example, some indicated that government's participation was evident, but its total commitment was questionable, while others maintained that government's participation and commitment only eventually surfaced when the currently operational MIC was established. In addition to the inquiry on government participation, the respondents were asked whether the cluster initiative managed to give better information about, and access to DTI supply-side measures which generally fall under the ambit of the MIDP. The respondents indicated that the cluster initiative partially achieved this. Understandably this partial success could be attributed to the identification, (by the strategic investment project team), of the top five supply side measures required by the motor industry to secure investments. These included logistics, human resource development, investment promotion, cash grants and tax holidays (Tsehf, 2000: 1).

The respondents further indicated government policies that could have contributed the most in raising the effectiveness of the cluster initiative. The need for greater export incentives and greater macro-economic stability were the two most important policies cited by a vast majority of the respondents as illustrated in Figure 6.12. An improvement in regional infrastructure was also cited by 58,3% of the respondents as being an important government policy that could have enhanced the cluster's effectiveness, while 50% cited improvement in basic education. It appears that both component manufacturers and OEMs (see

Section 6.2.6) consider greater export incentives a pertinent issue in terms of necessary government policy. Again this clearly indicates the industry's focus on exports.

**FIGURE 6.12 GOVERNMENT POLICIES THAT COULD HAVE INCREASED
CLUSTER EFFECTIVENESS**



n=12

6.3.7 Impact of cluster initiative on component firms

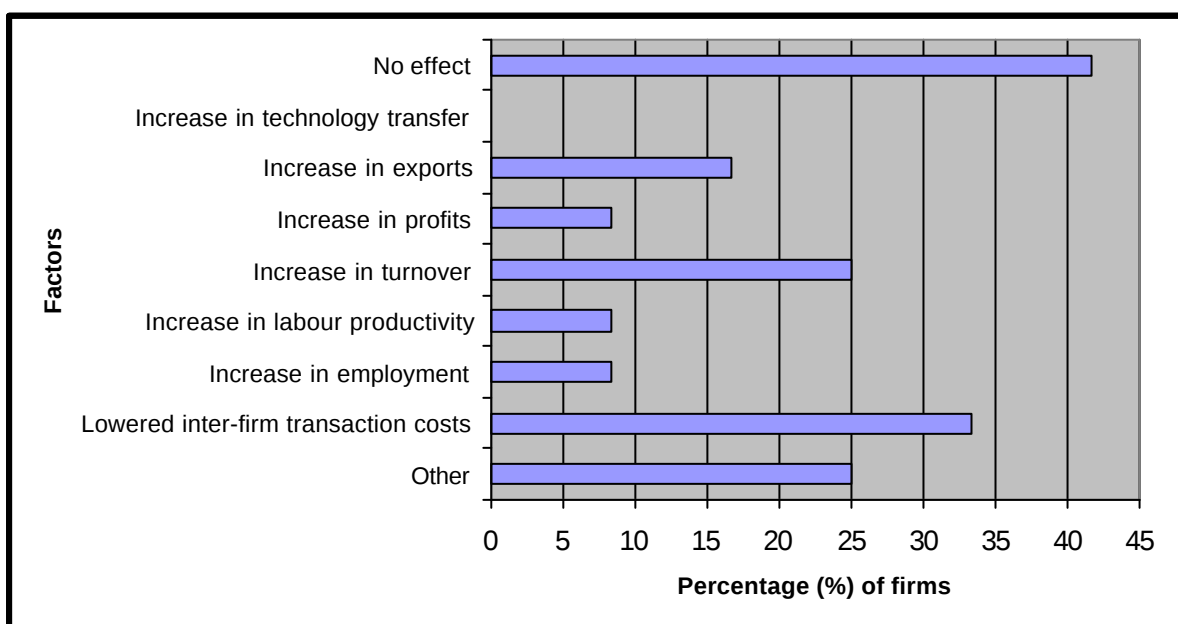
Similar to the survey on assembly firms, this part of the survey on component firms attempted to evaluate the effects the cluster initiative had on the component firms in the sample. When asked whether the desire to keep information proprietary restricted information flow within the cluster initiative, most of the respondents indicated that this was a problem initially, though with time information was freely exchanged. Furthermore, half of the respondents indicated that the process managed to partially overcome historical conflict and isolation within the industry. This seems to concur with the fact that a substantial amount of the respondent firms were of the opinion that the process had managed to somewhat improve relations between OEMs and component suppliers. The mere fact that the two parties managed to create a joint vision for the motor industry in the Eastern Cape, gives credence to this.

Nevertheless, there seemed to be mixed perceptions on the economic benefits that the cluster initiative had on individual firm performance. These varied from firms which indicated that the initiative did not have any effect on their economic performance (41,6%) to firms which indicated that it had reduced inter-firm transactions costs by eliminating bottlenecks and cost drivers (33,3%). At least 25% of the firms maintained that the initiative had increased turnover, while a similar percentage cited other factors such as:

- (i) it had improved the logistic supply chain;
- (ii) it had helped highlight problem areas inhibiting the supply industry;
- (iii) it enhanced collective bargaining;
- (iv) it allowed a cross-pollination of best practices and synergies of obtaining a critical mass of knowledge within the industry.

At least 16,6% of the firms indicated that the initiative had led to an increase in their exports, whilst 8,3% indicated that this had resulted in an increase in labour productivity, the same percentage being cited for resulting in an increase in employment and profits (see Figure 6.13).

FIGURE 6.13 IMPACT OF CLUSTER INITIATIVE ON COMPONENT FIRMS



n=12

As illustrated by Figure 6.13, the cluster initiative appears to have had minimal impact on the variables that underpin manufacturing performance as cited in Section 6.2.7 i.e. labour productivity, profits, exports, increase in employment. The only exception appears to be turnover. At least 25% of the firms indicated that they had achieved an increase in turnover due to the cluster initiative. It was also noted in Section 6.3 that there is an insurgence of subsidiaries of foreign multinational corporations (MNCs) in the region, a move that should facilitate the transfer of technology. In this respect, the cluster initiative does not seem to have influenced this increase in subsidiaries of MNCs, since none of the respondent firms (as illustrated in Figure 6.13) indicated that they had realised an increase in technology transfer as a result of the cluster initiative. It is safe to therefore conclude that overall, the initiative did not have a significant impact on component manufacturers' performance judging from the 41,6% of respondents who indicated this.

6.4 Analysis of the surveys

The purpose of this section is to analyse the findings of the surveys for the Eastern Cape motor vehicle assemblers and component manufacturers, in the light of the theoretical impact of clustering on industry performance and economic development. Notably, use of Porter's "diamond" framework and underlying theoretical concepts will be made in order to assess the competitive state of the Eastern Cape motor industry.

Throughout the theoretical literature (see Chapter 2), as well as the case studies highlighting international experience with clusters (see Chapter 3), the fundamental reality of clusters is that of business partnerships for mutual benefit i.e. the sum of the total is greater than the individual. Whatever form these clusters take (i.e. whether it is along a supply value chain or between firms sharing a common end market, or whether it comes about "naturally" or through direct intervention) it basically requires a tremendous change in the mindsets of the respective stakeholders who should establish a complete buy-in into the process. This should result in the necessary broad-based support essential for a successful, dynamic cluster. Taking cognisance of the notion of "co-operative competition" is important in changing stakeholder mindsets. The underlying implication is that competitive firms should find ways to work

together, even as they go head to head in the development of new products and in the battle for markets. At the same time, while the characteristics of a cluster may be present (i.e. geographic concentration), it does not necessarily represent an effective cluster. An effective cluster must also include a network of relationships based on trust and a shared vision (i.e. “social capital”) in order to create the dynamic nature of a cluster.

The basic philosophy behind the Fish River Cluster Initiative was to develop the Eastern Cape motor industry to a more efficient base through interaction. In order to do so, it was understood that some jobs were going to be lost because in order to become globally competitive meant a massive rationalisation of models in order to achieve greater volumes and benefit from economies of scale. Ultimately, a viable and vibrant motor industry would result in a more healthy, sustainable basis for the Eastern Cape economy which would lead to a net displacement of jobs i.e. those people unable to find employment in the motor industry would be employed in the other vibrant sectors in the region, e.g. tourism. It was also envisaged that the motor industry cluster would start in the Eastern Cape, the idea being that there was a better chance of developing a template, implementing it and then validating it to see whether it should be rolled out at a national level.

The fact that the cluster has extended to a national level probably indicates that the stakeholders were at least correct in identifying the key areas or enabling critical success factors (logistics, human resource development, strategic investments, and supplier development) in the motor industry. Nevertheless, the most important consideration is the impact the cluster initiative had on the performance of the motor industry in the region. This will be analysed in the following sections.

6.4.1 Factor Conditions

Section 2.3.1.1 indicated that factor conditions include both basic (raw materials; literate, numerate labour force; transport; communication infrastructure) and advanced (cluster-specific knowledge and know-how) factors. Again it has been highlighted that simply having a general workforce that is high school or even college educated represents no competitive advantage in modern international competition. More specialised factors that meet an industry’s particular needs are essential and these are ‘man-made’, implying the need for specialised ‘factor-creation’ mechanisms and institutions.

The stakeholders in the cluster initiative clearly identified that the region had an education crisis that has led to a poor skills base. Lack of skills not only compounds the problem of poor productivity, but also means inability to cope with the demands of transformation critical to the survival of the motor industry. At the same time, the costs of skilling the workforce is high due to low numeracy and literacy levels. Hence only 8,3% of firms indicated that the initiative had resulted in an increase in productivity and employment in the industry. Although levels of productivity are not solely dependent on any one given factor, poor skills prevailing in the industry are certainly part of the reason why the increase in productivity is constrained. The fact that 50% of the component firms indicated that an improvement in education was one of the policies that could have enhanced the effectiveness of the cluster is further evidence of the poor skills base in the motor industry.

Not only are basic education requirements in the region lacking, but also so are the industry-specific factors. In Section 5.5.4.2, it was noted that the general sentiment throughout the cluster workshops was that the training or tertiary institutions in the region did not meet the needs of the industry. This sentiment was also prevalent from interviews conducted within the industry for this research, and this was also confirmed by the audit conducted by the HRD project team under the cluster initiative. Moreover, it appears that the institutions in the region are actually competing against each other, with no coherent approach to meet the requirements of the motor industry (HRD Audit Report, 1999: 4).

There are obviously a host of problems with the human resource capabilities in the industry (special attention was given to this issue in Section 5.5.4.2). No tangible results emanating from the HRD project team are visible in the industry, judging from the responses to the survey as well as from interviews for this research. This is due in part to the fact that the HRD project team, which had commendably completed an audit of the skills needs of the industry, had not managed to fully implement or institutionalise its findings. This is despite the fact that as highlighted in Section 5.5.4.2, a recommendation was put forward that strategic and leadership strategies under the HRD project be implemented and co-ordinated by the International Centre for Management Development (ICMD). Furthermore, the Eastern Cape Training Centre had been commissioned to co-ordinate a skills development module owing to its experience and facilities in this area, as well as its links into national

training initiatives such as the Workplace Challenge⁶. Another obvious reason why the results of the HRD project are not visible in the industry is that the nature of the project only allows results to be realised in the medium to long term.

In the final analysis however, the HRD was one area that emerged as having potential for co-operation, an area in which traditionally the stakeholders in the motor industry had not co-operated. It can also be considered to be one of the areas in which the stakeholders found the greatest synergy, but judging from the survey for this research, it proved to be the most difficult to implement. Hence by the time of the final cluster executive meeting in November 1999, the project still had to finalise a business plan in terms of what specific training is required and formally link up industry with education institutions.

Agglomeration economies, in this case those associated with access to a large pool of skilled labour, with industry specific skills, are weak in the Eastern Cape's motor industry. This creates a drawback for the region; given that employers are generally bound to resort to any place where they are likely to find a good choice of workers with the special skills, which they require. At the same time, workers seeking employment naturally go to places where they are likely to find good jobs. There is a clear mismatch, which seems to exist between skills offered and the requirements of industry. This probably explains the tendency of migration to other parts of the country to obtain employment, in addition to the fact that unemployment in the Eastern Cape is high (40%) and wages are generally lower than e.g. Gauteng.

Another drawback in factor conditions established in this research was that of raw materials in the region. The respondent component firms indicated that they obtained only 25% of their raw materials from the Eastern Cape, whilst one of the assembly firms revealed that it did not obtain any of its raw materials in the Eastern Cape. At the same time, raw materials in the rest of the country were costly and lacked in quality. Attempts were therefore made by the strategic investment project team to remedy this situation. Again, like the HRD project team, the strategic investments project had made considerable strides e.g. identifying generic investments required for the motor industry (see Section 5.5.4.1).

6 DTI together with NEDLAC initiated a Workplace Challenge in 1996. Its main objective is to enhance the competitive capability of local firms and sectors to compete in the global market and ensure high investment and employment security, with economic growth (DTI, 1997: 1). One of the principal elements of the Workplace Challenge at the sectoral level is to facilitate the creation of HRD training programmes.

However, by the time of the final cluster executive meeting in November 1999, one of the remaining key challenges was to develop a regional strategy that would enhance and co-ordinate efforts of attracting investments to the region. This was exacerbated by uncertainty at the time as to which institution, Investment South Africa (ISA) or the Centre for Investment and Marketing in the Eastern Cape (CIMEC) should institutionalise the findings. It appears, however, that CIMEC has been given the responsibility of co-ordinating investment activity for the region and therefore for the motor industry.

Not only was there a disconcerted effort in attracting investment by these two associations, but the survey also revealed that there was no leadership from the two main motor-industry associations (NACAAM and NAAMSA), within the cluster initiative. The theoretical literature highlighted that trade or industry associations in successful clusters focus on innovation, upgrading and future development by developing cluster specific knowledge and expertise. Attempts to reveal why the two main industry associations were not involved in the cluster process produced a mixture of results.

Some industry stakeholders contended that it was a political issue, whilst others maintained that NACAAM is national and therefore not truly reflective of an Eastern Cape initiative. Other stakeholders indicated that at the outset a decision had been made for the cluster initiative to initially run independently of formal structures. It also appears that historically there has been a wide gulf between the two associations. NACAAM for example is the biggest countrywide platform of component manufacturers, with extensive communication systems in place, as well as a central secretariat. Furthermore, the survey revealed that nearly 66,6% of component firms made regular use of this industry association, similarly the three OEMs seem to make extensive use of NAAMSA. So ideally, the cluster initiative should have had a representative from the two associations. It, however seems, that as the cluster process progressed, the stakeholders in the motor industry recognised the need for more co-operation, especially in terms of including the two associations into the process that could avoid a duplication of effort between the two associations and the initiative.

As mentioned in Section 6.3.4, one of the functions, which a number of respondents, (OEMs and component suppliers) thought the cluster had partially achieved was creating visibility for the motor industry. The supplier development project team met with trade delegations from the United Kingdom

and Sweden for example, and this provided a possibility to establish contacts and potential markets. The potential ability of the cluster to stand out and visibly provide information about what the Eastern Cape offers in terms of the motor industry was clearly demonstrated. Most respondents, especially the component suppliers, believed that although the cluster initiative played a significant role in this respect, this could have been expanded further, possibly through such institutions as NACAAM/NAAMSA, or CIMEC.

A less obvious, though an increasingly important role the cluster initiative could have played, is assisting component suppliers in quality systems such as ISO 9000. These are quality standards in the automotive industry that are certified by way of the SABS ISO 9000 Registration Scheme, which clearly demonstrates their capability to consistently meet the international requirements as far as quality is concerned (DTI, 2000: 8). To comply with these means the ability to manufacture reputable, quality components. Other important quality ratings are ISO 14000 ratings, which are related to the environment. Having these ratings means that a firm has a well-documented and managed system in place to reduce any environmental impact that a product might have. Interviews for this research revealed that very few South African component companies have got these ratings in place. It is essential to have these ratings if component companies are exporting to European and North American markets. Given the trend towards huge export contracts by component suppliers to these markets, this is certainly of tremendous strategic importance. Although the cluster, (through its supplier development project team), attempted to create awareness and training, more could have been done in this area together with industry associations.

In the case studies on Silicon Valley in the USA and Sinos Valley in Brazil, industry associations were essential in the development of successful clusters. For example, in the analysis on the Brazilian shoe cluster, (see Section 3.3.3) mention was made of the extensive role played by industry associations in enhancing the capacity of local industry to respond to new export opportunities. These institutions played a major role in the development of Sinos Valley; especially in the period the cluster broke into new markets, a situation which has parallels to the context in which the South African motor industry is currently operating. It however seems that the two main industry associations have become more involved with the currently operational MIC Logistics Company.

Finally, the survey revealed that nearly 41,6% of the respondent component firms, and nearly all the three assembly firms considered that an improvement in regional infrastructure (roads, rail, ports) could have enhanced the effectiveness of the cluster initiative. There are however current attempts by government to remedy the situation through its Spatial Development Initiatives. As highlighted in Section 4.2.1 one of the main objectives of these initiatives is to crowd-in investment by restructuring regional infrastructure, hence the Coega and East London IDZs.

6.4.2 Related and supporting industries

Section 2.3.1.1 highlighted that these related and supporting industries can be industries within the production chain (i.e. customers and suppliers) or those with shared locational requirements. One of the potential advantages of the geographical proximity of world-class suppliers is that it facilitates the exchange of information and promotes a continuous exchange of ideas and innovations. Although, as already mentioned, both component suppliers and OEMs obtain a small percentage of their raw materials in the Eastern Cape, they however seem to obtain a relatively greater percentage of their components and sub-components from the region. At the same time, there appears to be an improvement in defined backward and forward linkages judging from the responses to the survey on the level of interaction between suppliers and their customers. For example, 58,3% of component suppliers indicated that they had suppliers offering assistance with problems arising from their products as well as explaining characteristics of their products, although only 33,3% of these firms indicated that their suppliers asked them for suggestions on how to improve their products. Similarly, the level of interaction between suppliers and OEMs seems encouraging, judging from the latter's response, although once again few of the suppliers asked for suggestions on improving their products. The latter does not bear well for fostering research and development (R&D), which is very low in the component industry (Onyango 1999:105). According to Duncan (1997:171), whatever little R&D that takes place in the automotive industry revolves around adapting components to suit the local terrain, or changing parts to suit the needs of the local assemblers.

Another potential advantage of having proximate suppliers is that of easier access to cheaper inputs (in terms of transport costs). To a certain extent this advantage cannot be entirely attributed to the cluster

initiative since the component suppliers were already located in close proximity to their suppliers at the time of its launch. What the initiative could have been able to impact on, is a further reduction, through mutual co-operation, in the costs of these inputs by further lowering inter-firm transaction costs by eliminating bottlenecks or cost drivers which are an example of static external economies of scale. Its impact in this area however, seems to have been somewhat limited judging from the 33,3% of surveyed component firms which confirmed this (probably those currently involved with the MIC). It seems to have had a greater impact on the OEMs, who as mentioned earlier, have benefited tremendously from an R23million savings in logistics that account for 15% of their total costs. In this particular context, the geographic concentration (as highlighted in the theoretical literature in Section 2.3.2.1) of the motor industry in the region enabled the industry to achieve a certain critical mass that is necessary to support such cluster-specific factor conditions as logistics.

The MIC Logistics Company therefore substantiates the notion of “co-operative competition” and the resultant collective efficiency espoused in the theoretical literature. It is an example of the rational interests of economic actors co-operating among each other, producing co-operation effects and increasing the collective efficiency of the system. Under the MIC logistics company, the three OEMs, together with Ford and two major suppliers, committed themselves to a joint profit-maximising level of logistics development in a “precompetitive stage”, remaining fierce competitors in the product market. In essence the MIC Logistics Company depicts a research joint venture (RJV) (analysed in Section 2.3.2.2). In this case firms share their information, eliminate duplication of effort, internalise spillover effects and co-ordinate their logistics expenditure so as to maximise the sum of their joint profits at the level of output where the industry marginal cost (MC) and marginal revenue (MR) are equal. Essentially, in the product market the OEMs face kinked average revenue curves, since the amount they sell depends, to a certain extent on the prices charged by other producers, that is, they cannot know what demand for their product will be. At the same time the OEMs are currently trading a relatively depressed market synonymous with a kinked average revenue curve.

Not only has the co-operation in logistics led to cost-savings, it has also led to the development of a cluster-specific logistics capability. For example, a dedicated information technology (IT) system – EDI tracking system – has been put in place by the MIC logistics company together with the appointed

service providers (Union Transport and Imperial). Consequently Nissan and BMW in Gauteng are considering joining the MIC, not only because of cost savings but also because of the IT link. At the same time, other stakeholders in the industry have realised that within the MIC, problems can be solved in a mutually beneficial manner, i.e. there is now a forum where component suppliers and OEMs can openly talk, since they have been able to establish some form of relationship. There has been a gradual increase in the number of suppliers considering joining the MIC once their individual contracts with service providers lapse. It should also be noted that the MIC had initially invited the component suppliers to join *en masse*, but it was faced with two main problems:

- some suppliers (as already mentioned) had individual contracts with service providers;
- when shipping companies discovered the intention of the MIC, they began to form cartels on various routes and increased their rates, or they approached suppliers and gave them alternative fixed, reasonable contracts which were difficult to rescind and which were sometimes exactly the same as those offered by the MIC.

Nevertheless, there is hope that the MIC will eventually incorporate 180 suppliers nation-wide to the logistics cluster. It is currently servicing the Supplier Council, the Export Council, NACAAM and NAAMSA. The intention is not only for the development of a national logistics capability, but for the MIC's activities to go beyond the motor industry in the Eastern Cape for example, to the wool, mohair, and tourism industry. The MIC has since approached these industries, but like the component suppliers, they are currently bound by their own individual contracts. Furthermore, given the nature of logistics, the MIC is working closely with Portnet, Spoornet as well as Coega and the East London IDZ in trying to upgrade the region's infrastructure, in particular its ports, airports and roads.

The MIC Logistics Company also clearly illustrates how the cluster focuses on the manner in which end-market industries (in this case the OEMs) drive the value chains of which they are a leading part. As highlighted in the theoretical literature, (see Section 2.3.2.2) this facet in clustering, which is consistent with the notion that propulsive industries are dominant economic actors, forms part of the growth pole analysis (Bergman & Feser 1999:6). These end-market industries, which usually have international links, can play an important role as diffusers of process and product innovation. At the same time, depending

on the degree of their market power to influence technology upgrades and improve manufacturing strategies to their suppliers, these end-market industries can, at least in part, drive overall cluster competitiveness. The OEMs in the MIC closely resemble this particular argument within the theoretical literature. They are encouraging global partnerships between local component suppliers global suppliers, and are even identifying these foreign partners for component suppliers in a bid to assist with technology upgrades.

6.4.3 Demand conditions

Section 2.3.1.1 again highlighted that the nature of demand is more important than the size of local demand. At the same time, successful clusters need to serve global markets, though this can only be achieved when sophisticated local customers work with suppliers to promote innovation. Demand conditions in South Africa have been relatively weak, which is one of the outcomes of the import substitution policies, which created uncompetitive firms and undiscerning customers. According to Monitor (1995: 18), weak machinery, industrial and supporting functions in South Africa created little world leading demand.

The surveyed component firms indicated that their main customer base is the domestic OEMs and the domestic aftermarket, 55% of which is concentrated in the Eastern Cape. With the advent of trade liberalisation, the OEMs have gradually improved the level of sophistication and quality of components they require in order to produce goods not only for the domestic market, but also for the growing foreign market. However, instead of working closely with local suppliers to promote innovation in components, it has been noted that the OEMs prefer foreign sources of components as evidenced by the percentage of components obtained abroad. Moreover, interaction between OEMs and suppliers appears to be more at arms length (to assist with problems arising from products supplied or to explain characteristics of products). Few firms, both component and OEMs indicated that their interaction was centred on generating ideas on how to improve their products or differentiate them (even artificially), a process which not only encourages learning-by-interacting but one which can generate a degree of competitiveness.

Except for DaimlerChrysler, VWSA and Delta's main customer base is in South Africa, though for all three, an insignificant amount is sold in the Eastern Cape. The domestic market for passenger cars is

however small, (being shared between 13 OEMs) and is stratified into the lower income and upper income. The former is characterised by weak, relatively pent-up demand, whilst the latter has strong purchasing power but still lags in terms of world trends (Monitor, 1995: 18). Nevertheless, there is an impending massive growth potential from the middle class (mainly black) developing in South Africa, a development that is fuelled by internet-enabled customers. There are 1,8million South Africans with access to the web (Cartoday, 2000b: 4), hence customers are becoming equipped with quality information and are also becoming very discriminating in their purchases. This bears well for demand conditions (i.e. improvement in innovation driven by sophisticated customers) in the motor industry, more so for the Eastern Cape motor industry, which has two OEMs (VWSA and Delta) with substantial domestic market share. At the same time, there is potential to create a middle class (through investment and hence job creation) in China and India, which currently have very small wealthy upper classes. This could add to South Africa's current export drive, (mainly led by DaimlerChrysler and VWSA), thus possibly leading to upgrading of demand conditions in the industry.

6.4.4 Firm structure, strategy and rivalry

Intense competition among local companies is one of the characteristics of a successful cluster and this is generally heightened by geographic proximity. Competition is also more effective when it involves non-price competition with local competitors and rivals rather than internationally more distant ones since the former encourages innovation and upgrading.

The surveyed firms revealed that their main competitors are located abroad 58,3%, whilst 41,6% were in other parts of South Africa and 33,3% in the Eastern Cape. The intensity of regional, geographically proximate competition is therefore compromised, judging from the low percentage of competitors located in the region. Nevertheless, when regional competition and competition from other parts of South Africa is combined (74,9%), the impression is that the pressure of domestic competition is significant in the industry. On closer inspection, however, this is not the case. The concentration of ownership and broad level of control in the industry, mitigate this competition, which has led to low rivalry (Monitor, 1995: 18). Moreover, many firms are battling to survive under the current pressure from international competition; hence for example, 16 NACAAM members (some of which were in the Eastern Cape) ceased operation between 1997 and 1998 (Barnes, 1998: 3). Although one could argue

that this therefore represents stiff competition in the industry, it is competition from internationally based firms (i.e imports) as opposed to local firms.

In terms of the theoretical literature (see Section 2.3.2.1), this does not bear well for local rivalry and competition since innovation and therefore competitiveness is strongly influenced by local, preferably proximate competitors whose visibility induce intense rivalry. Furthermore, a flow of new entrants (i.e. new firm formation) is essential to maintain competition. At the same time, the motor industry has been dominated by low cost strategies, driven by a commodities heritage, which has consequently reduced customer focus and rivalry (Monitor, 1995: 18). Hence at the Auto Africa Conference in October 2000, one of the prevailing sentiments was for the industry to become totally customer driven by essentially creating lifetime partnerships and customers (Cartoday, 2000b: 4).

The surveyed firms also indicated that their main competitors were large enterprises (66,6%), and 16,6% indicated that they were medium enterprises. This is consistent with Barnes' (1997: 3) observation that the automotive industry's high level of technological sophistication, its globalised nature, and the high barriers to entry that are generally evident, mitigate the proliferation of small owner-managed operations. At the same time, the institutional support structures for small and medium sized enterprises in South Africa still need to be fully developed. Another possible reason why the surveyed firms could have indicated that their main competitors are large to medium enterprises, is (as discussed in Section 6.3) the fact that they are either facing increasing competition from imports produced by large enterprises, or those exporting component firms are facing competition from large enterprises in their respective markets. However, as the theoretical literature revealed, the success of 'overseas' competitors can be discounted as 'unfair' competition (e.g. the value of their currency, government protection or subsidies) leading to lobbying for government support rather than a positive response (Porter, 1998: 152).

In terms of firm strategy, heavy protection has created government rather customer orientation, leading to poor strategy skills in the motor industry (Monitor, 1995: 18). There has also been a general unwillingness to use external sources of advice for strategy, a trend that has limited the strategic capability of the industry. As mentioned in the preceding section, dominant strategies have been those of

maintaining low costs at the expense of strategies, which continually improve productivity through innovation and adding value that are characteristic of a successful cluster. The latter strategies however, cannot work in an environment characterised by conflictual labour/management relationships (such as those in the motor industry) that tend to exclude strategies such like Total Quality Management, Just-in-time and radical restructuring. These conflictual labour relations in the industry were evident from the survey interviews conducted with labour and employers in the Eastern Cape.

For example, not only did labour view the cluster initiative as possibly compromising its position in the industry since it was a collaborative process, it also thought the cluster initiative would eventually evolve into a provincial bargaining forum for such issues as working conditions for example. Issues such as working conditions and wages should be decided at a national level, however labour thought that within the cluster initiative employers wanted to draw up a charter where labour would agree to stability in the industry and limit strike action. Labour maintained that their rights embodied in the labour legislation were being compromised within the initiative and at the same time there was insufficient focus on job creation and retention in the cluster's vision. Employers on the other hand considered labour to be one of the main challenges facing the motor industry, maintaining that investment would be reduced because of labour unrest, inflexibility, cost and relatively low productivity.

But, what about the earlier mentioned increasing trends towards high expenditure by both OEMs and component suppliers on skills development, coupled with the relative increase in labour productivity? As Barnes (1998: 30) puts it, the real problem with HRD in the motor industry in the Eastern Cape and nationally, escapes statistical analysis. These problems are rooted in low levels of trust that exist in the industry between management and labour, a sentiment that prevailed in the interviews conducted for this research. Relations are still antagonistic, and in many cases racially defined, with workers being given limited levels of responsibility. International trends seem to point towards increasingly multi-tasked and multi-skilled workers; a trend brought on by the generation of cellular production systems. At the same time, most international firms are developing an orientation towards team-working, self directed work teams, green areas, suggestion schemes, initiatives which require high levels of both worker and management commitment to the success of the firm (Monitor, 1995: 18). There is little indication of these necessary levels of commitment within not only the Eastern Cape motor industry but also the motor

industry in South Africa as a whole.

Finally, the theoretical literature also indicates that improving productivity, innovation and value-adding strategies also require a local environment, which encourages long-term commitment and investment. Clearly such an environment is deficient in the motor industry, hence the inclusion of a strategic investments project team as one of the enabling critical success factors under the cluster initiative. As highlighted in Section 5.5.4.1 the strategic investment team emphasised the need for supply side measures from government that encouraged investment. It emphasised the fact that long term investors are not only focussing on financial issues, but are also seeking assurances from government in areas, which are not directly related to financial input (crime, political instability).

6.5 Social Capital in the Eastern Cape motor industry as a means to economic development

Both Silicon Valley in the USA and Sinos Valley in Brazil are recognised as testimony to the notion of “social capital” in clusters as an essential element in economic development (see Section 3.2/3.3). The two case studies reveal that though social capital can emerge from socio-cultural identities (i.e. Sinos Valley), it can also emerge from purely commercial and business relations in a cluster (i.e. Silicon Valley).

The preceding analysis of the impact of the cluster initiative on the Eastern Cape motor industry and the state of the industry’s “diamond” thereof, does not seem to provide evidence of “social capital.” The overall impression is that the cluster process failed to have an impact on the motor industry. An attempt to develop public private partnerships appears to have been circumscribed by the relatively weak “diamond” elements of the motor industry. One of the key reasons for the demise of such collaborative endeavours lies with a culture of conflict and blame. On this basis, the Eastern Cape motor industry is not a good example of what Harrison (1993) as cited in Norton (1999: 4) calls, "post-neoclassical trust and harmony," in which regional growth is based on proximity, which leads to experience and trust, factors deemed to ultimately enhance regional growth.

The shortcomings of business and labour have already been cited, those of government on the other

hand, centred around, not so much a lack of participation, but weak co-ordination between national, regional and local government. This limited government's role as facilitator, despite providing funding for the initiative through the Sector Partnership Fund. There appears to have been a gap within government about the support and understanding of the cluster process. This led to a tremendous amount of frustration within the cluster initiative, which was already showing no signs of delivery in the short term. All these factors did not bear well for the creation of sustainable relationships characteristic of "social capital", particularly in an industry already characterised by high levels of mistrust.

It would do more harm than good however, to entirely dismiss the impact of the cluster process on the industry. The establishment of the MIC, typifies the operation of "social capital" in that relationships have been derived purely from commercial and business relations. Despite the fact that logistics is one area which was able to show tangible results in the short term, the fact that traditionally competing stakeholders were able to organise regional assets to build "collaborative advantage" through strong working relationships, holds potential for attempts to foster regional development (i.e. the intention is to include other non-automotive industries such as wool and mohair, tourism). As mentioned earlier (Section 6.4), such an undertaking obviously required a tremendous change in mindset, in this case, in a relatively short space of time.

Indeed in the short term the MIC's activities have not had much impact on the motor industry in the region. The important issue to realise, however, is the potential long-term advantages of creating a logistics capability for the industry and the region. At the same time, government's current restructuring and rationalisation could mean a stronger facilitation role to be played by government in any further cluster process in the future, a trend already evident in its continued role in the MIC and the establishment of a National Automotive Cluster. Essentially, the potential to create "social capital" to foster regional economic development in the region still exists.

6.6 Conclusion

This chapter set out to analyse the impact of the cluster process, through the Fish River Cluster Initiative, on the Eastern Cape's automotive industry. The overall impression is that, by and large, the cluster process had limited impact on the industry's performance, especially on the performance of component

suppliers.

Indeed the process was riddled with numerous problems. It is important to realise though that an initiative such as a cluster is normally slow to get off the ground. It does require energy and drive to get maximum benefits in the shortest possible time. Given the various positive factors developed by the cluster it has made notable contributions to the industry, especially in terms of creating industry capability.

CHAPTER 7

CONCLUSION

7.1 Introduction

The competitiveness of the automotive industry in the Eastern Cape is circumscribed by the legacy of import substituting (ISI) policies. This is currently exacerbated by the rapid liberalisation of the domestic market. Not only did the high levels of protection for the sector lead to poor manufacturing performance, high cost structures and low volumes, but attempts to remedy the situation under the new economic dispensation of export promotion, face increased pressure from international competition. This does not bear well for competitive advantage.

Indeed it is well known and documented that export growth is the way to secure a future for the automotive industry nationally and in the Eastern Cape (Barnes, 1998; Onyango, 1999; DTI, 2000). At the same time there is a need to rationalise models as well as maintaining labour stability in order to attract foreign direct investment (FDI) to the industry. In trying to achieve these objectives, which ultimately improve competitiveness, it is important to realise that the competitive ability of individual firms is increasingly governed by factors external to the firm. Essentially, the relationships between suppliers and sophisticated, demanding customers, and shared institutions such as trade associations or educational institutions, all contribute to the overall competitiveness and distinct competitive advantage of an industry.

7.2 Overview of arguments

As noted in Section 4.2, to complement the shift to export promotion under trade policy, current industrial policy has assumed a sectoral and spatial dimension. There has been increasing recognition of the need to improve industry performance and competitiveness in order to successfully implement export growth. Consequently, as noted in Section 4.2 the DTI has facilitated a series of cluster initiatives since 1997.

Since the late 1980s development strategists have given increasing attention to industry clusters. Consequently, there has been a shift in policies from those that are centred on individual firms, to those that acknowledge the fact that firms are interrelated both directly and indirectly. It is instructive to note that this change in

policy is broadly influenced by authors such as Porter (1990, 1998) and his "diamond" framework. The main thrust of the "diamond" is its dynamic nature and the manner in which its four attributes generate competencies beneficial to competitiveness. Moreover, as noted in Section 2.3.1.1, nations are leaders in those industries located in clusters characterised by effective networks. However, as noted in Section 2.3.2, in order to fully understand the concept of clusters, their origins, dynamic nature and usefulness as the basis of regional policy, one has to enrich Porter's "diamond" with a wide range of more developed ideas. Consequently, it was important to analyse in Section 2.3.2 the theories of external economies, agglomeration economies and location. Section 2.4 focused on the facilitation role that government can play in clusters. This was noted as requiring a shift from the traditional role of government (i.e. maintaining macroeconomic stability) to one of facilitation and providing cluster-specific policies. These cluster specific policies were extensively discussed in Section 2.5 in which clusters were described as holding potential to foster economic development.

To further validate the value of clusters, Sections 3.2; 3.3 and 3.4 provided examples of where the concept has led to increased competitiveness in various industries, which resulted in economic development. South Africa appears to have recognised the benefits derived from the cluster concept, judging from the case studies analysed in Section 4.4. It was noted however, that it is perhaps premature to consider them a resounding success, although they still provide valuable lessons.

Finally, the cluster in the Eastern Cape's automotive industry was described in Section 5.4, as well as the conditions governing its competitive ability. It was noted that geographic concentration is a strong defining feature of this cluster. However, as noted in Section 2.2, this does not necessarily imply the existence of a viable cluster. Although geographic proximity is a crucial enabling factor of clusters, it does not guarantee the existence of an effective, competitive cluster. More important are strong relationships built on trust and business transactions. Consequently, the Fish River Motor Industry Cluster Initiative was formed in April 1998 as noted in Section 5.5. Its overall objective was to create an internationally competitive automotive industry in the region, which amongst other things would lead to job creation.

The findings in Sections 6.2 - 6.4, based on a survey and interviews conducted for this research, revealed that the cluster initiative has had a minimal impact on the manufacturing performance of the industry, especially on the performance of the component manufacturers. On the other hand, the initiative notably led to the development of industry-specific capability in the form of a dedicated logistics network run by the MIC Logistics Company. This has resulted in substantial cost savings for the stakeholders in the MIC Logistics Company. Consequently, motor industry players in the rest of South Africa are considering joining the MIC in order to benefit, not only from logistics savings, but also to obtain an IT link. It was also indicated in Section 5.4 that the template developed in the Fish River Cluster initiative has been extended to a national level. Despite its shortcomings in generating tangible results on manufacturing performance in a short period of time, the initiative obviously has provided valuable lessons for the automotive industry.

7.3 Future role of cluster initiatives in the motor industry

As noted in Section 7.2, exports have been identified as the way to secure a future for the automotive industry. The Eastern Cape's motor industry seems to have realised the need for exporting activity in order to remain viable. This is reflected in the huge export contracts granted to the OEMs and to a lesser extent, the component manufacturers (see Section 5.4.4).

The survey for this research revealed, however, that this increase in export activity is not a direct result of the cluster initiative. International experience with industry clusters (i.e. Brazil) indicated that great potential exists for clustering to strengthen export activity (Section 3.4). In South Africa's case there is therefore a need to find ways in which cluster activity can further improve export competitiveness, especially through industry associations, parastatals, and the DTI. CIMEC in the Eastern Cape, a parastatal and stakeholder in the national automotive cluster initiative, seems to be promoting export activity in the region. More importantly, there is a need to continually develop the entire value chain within the industry, with particular emphasis on component suppliers.

Barriers to entry for component suppliers are very high (Barnes, 1997: 5). Coupled with the tendency towards integration of local OEMs into their global networks, this makes it increasingly difficult for local component suppliers to upgrade their technological capabilities to international standards. Government policy should therefore encourage domestic suppliers to upgrade their technological capabilities. This however, needs to be complemented by efforts from the private sector through cluster initiatives. It is encouraging to note that the combined automotive cluster initiative at national level has supplier development as one of its core objectives. One of the main goals under supplier development is to provide support to ensure the introduction of new technology and resources to meet international industry demands (DTI, 2000: 2). This is imperative, given that for example, the cluster initiative in the Eastern Cape has not resulted in any significant technology transfer, especially in the component industry (see Section 6.3.7).

Establishing joint ventures is one way of achieving technology transfers. It is therefore encouraging to note that the national automotive cluster initiative has realised the need to facilitate this, especially for small component manufacturers. This is because small suppliers are readily capable of dealing with the complexity of forming strategic alliances with international partners. The national automotive cluster initiative also appears to be trying to facilitate close cooperation between OEMs, suppliers and technical providers. It is also attempting to assist second tier suppliers into the global market and encouraging the development of third tier or small, medium enterprises, (DTI, 2000: 3).

To complement these efforts, there is also need to attract foreign direct investment (FDI). Indeed FDI will result in additional employment effects, but more importantly, foreign investment in a cluster may contribute to the development of the local production system (Altenburg & Meyer-Stamer, 1999: 1706). This is because new entrants in a cluster can invest in complementary activities, which therefore increase the division of labour along the value chain, strengthening positive externalities for already established firms. It is important to realise that strong interfirm cooperation will make the cluster less vulnerable to, "the volatility of footloose investment," (Altenburg & Meyer-Stamer, 1999: 1706). The IDZ and SDI programmes initiated by the government should be able to play a major role in attracting FDI. However, it is

important in some cases to avoid emphasis on subsidies in attracting investment. Instead, policy makers should strengthen the attractiveness of the cluster by enhancing interdependencies. It is also important to invest in dynamic locational advantages such as a specialised workforce or R&D facilities. Furthermore it is crucial to promote a given location abroad; hence CIMEC for example is actively undertaking this drive (DTI, 2000: 3).

Finally, it is important to develop cluster policy as a broader and dynamic view of competition based on the growth of productivity (see Section 2.4.2). The main tenet of such policy is bias towards attention being given to all clusters in an economy, as opposed to targeting particular industries and placing emphasis on subsidies. To effectively implement this requires the repositioning of local and provincial government in order to become more involved in regional development issues. This implies that various levels of government need to be encouraged to incorporate competitive strategies into their policies. At the same time, it is important the cluster initiatives do not become a series of initiatives, which are government driven i.e. a top-down-approach (TUA), given that the DTI appears to have facilitated a series on initiatives in various industries. In addition, it is important that government does not attempt to develop clusters from "scratch", although attention should be given to small and emerging clusters (see Section 2.4.2).

APPENDIX 1

QUESTIONNAIRE ON THE FISH RIVER MOTOR INDUSTRY CLUSTER

1. GENERAL BACKGROUND

1.1 In what part of the Eastern Cape are your operations principally located?

[i] Port Elizabeth

[ii] Uitenhage

[iii] East London

[iv] Other (Please specify) _____

1.2 Into which category in the automotive value chain would your firm fall?

[i] Original Equipment Manufacturer (OEM)

[ii] First tier manufacturer

[iii] Second tier manufacturer

[iv] After market producer

[v] All or some of the above (please specify) _____

1.3 What is the size of your labour force? Please tick one:

[i] 0 - 500

[ii] 500 - 1000

[iii] 1000 - 1500

[iv] 1500 - 2000

[v] over 2000

1.4 What is your firm's annual turnover?

[i] 0 - 100 million

[ii] 100 - 200 million

[iii] 200 - 300 million

[iv] 300 - 400 million

[v] 400 - 500 million

[vi] over 500 million

1.5 What is the ownership structure of your firm? (Please tick one)

[i] Wholly locally owned

[ii] Subsidiary of local company

[iii] Joint venture with foreign multinational corporation

[iv] Subsidiary of foreign multinational corporation

2. RELATIONSHIPS WITH SUPPLIERS

2.1 Location of suppliers: What **percentage** of inputs do you buy from the following?

Type of Input	LOCATION			AVAILABILITY	
	Local	National	Abroad	in quantity requested	
				Yes	No
				Yes	No
Raw materials					
a]					
b]					
Components:					
c]					
d]					
e]					
Machines:					
f] new					
g] second-hand					

2.2 Have your suppliers approached you to:

[i] offer assistance with problems arising from their products?

Yes

No

[ii] ask for suggestions on how to improve their products?

Yes

No

[iii] explain the characteristic of their products?

Yes

No

[iv] other purposes ? (specify)

Yes

No

2.3 Did the motor industry cluster initiative improve relations between OEMs and component suppliers?

Yes

No

3. MARKET

3.1 Specify to whom you sell your products as a % of total sales

[i] direct to domestic OEM

[ii] direct to foreign OEM dealer

[iii] domestic aftermarket

[iv] foreign aftermarket

[v] through a consortium with other manufacturers

[vi] other (specify)_____

3.2 Where are the outlets at which your products can be bought? Give answer as % of total sales

[i] local area

[ii] rest of the province

[iii] rest of the country

[iv] abroad

3.3 Did the motor industry cluster initiative manage to create a greater understanding of customer needs and market opportunities in South Africa and abroad?

Yes

No

4. INTER-FIRM COMPETITION

4.1 Where are your main competitors located?

[i] in the local area

[ii] in other parts of the country

[iii] abroad

4.2 Are your main competitors?

[i] large enterprises

[ii] medium enterprises

[iii] small enterprises

4.3 In order to out-compete your rivals, what are the three main factors (in order of importance) ?

[i] Price

[ii] Quality

[iii] New designs

[iv] Delivery

5. INTER-FIRM COOPERATION

5.1 Do you have any formal arrangements with other firms?

Yes

No

If yes, specify _____

5.2 How do your informal relationships usually come about?

- [i] family ties
- [ii] neighbours or spatial proximity
- [iii] friends or former colleagues from courses or work
- [iv] industry associations
- [v] other (specify) _____

5.3 Do you cooperate with other local producers in your industry in the following ways:

- [i] lending machinery
- [ii] product development
- [iii] marketing
- [iv] training workers
- [v] purchase of inputs
- [vi] transport of inputs and products
- [vii] other (specify) _____

5.4 Do you exchange ideas or discuss problems/strategies with other local automotive firms?

- [i] never
- [ii] occasionally
- [iii] often

6. ASSOCIATIONS

6.1 Does your firm belong to an industry association?

- Yes
- No

If yes, specify _____

6.2 Do you use the association for?

Service used	Often	Occasionally	Never
Advice in legal regulatory matters			

Information on other enterprises			
Courses and seminars			
Information Bulletins			
Other (specify)			

6.3 Did any of the industry association\ s provide leadership within the Fish River cluster?

Yes

No

7. GOVERNMENT POLICY

7.1 Was government's active participation and commitment forthcoming in the cluster initiative?

Yes

No

7.2 Did the cluster initiative manage to give better information about and access to DTI supply-side measures?

Yes

No

7.3 What government policies would have contributed most to raising the effectiveness of the cluster initiative?

_____ i] Greater macro-economic stability

_____ ii] Export incentives

_____ iii] Improved regional infrastructure

_____ iv] More and better training

_____ v] Improvement in basic education

8. VIEWS ON CLUSTERING

8.1 Did the desire to keep information proprietary restrict information flow within the cluster?

Yes

No

8.2 Did the process manage to overcome historical conflict and isolation within the industry and society ?

Yes

No

8.3 What is your perception of the benefits of the cluster initiative that have accrued to your firm?

[i] It has resulted in technology transfer

[ii] It has led to increased exports

[iii] It has resulted in an increase in turnover

[iv] It has led to an increase in labour productivity

[v] It has resulted in increased employment

[vi] It lowered inter-firm transaction costs by eliminating bottlenecks and cost drivers?

[vii] Other (specify)_____

8.4 Any other comments which you feel might be of value to the research?

THANK YOU FOR HAVING TAKEN THE TIME TO FILL OUT THE QUESTIONNAIRE

APPENDIX 2

LIST OF INTERVIEWEES FOR THE RESEARCH

NAME	ORGANISATION/ROLE IN CLUSTER INITIATIVE
Benedix Claasen	Machinery & Allied Industries Cluster Initiative: Department of Trade and Industry
Bill Davies	Department of Economic Affairs, Environment & Tourism
Chipfupa Tumelo	Department of Trade and Industry
Eddie Kitching	Consultant to Logistics Project team: Motor Industry Cluster Logistics Company
Ian Russell	Principal Consultant to the cluster initiative: Transformation Africa.
Johan Kruger	Consultant to Logistics Project team: Motor Industry Cluster Logistics Company
Louis Laubscher	Supplier Development Project Leader: Managing Director, First National Battery
Malibongwe Yokwe	South African Cluster Initiatives Resource Person: Centre for Investment and Marketing in the Eastern Cape (CIMEC)
Rodney Skelton	Manager - Logistics, Ford Motor Company of South Africa

Roger Pitot	Consultant to Strategic Investments Project team: National Association of Allied Component Manufacturers (NAACAM).
Silumko Nondwangu	National Union of Metal Workers South Africa (NUMSA)
Stewart Jennings	Human Resource Development Project Leader: Managing Director, Shatterprufe
Suren Singh	Director: Special Projects. Department of Trade and Industry
Zola Tshefu	Auto Sector Manager: Centre for Investment and Marketing in the Eastern Cape (CIMEC)

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