

# **The socio-economic impact of an inland container depot as part of a logistical hub in the Vaal**

Diana-Joan Viljoen, Honours B.Com. (Risk management)

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Supervisor: Prof. T.J.C. Slabbert

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## **ABSTRACT**

As developing economies become increasingly integrated with the global economy, their governments must make such integration work for their development objectives. In doing so, there would be a critical role for public goods that cross borders in bringing benefits that would not materialise by domestic public goods alone.

An example of this would be the envisaged inland container depot (ICD) which would be established as part of the proposed Vaal Logistical Hub (VLH), consisting of an international cargo airport, the Vaal International Airport (VIA) and an industrial development zone, the Vaal Industrial Development Zone (VIDZ). This study has shown that the VICD as part of a logistical hub would create more than 40 000 jobs and would increase household income by more than R 1 billion in the Vaal region.

## **OPSOMMING**

Soos ontwikkelende ekonomieë toenemend geïntegreerd raak binne die globale ekonomie, moet regerings van hierdie ekonomieë hulle ontwikkelings doelwitte aanpas. Hierdie aanpassings sal meebring dat die kritiese rol van openbare goedere wat oor grense beweeg, voordele bring wat nie deur binnelandse openbare goedere meegebring kan word nie.

'n Voorbeeld hiervan is die beoogde binnelandse behouerings depot wat as deel van 'n Vaal Logistieke Hub beoog word. Hierdie Vaal Logistieke Hub sluit in 'n Vaal Internasionale Lughawe en 'n Vaal Nywerheids Ontwikkelings Zone. Die studie toon aan dat so 'n logistieke hub meer as 40 000 werksgeleenthede sal skep en dat huishoudelike inkome in die Vaal gebied met meer as R 1 biljoen sal toeneem.

## TABLE OF CONTENTS

Acknowledgements .....	i
Abstract .....	ii
Opsomming .....	iii
Table of contents .....	iv
List of figures .....	xv
List of tables .....	xix
List of abbreviations .....	xxi

## CHAPTER 1: INTRODUCTION, PROBLEM STATEMENT AND OBJECTIVE OF THE STUDY

1.1	Introduction .....	1
1.2	Problem statement and importance of the study.....	1
1.3	Objective of the study .....	3
1.4	Theoretical perspectives on inland container depots and industrial development zones.....	4
1.4.1	Inland container depots.....	4
1.4.1	Functions of an inland container depot .....	4
1.4.2	Possible layout of an inland container depot.....	5
1.4.1.3	Logistical benefits of an inland container depot .....	6
1.4.2	Industrial development zones .....	7

1.4.2.1	Variations of industrial development zones.....	7
1.4.2.1.1	Spatial development initiatives.....	8
1.4.2.1.2	Export processing zones.....	8
1.4.2.2	Incentives offered by and objectives of industrial development zones .....	9
1.4.2.3	The South African industrial development zone programme .....	10
1.4.2.4	The economic impact of industrial development zones.....	12
1.5	Research methodology .....	13
1.5.1	Literature study .....	13
1.5.2	Empirical study.....	14
1.6	Outline of the study .....	14

## **CHAPTER 2: AN OVERVIEW OF THE VAAL ECONOMY**

2.1	Introduction .....	16
2.2	Composition of the Vaal area.....	16
2.3	Demographic profile of the Vaal.....	20
2.3.1	Racial composition of the Vaal population .....	22
2.3.2	Gender distribution in the Vaal.....	24
2.3.3	Age distribution of population within the Vaal .....	25
2.3.4	Levels of education attained in the Vaal .....	26
2.3.5	Levels of income within the Vaal.....	28

2.3.6	Poverty in the Vaal.....	29
2.4	The Vaal labour force.....	30
2.4.1	Theoretical aspects of employment and unemployment.....	30
2.4.1.1	Unemployment.....	30
2.4.1.1.1	Methods for the measurement of unemployment.....	31
2.4.1.2	Employment.....	32
2.4.2	Labour profile of the Vaal.....	33
2.5	Structural composition of the Vaal economy.....	36
2.5.1	Analysis by sector.....	38
2.5.1.1	Primary sector.....	38
2.5.1.2	Secondary sector.....	38
2.5.1.2.1	Manufacturing.....	38
2.5.1.2.2	Electricity/Gas/Water and Construction.....	38
2.5.1.3	Tertiary sector.....	39
2.5.2	Linkages and multipliers amongst the economic sectors of the Vaal.....	39
2.5.2.1	Primary sector.....	41
2.5.2.1.1	Agriculture.....	41
2.5.2.1.2	Mining and quarrying.....	42
2.5.2.2	Secondary sector.....	44

2.5.2.2.1	Manufacturing .....	44
2.5.2.2.2	Electricity/gas and water .....	46
2.5.2.2.3	Construction .....	47
2.5.2.3	Tertiary sector .....	48
2.5.2.3.1	Trade .....	48
2.5.2.3.2	Transport .....	49
2.5.2.3.3	Financing .....	50
2.5.2.3.4	Services .....	51
2.5.2.3.5	Tourism and entertainment .....	52
2.5.2.4	Summary of linkages and multipliers and relevance to the establishment of an inland container depot.....	53
2.5.2.4.1	Summary of linkages .....	53
2.5.2.4.2	Summary of multipliers .....	55
2.5.2.4.3	Relevance to the establishment of an inland container depot in the Vaal.....	56
2.6	Summary and conclusions .....	57

### **CHAPTER 3: GOVERNING LEGISLATION AND DRIVING STRATEGIES OF TRANSPORT INFRASTRUCTURE IN SOUTH AFRICA**

3.1	Introduction .....	59
3.2	Background to the commercial freight system in South Africa .....	59



3.3	South African transport and freight infrastructure legislation.....	62
3.3.1	White Paper on National Transport Policy .....	62
3.3.2	Land freight transport.....	64
3.3.2.1	Goals of land freight transport.....	65
3.3.2.2	Policy statements regarding key land freight transport issues .....	66
3.3.2.2.1	Infrastructure capital, operating and maintenance costs.....	66
3.3.2.2.2	Seamless intermodal services .....	67
3.3.2.2.3	Small, medium and micro enterprises.....	67
3.3.3	Draft White Paper on National Commercial Ports Policy .....	68
3.3.4	Policy statements regarding commercial ports .....	68
3.3.4.1	National development strategy for commercial ports .....	69
3.3.4.2	Improving the competitive position of South Africa's commercial ports.....	69
3.3.4.3	Supporting an integrated industrial strategy.....	70
3.4	Strategies for developing transport infrastructure and freight movement.....	70
3.4.1	The Moving South Africa strategy .....	70
3.4.1.1	Strategy recommendations regarding freight customers and movements .....	72
3.4.1.1.1	Customer needs and demand patterns.....	72
3.4.1.1.2	Performance objectives regarding the freight system .....	73

3.4.1.1.3	Performance challenges and strategic focus .....	74
3.4.1.1.4	Road freight systems .....	75
3.4.2	The National Freight Logistics Strategy .....	77
3.4.2.1	Situational analysis .....	79
3.4.2.2	Limitations of road transport.....	80
3.4.2.3	Inter-modal interfaces .....	81
3.5	Summary and conclusions .....	82

#### **CHAPTER 4: THEORETICAL ASPECTS OF FIRM LOCATION**

4.1	Introduction .....	85
4.2	Importance of firm location.....	86
4.3	The development of industrial location theory.....	89
4.3.1	Traditional theories of industrial location.....	89
4.3.1.1	The von Thünen land use model.....	89
4.3.1.2	Weber's theory of industrial location .....	91
4.3.1.3	Shortcomings of classical location theories .....	95
4.3.1.3.1	Profit maximisation.....	95
4.3.1.3.2	Personal factors .....	96
4.3.2	Modern industrial location theory .....	96
4.3.2.1	New economic geography .....	97

4.3.2.1.1	Increasing returns to scale .....	97
4.3.2.1.2	Agglomeration economies .....	98
4.3.2.1.3	Cumulative or circular causation mechanism.....	99
4.3.2.1.4	Relevance of new economic geography .....	101
4.4	Factors affecting locational decisions .....	103
4.4.1	Direct factors affecting location .....	103
4.4.1.1	Capital.....	104
4.4.1.2	Labour.....	104
4.4.1.3	Land and access to raw materials.....	105
4.4.1.4	Local infrastructure .....	106
4.4.1.5	Transportation.....	107
4.4.1.6	Markets .....	108
4.4.1.7	Entrepreneurship .....	109
4.4.1.8	Public policy .....	109
4.4.1.8.1	Regulations.....	109
4.4.1.8.2	Taxes .....	110
4.4.1.8.3	Financial incentives.....	110
4.4.2	Indirect factors affecting location.....	111
4.4.2.1	Industry clusters.....	111
4.4.2.2	Quality of life .....	112

4.4.2.3	Innovation .....	113
4.4.2.4	Consumer tastes.....	114
4.4.3	Categories of firm location factors.....	114
4.5	Input-output analysis.....	115
4.5.1	Description of the input-output model .....	116
4.5.2	Methodology .....	118
4.6	Summary and conclusions .....	123

## **CHAPTER 5: THE SOCIO-ECONOMIC IMPACT OF AN INLAND CONTAINER DEPOT AS PART OF A LOGISTICAL HUB IN THE VAAL**

5.1	Introduction .....	126
5.2	Results of the industry questionnaire .....	126
5.2.1	Origin and destination of goods within the Vaal .....	127
5.2.2	Mode of transport used and level of containerisation.....	131
5.2.3	Prevalent economic sector and business size within the Vaal .....	132
5.2.4	Statements regarding the establishment of the proposed Vaal Inland Container Depot.....	134
5.2.4.1	Statement 1: My business will make use of a container depot in the Vaal.....	134
5.2.4.2	Statement 2: A container depot in the Vaal would lead to cost reductions for my business .....	135

5.2.4.3	Statement 3: A container depot in the Vaal will solve the problem of delays for my business .....	136
5.2.4.4	Statement 4: A container depot in the Vaal will enable my business to carry fewer inventories .....	137
5.2.4.5	Statement 5: The VICD would enable my business to use international best practice .....	138
5.2.4.6	Statement 6: My business fully supports the establishment of a container depot in the Vaal .....	139
5.2.4.7	Statement 7: A container depot in the Vaal would lead to higher business confidence in the area.....	140
5.2.4.8	Statement 8: A container depot in the Vaal would create more jobs .....	141
5.2.4.9	Statement 9: A container depot in the Vaal will lead to a higher rate of industrial development in the area .....	142
5.2.4.10	Statement 10: My business will be exposed to more export opportunities with a container depot in the Vaal.....	143
5.2.4.11	Statement 11: My business will be exposed to more imported products with a container depot in the Vaal .....	144
5.2.4.12	Statement 12: My business will create more jobs as a result of a container depot in the Vaal .....	145
5.2.4.13	Statement 13: My business will expand because of a container depot in the Vaal.....	146
5.2.4.14	Statement 14: It is a good idea to combine the container depot with an international cargo airport and an industrial development zone .....	147

5.2.4.15	Statement 15: My business will use the container depot to export/import primarily to/from African countries.....	148
5.2.4.16	Statement 16: My business will use the container depot to distribute/procure goods primarily to/from other cities/areas in South Africa.....	149
5.2.4.17	Statement 17: My business will use the container depot to export/import primarily to/from international destinations other than Africa.....	150
5.3	Results of the freight forwarder questionnaire .....	151
5.3.1	Size of the undertaking .....	152
5.3.2	Current industry constraints .....	152
5.3.3	Preference of respondents.....	154
5.3.3.1	Would you make use of the proposed Vaal Inland Container terminal?.....	154
5.3.3.2	If the VICD is managed with less administrative constraints would you make use of it?.....	155
5.3.3.3	If the VICD rendered the same services as City Deep but at a lower fee structure would you make use of its facilities? .....	155
5.3.3.4	If the Vaal region does not have enough origin/destination demand, would you still make use of the VICD?.....	155
5.4	The socio-economic impact of a container depot in the Vaal.....	155
5.4.1	The effect on household income within the Vaal region.....	157
5.4	The effect on employment and poverty within the Vaal region.....	158

5.5	Summary and conclusions .....	159
-----	-------------------------------	-----

## **CHAPTER 6: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

6.1	Summary .....	162
-----	---------------	-----

6.2	Conclusion .....	167
-----	------------------	-----

6.3	Recommendations .....	169
-----	-----------------------	-----

<b>Bibliography</b> .....	<b>171</b>
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### **Annexures**

Annexure A: Classification of economic activities .....	180
---	-----

Annexure B: Industry Questionnaire .....	184
--	-----

Annexure C: Freight forwarder questionnaire .....	195
---	-----

## LIST OF FIGURES

### Chapter 1: Introduction, problem statement and objective of the study

Figure 1.1	An ICD layout.....	6
------------	--------------------	---

### Chapter 2: An overview of the Vaal economy

Figure 2.1	The Emfuleni municipal area.....	18
Figure 2.2	The Metsimaholo municipal area .....	19
Figure 2.3	The Midvaal local municipality.....	20
Figure 2.4	The population of the Vaal Triangle (2001) .....	22
Figure 2.5	Racial composition of the Vaal Triangle (2001).....	23
Figure 2.6	Gender distributions by municipal area .....	25
Figure 2.7	Age distribution of the Vaal population (2001).....	26
Figure 2.8	Level of education within the Vaal (post-school) (2001).....	27
Figure 2.9	Distribution of population amongst the various income groups (2001).....	28
Figure 2.10	Employment and unemployment in the Vaal (2001).....	33
Figure 2.11	Vaal employed population by sector of employment (2001).....	36

### Chapter 3: Governing legislation and driving strategies of transport infrastructure in South Africa

Figure 3.1	Global routes around international port systems .....	62
------------	---	----



Figure 3.2	Current and 2020 freight volumes and destinations .....	72
Figure 3.3	Top five features ordered by importance.....	73
Figure 3.4	The road freight network in South Africa .....	76
Figure 3.5	South African tonnages carried by road and rail (1993-2003).....	80

#### **Chapter 4: Theoretical aspects of firm location**

Figure 4.1	Zones of economic activity .....	90
Figure 4.2	Weber's locational triangle .....	92
Figure 4.3	Processing plant is far from the source of raw materials .....	93
Figure 4.4	Processing plant is moved closer to the raw material .....	94
Figure 4.5	Processing plant is located at the source of the raw material.....	94
Figure 4.6	Infrastructure and cumulative growth .....	101
Figure 4.7	The categories of factors influencing location decisions .....	115

#### **Chapter 5: The socio-economic impact of an inland container depot as part of a logistical hub in the Vaal**

Figure 5.1	Origin of products within the Vaal region.....	128
Figure 5.2	Destination of products within the Vaal region .....	128
Figure 5.3	Country of origin.....	130
Figure 5.4	Destination of products.....	130
Figure 5.5	Mode of transport used for delivery .....	131

Figure 5.6	Mode of transport used for procurement .....	132
Figure 5.7	Economic classification of business activities within the Vaal .....	133
Figure 5.8	Size of business undertakings in the Vaal.....	133
Figure 5.9	Statement 1: My business will make use of a container depot in the Vaal.....	135
Figure 5.10	Statement 2: A container depot in the Vaal would lead to cost reductions for my business.....	136
Figure 5.11	Statement 3: A container depot in the Vaal will solve the problem of delays for my business.....	137
Figure 5.12	Statement 4: A container depot would decrease inventories.....	138
Figure 5.13	Statement 5: International best practice can be used as a result of the VICD.....	139
Figure 5.14	Statement 6: My business supports the establishment of the VICD.....	140
Figure 5.15	Statement 7: Business confidence in the Vaal would increase as a result of the VICD.....	141
Figure 5.16	Statement 8: Jobs in the area would increase as a result of the VICD.....	142
Figure 5.17	Statement 9: Industrial development in the area would increase as a result of the VICD.....	143
Figure 5.18	Statement 10: Export opportunities will increase for businesses with the area .....	144
Figure 5.19	Statement 11: Business in the Vaal will be exposed to more imported products as a result of the VICD.....	145

Figure 5.20 Statement 12: My business would create more job opportunities in the Vaal as a result of the VICD .....	146
Figure 5.21 Statement 13: My business will expand because of a container depot in the Vaal .....	147
Figure 5.22 Statement 14: The VICD should be combined with a cargo airport and an industrial development zone.....	148
Figure 5.23 Statement 15: The VICD will be used to import/export primarily to/from African countries .....	149
Figure 5.24 Statement 16: The VICD will be used primarily to distribute/procure good from other regions in South Africa .....	150
Figure 5.25 Statement 17: The VICD will be used primarily to export/import from international destinations other than Africa .....	151
Figure 5.26 Size of the freight forwarders' business activities.....	152
Figure 5.27 Do constraints exist in the industry?.....	153
Figure 5.28 Are problems at City Deep likely to continue? .....	154

## LIST OF TABLES

### Chapter 2: An overview of the Vaal economy

Table 2.1 Total population of the Vaal (2001) .....	21
Table 2.2 Total population of the Vaal by racial group (2001).....	24
Table 2.3 Economic status and gender of the poor population .....	30
Table 2.4 Vaal employed population by sector of employment (2001) .....	35
Table 2.5 Economic structure of the Vaal region: GGP contribution (R million)	37
Table 2.6 Manufacturing activities in the Vaal (2003) .....	39
Table 2.7 Backward linkages of the different sectors of the Vaal economy (2000) .....	53
Table 2.8 Forward linkages of the different sectors of the Vaal economy (2000) .....	53
Table 2.9 Sectoral multipliers of the Vaal economy (2000).....	56

### Chapter 3: Governing legislation and driving strategies of transport infrastructure in South Africa

Table 3.1 Challenges in the current freight system.....	74
Table 3.2 Key challenges concerning inter-modal connectivity.....	81

### Chapter 4: Theoretical aspects of firm location

Table 4.1 Features of an input-output table .....	117
Table 4.2 A skeletal input-output table.....	120

Table 4.3 Direct input coefficient matrix..... 121

Table 4.4 Leontief inverse matrix..... 122

**Chapter 5: The socio-economic impact of an inland container depot as part of a logistical hub in the Vaal**

Table 5.1 Origin and destination of products within the Vaal..... 127

Table 5.2 Regional distribution of goods in the Vaal..... 129

Table 5.3 Containerisation of goods ..... 132

Table 5.4 Effect of revenue generated by the VICD ..... 157

## LIST OF ABBREVIATIONS

CDLH	:	City Deep Logistical Hub
CPS	:	Current Population Survey
CSA	:	Customs secured area
CSIR	:	Council for Scientific and Industrial Research
CSISS	:	Centre for Spatially integrated Social Science
CSS	:	Central Statistical Service
DoL	:	Department of Labour
DoT	:	Department of Transport
DTI	:	Department of Trade and Industry
EAP	:	Economically active population
EMA	:	Emfuleni Municipal Area
EPZ	:	Export processing zone
FDI	:	Foreign direct investment
GDP	:	Gross domestic product
GGP	:	Gross geographical product
HSL	:	Household subsistence level
ICD	:	Inland container depot
IDZ	:	Industrial development zone
ILO	:	International Labour Organisation

ISC	:	Industries and services corridor
Iscor	:	Iron and Steel Corporation of South Africa
JIA	:	Johannesburg International Airport
LFS	:	Labour Force Survey
MDP	:	Manufacturing Development Programme
MLM	:	Midvaal local municipality
MMA	:	Metsimaholo Municipal Area
MSA	:	Moving South Africa
NEG	:	New economic geography
NFLS	:	National freight logistics strategy
NPA	:	National port authority
OHS	:	October Household Survey
PDC	:	Portland Development Centre
RDP	:	Reconstruction and Development Programme
RTQS	:	Road transport quality system
SADC	:	Southern African Development Community
SASOL	:	South African Synthetic Oil Limited
SDI	:	Spatial development initiatives
SIC	:	Standard Industrial Classification of all Economic Activities
SMMDP	:	Small and Medium Manufacturing Development Programme

SMME	:	Small, medium and micro enterprises
Stats SA	:	Statistics South Africa
TAFF	:	Transvaal Association of Freight Forwarders
UNCTAD	:	United Nations Conference on Trade and Development
VAT	:	Value-added tax
VIA	:	Vaal International Airport
VICD	:	Vaal Inland Container Depot
VIDZ	:	Vaal Industrial Development Zone
VLH	:	Vaal Logistical Hub
VRG	:	Vaal Research Group
VT	:	Vaal Triangle
WTO	:	World Trade Organisation



# **CHAPTER 1: INTRODUCTION, PROBLEM STATEMENT AND OBJECTIVE OF THE STUDY**

## **1.1 INTRODUCTION**

This study investigates the feasibility of the establishment of an inland container depot (ICD), known as the Vaal Inland Container Depot (VICD) in the Vaal area. The Vaal area comprises the Midvaal Local Municipality (MLM), the Emfuleni Municipal Area (EMA) and the Metsimaholo Municipal Area (MMA), situated in southern Gauteng and northern Free State.

The envisaged ICD will be established as part of the proposed Vaal Logistical Hub (VLH), which will consist of an international cargo airport, the Vaal International Airport (VIA) and an industrial development zone, the Vaal Industrial Development Zone (VIDZ). Together these three undertakings will facilitate the expansion of trade and industry within the area as well as supplying various socio-economic benefits to the inhabitants of the Vaal region.

The establishment of an inland container depot is viewed as an infrastructural development strategy that is aimed at introducing new business opportunities to the Vaal area as well as a means of expanding local markets by facilitating the cross-border flow of goods through the development of related cross-border transport infrastructure.

## **1.2 PROBLEM STATEMENT AND IMPORTANCE OF STUDY**

As developing economies become increasingly integrated with the global economy, their governments must make such integration work for their development objectives. In doing so, there would be a critical role for public goods that cross borders in bringing benefits that would not materialise by domestic public goods alone, states Fujimura (2004:3).

There has been an increasing realisation that regional integration cannot take place without regional transport and infrastructure. Governments should have their own development policies and investment priorities that suit their circumstances. However, it is often the physical infrastructure development, particularly in the transport sector, that is high on the priority list. As transport infrastructure does not end at local boundaries for their users it becomes necessary to develop cross-border infrastructure and associated institutions, as well as to maximise the economic benefits of domestic infrastructure (Fujimura, 2004:3).

In South Africa this is evident by the development of the Gauteng province's Blue IQ projects, which is a strategy aimed at the development of domestic industries. Blue IQ is an important driving force and dynamic catalyst for funding and promoting strategic investment in Gauteng, which is considered the economic heartland of modern South Africa. More specifically, Blue IQ is a multi-billion rand initiative of the Gauteng Provincial Government to invest in economic infrastructure development in identified mega projects in tourism, smart industries and high value added manufacturing (Blue IQ, 2002). The core responsibility of Blue IQ, states Maharaj (2001), is to develop world-class infrastructure, implement marketing and investment strategies, reduce bureaucratic red tape for investors and suppliers, and encourage skills training and resource building in the areas of technology.

Rogerson (2004:187) states that in terms of the economic infrastructure linked to the mega projects within the region, the chosen institutional vehicle, Blue IQ, was seen as making a significant break from traditional planning approaches. In the area of transportation infrastructure development under Blue IQ, three of the most prominent projects undertaken by the initiative was the development of the Johannesburg International Airport (JIA), City Deep container terminal and most recently, the Gautrain Rapid Rail Link.

The importance of logistics is further carried through into the logic of upgrading and developing the potential of the concentration of container terminals, storage and distribution facilities within the City Deep area, states Fuchs (2001). The same can be said for other areas, such as the Vaal, where the ability to get products produced within the area to potential markets has become increasingly vital to the growth and sustainability of the activities taking place within the region.

For this reason, infrastructural development should be at the centre-point of investment focus. The benefits that could accrue as a result of these infrastructural investments include:

- Income generation for individuals and enterprises within the study area;
- New enterprises that will take root as a result of the increased income earning capacity of the region;
- The promotion of local employment creation;
- Lower costs to freight forwarders; and
- The opportunity of expanding local businesses to new markets (Fuchs, 2001).

### **1.3 OBJECTIVE OF THE STUDY**

The objective of the study is to measure the impact of the inland container depot on the inhabitants of the Vaal area and its potential to create new opportunities for growth and development.

## **1.4 THEORETICAL PERSPECTIVES ON INLAND CONTAINER DEPOTS AND INDUSTRIAL DEVELOPMENT ZONES**

By studying the proposed VICD as part of a logistical hub, an analysis must be performed with regard to the theoretical aspects of an inland container depot (ICD) and an industrial development zone (IDZ).

### **1.4.1 Inland container depots**

An inland container depot (ICD) is defined by DC (2005) as a common user facility with public authority status that is equipped with fixed installations and offering services for the handling and temporary storage of import/export laden containers as well as empty containers carried under customs control and with customs agencies to clear goods for home use, warehousing, temporary admissions, re-export, temporary storage for onward transit and outright export.

### **1.4.1 Functions of an inland container depot**

According to DC (2005), the ICD performs the same functions as a port except for the loading and unloading of ships. In this way, a container will bypass the port container depot and be processed nearer the consignee of the shipper. The primary functions can be summed up as follows:

- Receipt and dispatch or delivery of cargo;
- Stuffing and stripping of containers;
- Transit operations by rail/road to and from serving ports;
- Customs clearance;
- Consolidation and desegregation of cargo;
- Temporary storage of cargo and containers;

- Reworking of containers; and
- Maintenance and repair of container units (DC, 2005).

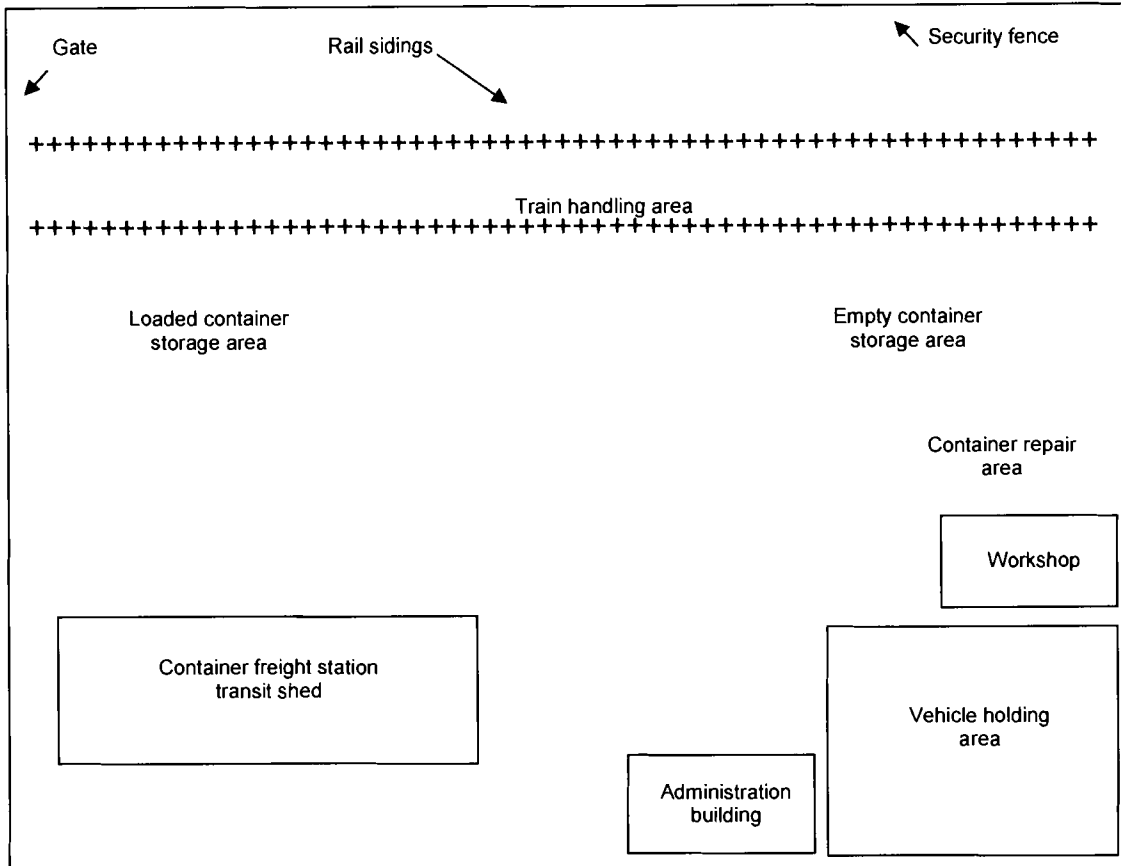
#### **1.4.2 Possible layout of an inland container depot**

The United Nations Conference on Trade and Development (UNCTAD, 1991) suggests that the possible layout of an ICD should be as in Figure 1.1. Central to the proposed ICD layout is the train handling area as well as the loaded and empty container storage areas. Here the main activities of the ICD take place, with containers being received and stored until shipment. Any further processing of the goods that must be undertaken is conducted in these areas before the containers are moved to the container freight station transit shed where they await shipment.

Directly opposite the empty container storage area is the container repair area where any necessary repairs are undertaken on the containers before use. A workshop, located near this area facilitates these repairs, states UNCTAD (1991).

The administration building handles all the necessary paperwork regarding the containers such as customs clearance, offloading and repackaging the products, etc. The vehicles that are used to transport the freight are kept at the vehicle holding area where the vehicles used are prepared for shipment or are received for delivery. A security fence and gate encloses the entire container depot including the rail and road access points.

**Figure 1.1 An ICD layout**



Source: UNCTAD (1991)

### 1.4.1.3 Logistical benefits of an inland container depot

DC (2005) states that the main benefits of an ICD are as follows:

- Concentration points for long distance cargoes and its unitisation;
- Service as a transit facility;
- Customs clearance facilities available near centres of production and consumption;
- Reduced levels of demurrage and pilferage;
- No customs required at gateway ports;

- Issuance of through bill of lading by shipping lines, hereby resuming full liability of shipments;
- Reduced overall level of container movement;
- Competitive transport costs;
- Reduced inventory cost; and
- Increased trade flows (DC, 2005).

#### **1.4.2 Industrial development zones**

The Department of Trade and Industry (DTI, 1992:2) describes an industrial development zone as a purpose built industrial estate linked to an international port or airport, and as a zone designated for new investment into export-driven industries.

According to Hartzenberg (2001:772) government will license operators to develop and run the IDZs which are to be duty-free operating environments with quality infrastructure. IDZs will consist of two zones. One zone will be a customs secured area (CSA) with a dedicated customs office providing rapid inspection and clearance services. CSA-based firms will be eligible for duty-free import of production-related raw materials and inputs. They will qualify for zero-rating on value-added tax (VAT) for supplies procured from South Africa and have the right to sell in South Africa by paying normal import duties on finished goods. The other zone will be an Industries and Services Corridor (ISC), an industrial and office park occupied by service providers to CSA firms.

##### **1.4.2.1 Variations of industrial development zones**

There are other economic areas that are similar to IDZs but have several distinguishing characteristics that set them apart from an IDZ. They are as follows.

#### **1.4.2.1.1 Spatial development initiatives**

Spatial development initiatives (SDIs) encourage private sector investment in regions with under-utilised development potential sectors as diverse as mining, agriculture and tourism (DTI, 1999:2). According to Newman (1998:42), the difference between SDIs and IDZs is that SDIs are broad geographical areas within which different economic activities can take place, while IDZs are specific, smaller areas, targeted for industrial export manufacturing. SDIs are designed to support the focus of the government's industrial policy on export growth, to underpin the industrialisation of Southern Africa and to promote output and employment growth.

Jourdan (1998:717) states that SDIs are targeted interventions by central government to unlock economic potential and facilitate new investment and job creation in a localised area or region. Hartzenberg (2001:771) argues that the SDI programme aims to unlock the inherent potential of a specific location through:

- Investment in infrastructure (through private-public ownership).
- Investment in anchor projects (private sector).
- Removal of barriers to investment (administrative, legal).
- Political focus (by a political champion).

#### **1.4.2.1.2 Export processing zones**

Nel (1994:2) describes export processing zones (EPZs) as being independent bonded areas where less rigorous environmental and labour standards are often employed, while IDZs are subject to South African environmental and labour legislation. An EPZ is located in a specific geographical area within a country where various economic activities are promoted by a set of policy instruments that are not generally available to the rest of the country. EPZs can serve as a



catalyst for the development of strategic recourse intensive industries as well as the clustering of related industries.

It can be a node from where further developments can spill over to the rest of the country (Dippenaar, 2001:18). Ge (1999:1) acknowledges that by opening up EPZs in countries, governments help the economy to break away from an inward-looking growth path, to facilitate international flows of trade, capital and technology, and to increase the pace of economic development and structural transformation. The activities in EPZs are diverse although the focus is mainly on the promotion of export-orientated manufacturing.

According to Ligthelm and Wilsenach (quoted by Nel, 1994:99), there are two types of EPZs: Firstly; closed EPZs which is an EPZ that can be a fenced-off zone, usually next to a port, which could be effectively independent of the host country. Secondly; an EPZ can also be a region in a country where a firm qualifying for the scheme may settle anywhere in that region (open EPZ). This is the cheapest form of an EPZ as it uses existing infrastructure and doesn't need a separate new industrial area.

#### **1.4.2.2 Incentives offered by and objectives of industrial development zones**

IDZs offer several incentives to those businesses which operate within the IDZ environment (DTI, 2004):

- Direct links to an international port or airport;
- World-class infrastructure, specially designed to attract tenants;
- Suitability for export-orientated production;
- Dedicated customs support services to expedite excise inspection and clearing;
- Duty-free importation of production-related raw materials and inputs;

- A zero rate of VAT on supplies procured from South African sources;
- Import status for finished goods which are sold into South Africa;
- Government incentive schemes;
- Reduced taxation and exemption for some activities or products; and
- Access to the latest information technology for global communications.

In order to provide the incentives mentioned above, Dippenaar (2001:180) states that an IDZ in South Africa should have the following objectives:

- An instrument for the development of strategic resource intensive industries, vertical integration and increased value added manufacturing activity;
- An initiative to optimise the use of existing infrastructure;
- A contribution to employment generation;
- A method for leading edge technology and technological transfer and to obtain foreign exchange by attracting foreign direct investment (FDI); and
- A catalyst for facilitating small, medium and micro enterprise (SMME) participation in exports.

#### **1.4.2.3 The South African industrial development zone programme**

According to Kleynhans (2003:200) IDZs provide a further mechanism to facilitate investment in complex manufacturing. They are designated to attract FDI for export orientated manufacturing production and it is located within designated SDI regions so as to maximise the natural linkage between these two programmes. IDZs are based on industrial concentration, which is becoming increasingly important in the global economic environment, and attracts manufacturing FDI without offering foreign investors further incentives.

The DTI (2004) states that the factors promoting the establishment of IDZs around the world are the need for platforms that provide a business environment offering speedy decision-making, attractive benefits, high quality inputs at competitive rates and standards for labour and the investment environment that give easy access to world markets.

IDZs could serve as a catalyst for the development of strategic resource intensive industries as well as the clustering of related industries. Light manufacturing and assembly through to capital-intensive natural resource based industries is what the South African government has in mind for IDZs (DTI, 2004).

New investments could benefit from IDZs through (Dippenaar, 2001:168):

- An attractive regulatory regime and investment facilitation services provided by zone protectors;
- Duty free imports of capital goods and inputs;
- Value added tax (VAT) exemption for exports; and
- Access to government's incentive mechanism compliant with World Trade Organisation (WTO) guidelines.

IDZs are supported by developments in many emerging and developing countries where it is becoming difficult to attract foreign direct investment (FDI) without offering foreign investors further incentives (Hanival & Hirsch, 1998:29). According to Dippenaar (2001:168) the location of an IDZ could also play an important role in achieving international competitive advantages. However, environmental management plans need to be in place to ensure that environmental standards will be maintained for every zone and be compliant with national legislation. There are various IDZs located in South Africa, which has a vast impact on the economy of the country.

#### **1.4.2.4 The economic impact of industrial development zones**

According to Dippenaar (2001:193) South Africa is a middle-income developing country with an abundant supply of natural resources, well-developed financial, legal, communications, energy and transport sectors, a modern infrastructure, and a stock exchange that ranks among the ten largest in the world. Kleynhans (2003:199) states that the main locational advantages of an IDZ reside in the quality of its physical, transport and communications infrastructure, in the services of a dedicated, investor-friendly IDZ management.

The development of IDZs will potentially influence all aspects of community life in the less developed regions argues Kleynhans (2003:200). It will lead to structural changes in the formal and informal commercial and industrial sectors, as well as social structural change of the advanced and disadvantaged sectors of the economic community. The process will involve the urban and rural structure. It will entail industrial and commercial development; housing schemes, provide health and educational facilities, reorganisation of administrative bodies as well as the establishment of regional public services.

IDZs provide a further mechanism to facilitate investment in complex manufacturing. They are designed to attract foreign direct investment (FDI) for export orientated manufacturing production and it is located within designated SDI regions so as to maximise the natural linkage between the two programs. Dippenaar (2001:194) concurs by stating that countries are best placed to benefit from opportunities offered by globalisation through policies that support outward orientated trade, investment and exchange rate policies. South Africa could address these challenges through sound macro-economic principles of which IDZ are one of many strategies.

Kleynhans (2003:200) proposes that IDZs are based on industrial concentration, which is becoming increasingly important in the global economic environment, and attracts manufacturing FDI without offering foreign investors further incentives. According to Dippenaar (2001:195) sustainable development paths

can only be achieved if the province can succeed in becoming internationally competitive. For this reason, Kleynhans (2003:200) states that various schemes that have far reaching development implications are established. There are for instance, employment schemes, the multi-shift scheme, normal finance, venture capital scheme, accelerated depreciation scheme, an emerging entrepreneur scheme, capacity building support, business loans for retail financial intermediaries, the Manufacturing Development Programme (MDP), the Small and Medium Manufacturing Development Programme (SMMDP) and finance for export of capital goods and services.

The elimination of trade and investment barriers contributes towards ensuring contestable markets. The advantages of liberalisation can be destroyed by restrictive business practices and the implementation of the IDZ strategy can counteract this. The IDZ programme connects with a strong current in industrial policy that increasingly views sub-national as key sites for developmental intervention and the provision of reliable economic infrastructure. For this reason IDZs are designed to support the focus of the government's industrial policy on export growth, to underpin the industrialisation of southern Africa and to promote output and employment growth (Kleynhans (2003:200)).

## **1.5 RESEARCH METHODOLOGY**

### **1.5.1 Literature study**

Primary sources such as reports, articles and government publications were consulted to obtain the legislation regarding the establishment of ICDs as well as possible strategies implemented by the government to further economic growth and development through infrastructural development and in particular, logistical infrastructure development.

Secondary sources such as journals and textbooks were used in order to obtain the theoretical basis regarding economic growth and industrial development

strategies as well as the theory behind business location and the reasons for regional growth.

### **1.5.2 Empirical study**

A survey of businesses within the Vaal area was conducted in order to test the possible benefits that would be derived from the VICD. The origin and destination of inputs or final products was also collected by the questionnaire in order to determine the ultimate users of the facilities that would be provided by the VICD. This is done by categorising the businesses that were surveyed by size and economic sector.

A questionnaire was also sent out to various freight forwarders that form part of the Transvaal Association of Freight Forwarders in order to gain insight into the current situation of the market with regard to possible constraints, and their opinion as to the feasibility of the establishment of the VICD.

## **1.6 OUTLINE OF THE STUDY**

Chapter 1 (*Introduction, problem statement and objective of the study*) provides a brief introduction of the definition and uses of an inland container depot (ICD) as well as the benefits that can accrue to those who make use of this facility. The problem statement, objective of the study and the research methodology used is discussed. A brief chapter outline is also provided.

Chapter 2 (*An overview of the Vaal economy*) consists of a socio-economic overview of the study area. The current socio-economic situation of the area is analysed in terms of poverty levels, rates of unemployment, and distribution of employment amongst the various demographic groups. The backward and forward linkages of each economic sector are also discussed and an analysis of the multiplier for each sector is given.

Chapter 3 (*Governing legislation and driving strategies of transport infrastructure in South Africa*) describes the vision of the South African government with regard

to transport infrastructure and the role that it is meant to play in the economy. The White Paper on National Transport Policy will form the basis of this analysis, with reference given to the White Paper on National Commercial Ports Policy, the Moving South Africa strategy and the National Freight Logistics strategy.

Chapter 4 (*Theoretical aspects of firm location*) lays out a theoretical basis for the development of business in certain regions and the role that transportation infrastructure plays in these theories. Here attention is paid to the classical location theories as well as modern theories of locational development such as the New Economic Geography proposed by Paul Krugman.

Chapter 5 (*The socio-economic impact of an inland container depot as part of a logistical hub in the Vaal*) analyses the socio-economic impact of the project. The origin and destination of goods that are imported and exported into the Vaal is discussed. The opinions of the ultimate users of the VICD facilities, i.e., freight forwarders, are analysed and discussed.

Chapter 6 (*Summary, conclusions and recommendations*) provides a summary of the study. Also conclusions are drawn and recommendations are given.

## **CHAPTER 2: AN OVERVIEW OF THE VAAL ECONOMY**

### **2.1 INTRODUCTION**

In this chapter the study area is fully described and illustrated. The Vaal is analysed as an entire economic unit to gain an overall picture of the current socio-economic situation of the Vaal.

The focus of this chapter is to analyse the current position of the Vaal economy and also to highlight any possible areas of development that could bring about a greater level of output within the area and promote the socio-economic development of the inhabitants of the Vaal.

The sectoral contributions of the study are discussed in order to illustrate the prevalent economic activities within the region and to indicate whether the proposed Vaal Logistical Hub will be an extension of current activities within the Vaal.

### **2.2 COMPOSITION OF THE VAAL AREA**

The Vaal area comprises the Emfuleni, Midvaal and Metsimaholo municipalities, which are situated in the in the southern part of Gauteng and the northern part of the Free State respectively. These areas form a cohesive and intensively integrated economic unit that cannot be separated by politically demarcated boundaries (Slabbert & Slabbert, 2002b:3).

People living in Metsimaholo and Midvaal are, too a great extent, shopping, working or searching for jobs in Emfuleni and the same could be said for the reverse, states Slabbert (2004:1). There is thus a high incidence of commuting between these areas. People commute daily between the different centres for work and for trade and as a result a well developed road and transport system exists in the EMA, linking the areas of economic activity with its sources of labour, inputs and markets, observes Slabbert and Slabbert (2002b:3). For this reason unemployment, poverty and various other socio-economic factors



prevalent in the Vaal cannot be studied in isolation because any action that is taken in the one municipality will undoubtedly have an effect on those living in the other two.

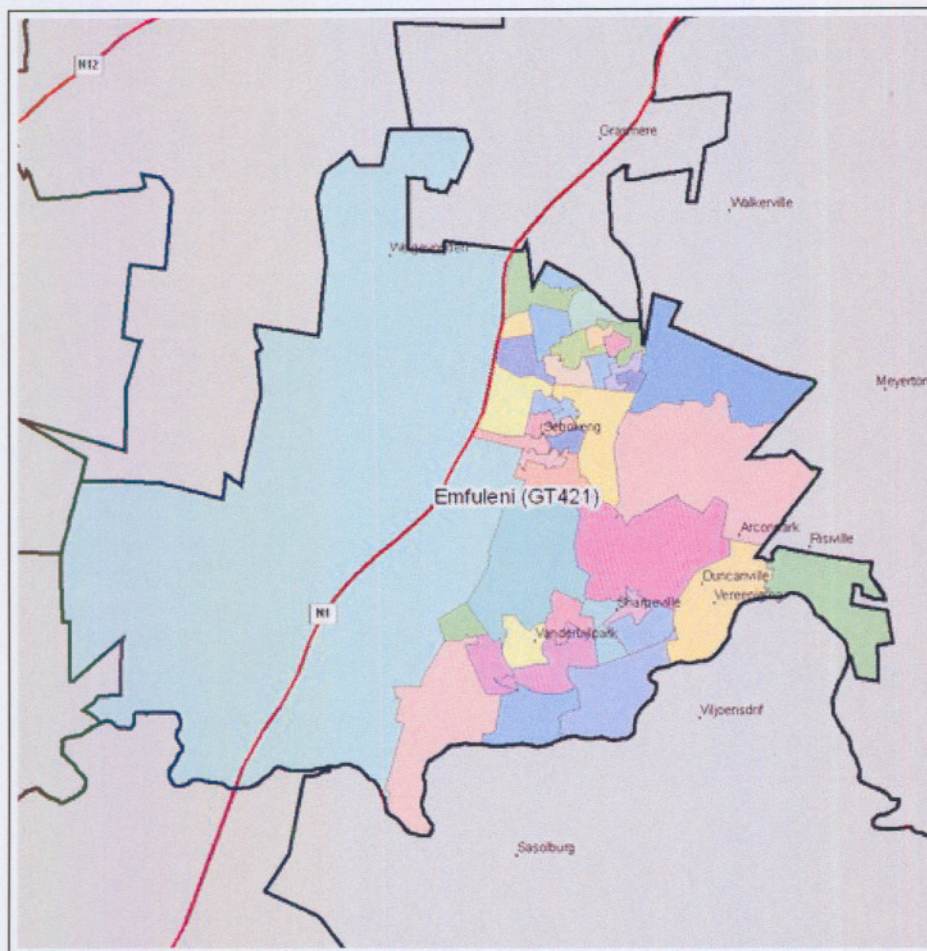
The Vaal economy is characterised by areas of economic activity closely surrounded by medium to high income areas with adequate urban facilities and economic centres. Low income areas are located on the urban boundaries of the Vaal and are in some cases isolated with little or no economic development at all. According to Slabbert and Slabbert (2002b:3) these low income areas are almost totally dependent on the economic activities taking place in the high to medium income areas.

The Emfuleni municipal area (EMA) consists of the following suburbs and townships:

- Boipatong;
- Boitumelo;
- Bophelong;
- Evaton;
- Rust ter Vaal;
- Roshnee.
- Sebokeng;
- Sharpville;
- Tshepiso;
- Vanderbijlpark; and
- Vereeniging.

Figure 2.1 shows the location of the EMA, as well as the various suburbs and townships that can be located in the area based on the municipal boundaries set out by the Demarcation Board in 2003.

**Figure 2.1** The Emfuleni municipal area



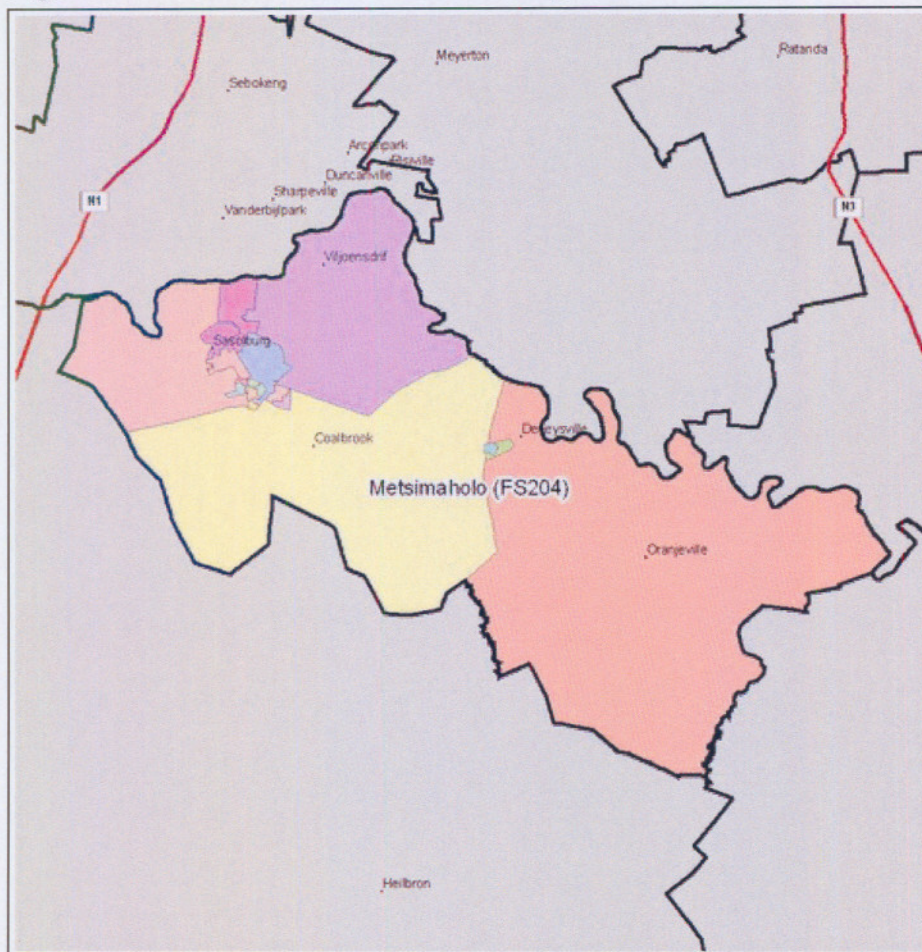
Source: Demarcation Board (2003)

The Metsimaholo municipal area (MMA), situated in the northern part of the Free State, includes the following suburbs and townships:

- Coalbrook;
- Deneysville;
- Oranjeville;

- Refenkgotso;
- Sasolburg;
- Viljoensdrif; and
- Zamdela.

**Figure 2.2 The Metsimaholo municipal area**

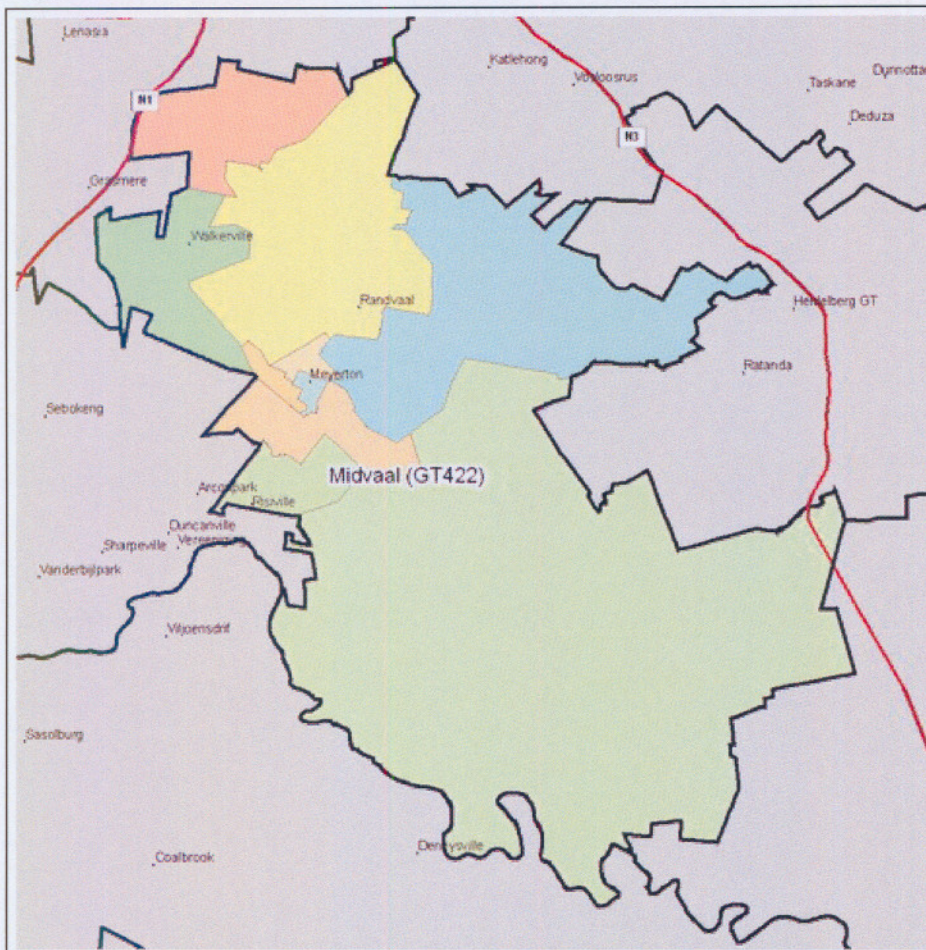


Source: Demarcation Board (2003).

The location of the MMA is illustrated in Figure 2.2, which is based on the new municipal demarcations set out by the Demarcations Board in 2005. The Midvaal local municipality (MLM) can be seen in Figure 2.3. Suburbs that can be located in the MLM include:

- Meyerton;
- Randvaal;
- Risiville; and
- Walkerville.

**Figure 2.3 The Midvaal local municipality**



Source: Demarcation Board (2003)

## **2.3 DEMOGRAPHIC PROFILE OF THE VAAL**

Any change in the economy of a region will have a great effect on its inhabitants in terms of employment, expenditure patterns, income and poverty levels, etc.

(Slabbert & Slabbert, 2002b:3). For this reason it is of great importance to have an adequate picture of the current demographic profile of the area to determine the largest concentration of the population, as well as population specific data such as racial, gender and age distribution. According to Statistics South Africa (Stats SA, 2003) the estimated population of the Vaal, based on Census 2001 data, was 839 039.

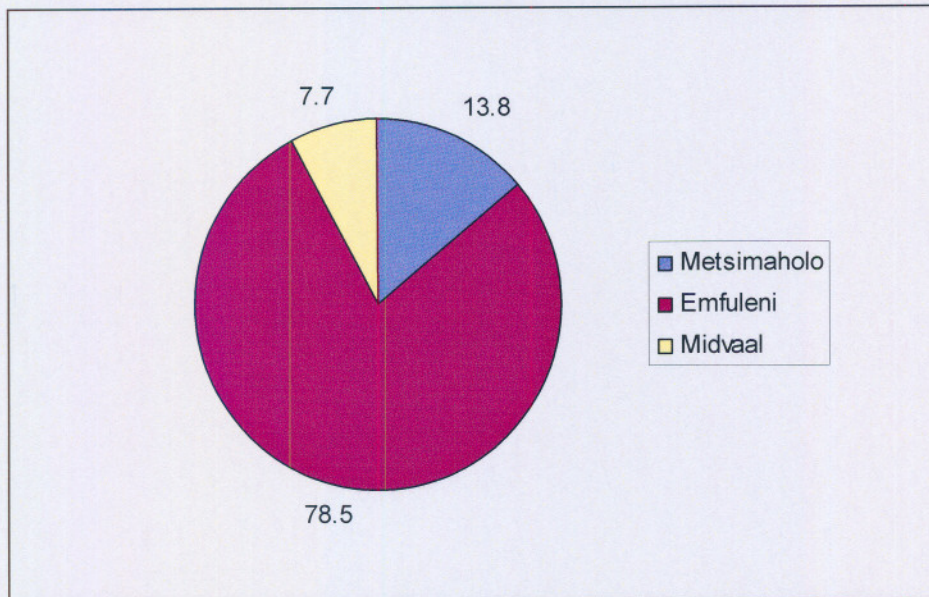
**Table 2.1 Total population of the Vaal (2001)**

<b>Municipal area</b>	<b>Population</b>
Emfuleni	658 420
Metsimaholo	115 977
Midvaal	64 642
<b>Total</b>	<b>839 039</b>

Source: Calculations based on Census 2001 data (Stats SA, 2003)

Based on the Census 2001 estimates, Table 2.1 shows the total population numbers for the EMA, MMA and MLM respectively. Emfuleni has the largest percentage of the total Vaal population at 658 420. Metsimaholo's and Midvaal's population was estimated at 115 977 and 64 642 respectively. The percentage distribution of the population in each municipal area in the Vaal is illustrated by Figure 2.4. Midvaal has the smallest percentage of the total population at 7.7 percent, while Emfuleni has the largest portion of the population at 78.5 percent. Metsimaholo has 13.8 percent of the total Vaal population.

**Figure 2.4 The population of the Vaal Triangle (2001)**

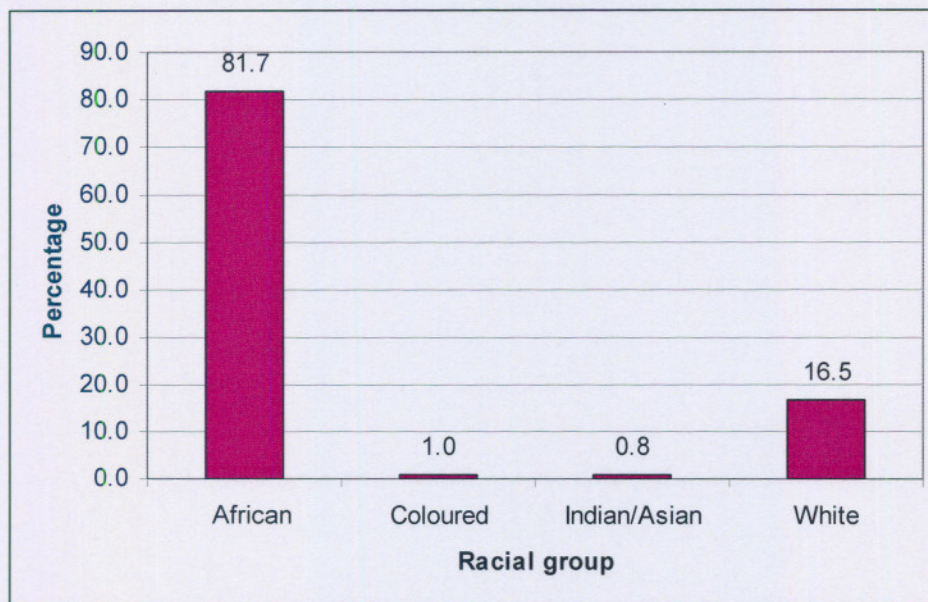


Source: Calculations based on Census 2001 data (Stats SA, 2003)

### **2.3.1 Racial composition of the Vaal population**

According to Census 2001 estimates (Stats SA, 2003) the African population in the Vaal area is estimated at 685 495, which forms 81.7 percent of the total population of the Vaal. The White population, on the other hand, was estimated at 138 441 or 16.5 percent of the total Vaal population. The smallest racial group is the Indian/Asian population which constitutes only 0.8 percent of the population of the Vaal or 6 712, while the Coloured population forms 1 percent or 8 390 of the total population. Figure 2.5 shows the total racial composition of the Vaal for the year 2001.

**Figure 2.5 Racial composition of the Vaal Triangle (2001)**



Source: Calculations based on Census 2001 data (Stats SA, 2003)

Table 2.2 illustrates the total percentage of each racial group per municipal area. Emfuleni and Metsimaholo have the highest African population in the Vaal area at 84.0 percent 81.1 percent respectively. Midvaal has the largest White population at 39.1 percent. The racial group with the lowest representation in the study area is the Indian/Asian population of which only 0.2 percent resides in Metsimaholo.

**Table 2.2 Total population of the Vaal by racial group (2001)**

	<b>Emfuleni municipal area</b>	<b>Metsimaholo municipal area</b>	<b>Midvaal local municipality</b>	<b>Total</b>
<b>African</b>	84.0	81.1	59.0	100
<b>Coloured</b>	1.1	0.5	1.4	100
<b>Indian/Asian</b>	0.9	0.2	0.5	100
<b>White</b>	14.0	18.3	39.1	100

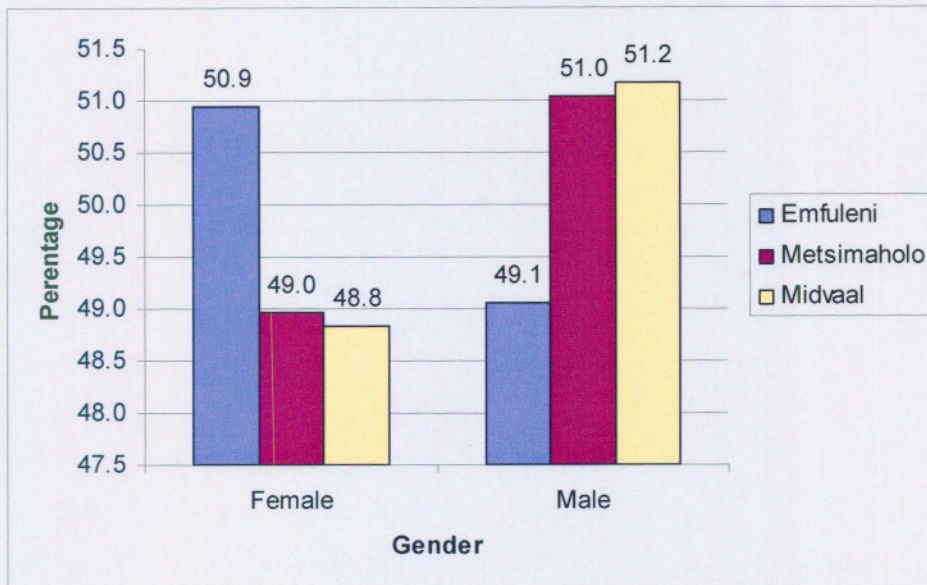
Source: Calculations based on Census 2001 data, Stats SA (2003).

### **2.3.2 Gender distribution in the Vaal**

Based on the estimates of the Census 2001 data, of the total population of the Vaal, 50.5 percent is female while 49.5 percent is male (Stats SA, 2003). Figure 2.6 illustrates gender distribution per municipal area.



**Figure 2.6 Gender distributions by municipal area**



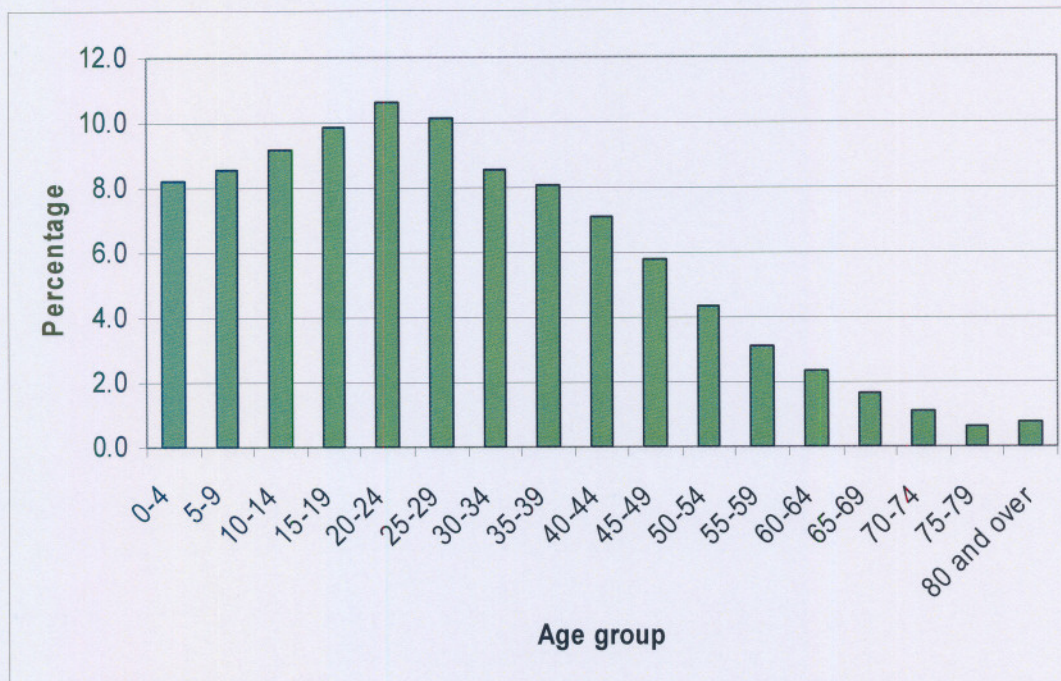
Source: Calculations based on Census 2001 data, Stats SA (2003)

From the above figure it is clear that there is a relatively even gender distribution throughout the Vaal area, in as much as there is only a few percentage point differences between each gender in the various areas. In the Metsimaholo and Midvaal areas there is a higher concentration of males while Emfuleni has the highest concentration of females.

### **2.3.3 Age distribution of population within the Vaal**

Figure 2.7 illustrates the age groups of the population within the Vaal as well as the percentage distribution of the total population amongst each age group.

**Figure 2.7 Age distribution of the Vaal population (2001)**



Source: Calculations based on Census 2001 data (Stats SA, 2003)

In general, the inhabitants of the Vaal appear to be highly concentrated over the young, adolescent and twenties age categories. As a result, strain is placed on the labour market within the region as school-leavers and those recently graduated from tertiary institutions looking for employment. With the highest concentration of the population over the job-seeking ages and the current unemployment rate for the Vaal area at 53.6 percent (Slabbert, 2004:12), many youths within the area will probably not find gainful employment thus forcing them to find work in other areas. A large percentage of the population is also spread out over the non-economically active population (children younger than 15 and individuals older than 65), thereby placing pressure on the parents of these children to provide the respective needs of the family.

#### **2.3.4 Levels of education attained in the Vaal**

The level of education attained by those within the Vaal is illustrated in Figure 2.8. Only 16.4 percent of the total population has a Grade 12 certificate. Less

than 5 percent have some form of tertiary education, with 0.69 percent of school-leavers having a bachelor's degree and an even smaller percentage (0.25) having a higher degree. More than 60 percent of the VT population has only reached an education level of Grade 11 and lower, with 9.49 percent having no formal education at all.

**Figure 2.8 Level of education within the Vaal (post-school) (2001)**

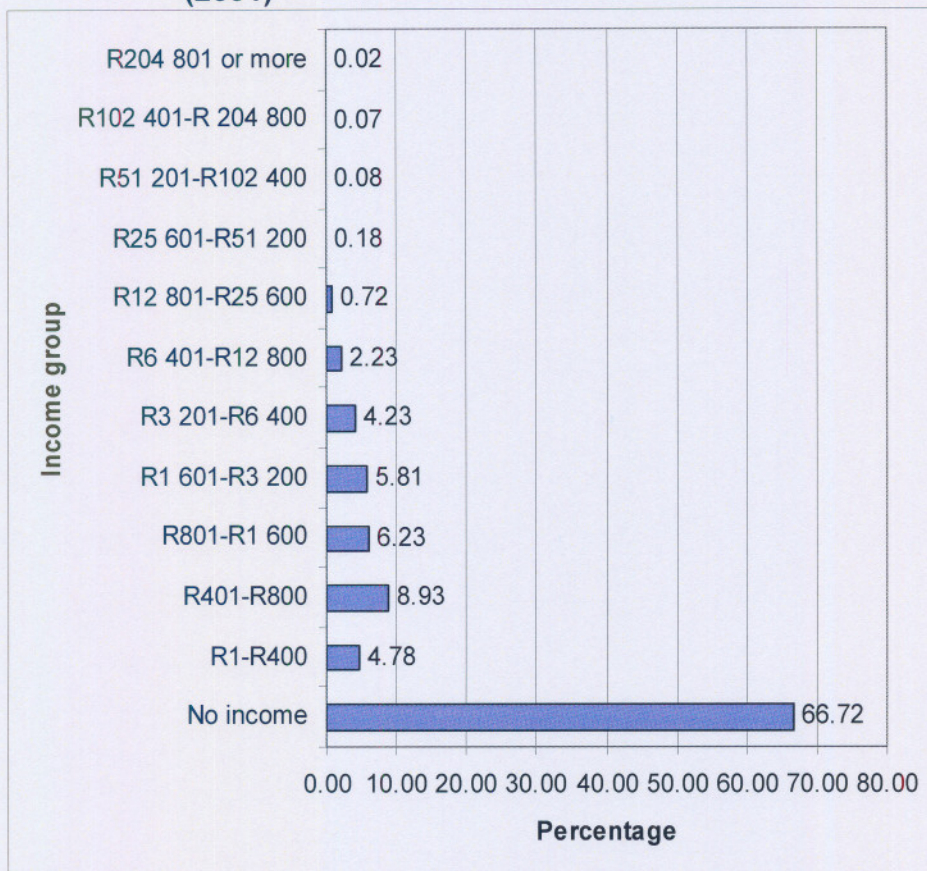


Source: Stats SA (2003)

### 2.3.5 Levels of income within the Vaal

As shown in Figure 2.9, of the entire Vaal population only 4.23 percent earns between R 3 201 and R 6 400 per month, while less than 1 percent earns over R 12 000 per month. On the other hand, a greater percentage (4.78 percent) earns only R 1 to R 400 per month, while almost double that amount (8.93 percent) earns between R 401 and R 800 per month. By comparing Figures 2.7 and 2.9, the percentage of the Vaal population that has no income at all, i.e. 66.72 percent can mostly be described as the economically non-active population or, in other words, those that are younger than 15 and older than 65, as well as housewives, the unemployed, etc.

**Figure 2.9 Distribution of population amongst the various income groups (2001)**



Source: Calculation based on Census 2001 data (Stats SA, 2003)

### 2.3.6 Poverty in the Vaal

According to Todaro and Smith (2003:205), impoverished individuals are those who are unable to command sufficient resources to satisfy their basic needs. They are counted as the total number living below a specified minimum level of real income, i.e., a national poverty line. According to Slabbert (2005:21) the headcount index for the Vaal area for 2003 is 0.516, which implies that 51.6 percent of all households have an income that is below their respective poverty lines.

Of the employed population, those in the formal and informal sector amounts to 12.4 percent of the poor. Of the poor, 31.8 percent were unemployed in 2003 and 55.8 percent formed part of the dependent population, compared to 54.2% for the poor and non-poor combined (Slabbert, 2005:15).

If the definition of dependency is taken as the ratio of dependent people to those having work (employed), then the problem becomes acute. This ratio for the poor is 7:1, while for the poor and non-poor combined it is 3:7. This means that within the poor population in Emfuleni, over 7 persons rely on the income of one person. It is also worth noting that the unemployment rate among the poor population is 71.8 percent. Therefore, there is a very strong correlation between poverty and unemployment in the Vaal (Slabbert, 2005:15).

Table 2.3 analyses the economic status of the poor population from a gender perspective. It shows that within the poor population, more males are employed in the formal sector than females. There are more females employed in the informal sector than males. More females fall in the economically non-active and children category than males, which is the same for the non-poor. Females seem to be more affected by poverty than males (Slabbert, 2004:26).

Bladsy 30

employment during the seven days preceding the interview and c) took specific steps during the four weeks preceding the interview to find paid employment or self-employment.

Mohr (2000:88) states that the expanded definition is more suitable for developing countries. According to the expanded definition the unemployed are persons who are 15 years and older, a) are not in paid employment or self-employment, b) were available for paid employment or self-employment during the seven days preceding the interview and c) had the desire to work and take up employment or self-employment.

South Africa initially used the strict definition but later switched to the expanded definition because of criticism against the conservative unemployment figures. The expanded definition, however, caused the same levels of criticism only with the higher estimates now being the focus of ridicule. From 1998, South Africa began using the expanded definition once again, states Mohr (2000:88).

According to Colander and Gamber (2000:35) the unemployment rate is obtained by expressing the number of people who are unemployed as a percentage of the economically active population (EAP) or labour force.

#### **2.4.1.1.1 Methods for the measurement of unemployment**

Mohr (2000:89) and Slabbert and Slabbert (2002a:21) give the following methods for the measurement of unemployment:

- **The census method**

In every population census there are questions aimed at determining the economic status of population. However, the focus of the census is estimating the population and not on collecting employment and unemployment data (Mohr, 2000:89). Slabbert and Slabbert (2002a:21) reiterate this by stating that only a limited number of questions pertaining to unemployment is included in the Census.

- **The registration method**

According to Slabbert and Slabbert (2002b:21) the registration method provides for the unemployed to register at placement offices - in South Africa these are offices of the Department of Labour (DoL). Registration is compulsory to qualify for unemployment benefits. In South Africa some categories of civil servants, domestic workers, farm workers, casual and seasonal workers, those earning more than the ceiling income and those whose period of benefit (6 months) has run out, are excluded from the fund. Many persons, therefore, have no reason to register. Registered unemployment figures published by the DoL in South Africa consequently do not show the level of unemployment accurately, particularly not for the African population.

- **The sample survey method**

Surveys are undertaken on a sample basis to obtain the data required to calculate unemployment rates for specific groups of people. In earlier years the Central Statistical Services (CSS) conducted surveys on a monthly basis for Africans, Coloureds and Asians. It was called the Current Population Survey (CPS). However, since the figures obtained for Africans were found to be inaccurate, their results have not been published since April 1990 (Mohr, 2000:90). In 1994, the CPS was terminated and the October Household Survey (OHS) was introduced. Stats SA has conducted the OHS since 1996. It is an annual survey, based on a probability sample of a large number of households. It covers a range of development and poverty indicators, including unemployment (official and expanded), according to the definitions of the ILO. In 2000, the OHS was replaced by the Labour Force Survey (LFS).

#### **2.4.1.2 Employment**

Mohr (2000:79) describes the total number of people that are willing and able to work as the labour force or the economically active population (EAP). The EAP consists of workers in the formal sector plus self-employed persons and



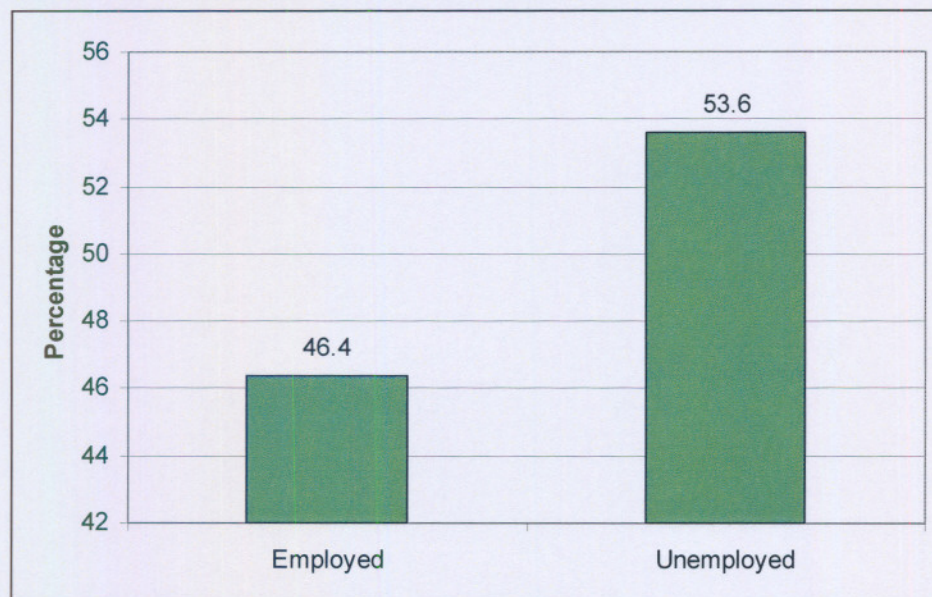
employers plus informal sector workers plus unemployed persons. Thus, the EAP includes all who are in work or unemployed. The percentage of the population that is of working age and who are economically active is called the labour force participation rate.

#### 2.4.2 Labour profile of the Vaal

According to Slabbert (2005:11), the economically active population of the Vaal for 2001 is 47.6 percent of the total population of the area. The unemployment rate in the Vaal is determined at 53.6 percent and there is on average 1.12 unemployed persons per household. However, in the township areas the unemployment rate is much higher (61.0 percent) and the number of unemployed persons per household is 1.35 (Slabbert, 2004:12).

Of the 46.4 percent of the labour force that is employed, 9.5 percent is employed in the informal sector while 36.9 percent is employed in the formal sector. Figure 2.10 illustrates the distribution of the employed and unemployed over the Vaal population.

**Figure 2.10 Employment and unemployment in the Vaal (2001)**



Source: Slabbert (2004:12)

The employment profile in the Vaal is largely influenced by the economic structure of the area (Slabbert and Slabbert, 2002a:9 and Slabbert, 2005:12). The area is characterised by specialisation in certain sectors, namely:

- The manufacturing of basic metals and metal products: these activities are responsible for almost 66.4 percent of all manufacturing employment opportunities, and
- Trade and services activities: the wholesale and retail, community and personal services, and other activities, are responsible for about 77.6 percent of all tertiary employment.

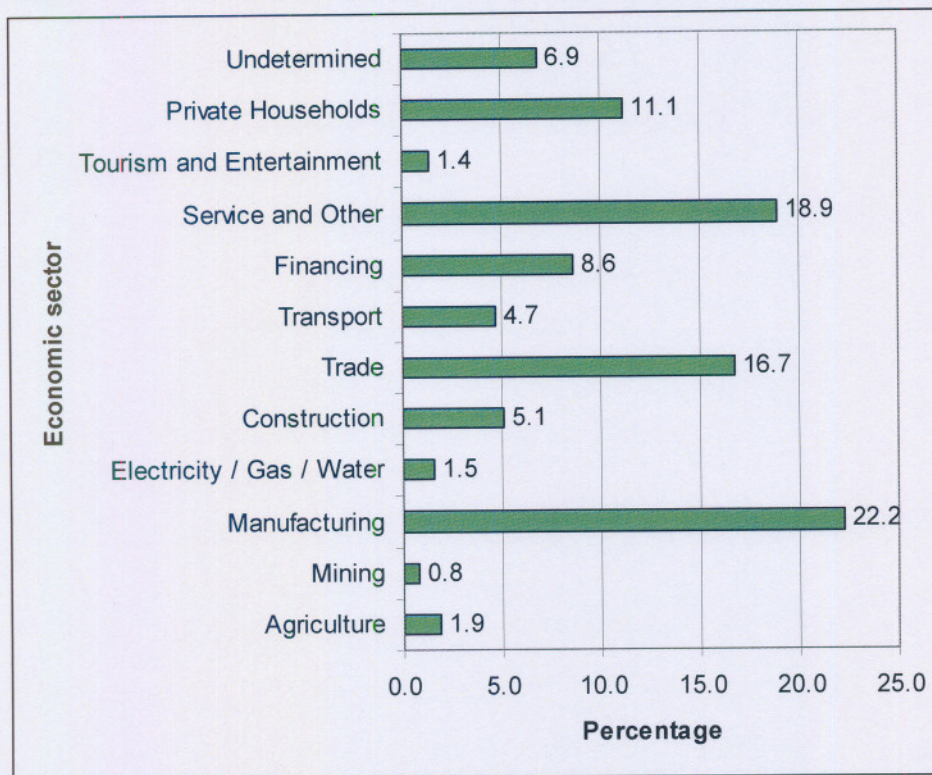
The employment profile of the Vaal is shown in Table 2.4 and Figure 2.11. Based on Census 2001 data, Figure 2.11 illustrates the distribution of the Vaal population by sector of employment. A high incidence of employment occurs in the manufacturing (22.2 percent), trade (16.7 percent) and the services and other sectors (18.9 percent). The lowest employment figures are for the mining (0.8 percent), electricity/gas/water (1.5 percent) and tourism and entertainment (1.4 percent) sectors.

**Table 2.4 Vaal employed population by sector of employment (2001)**

<b>Economic sector</b>	<b>Number employed</b>	<b>Percent</b>
Agriculture	2 904	1.9
Mining	1 230	0.8
Manufacturing	34 122	22.2
Electricity / Gas / Water	2 367	1.5
Construction	7 812	5.1
Trade	25 717	16.7
Transport	7 277	4.7
Financing	13 228	8.6
Services & other	29 105	18.9
Tourism & Entertainment	2 176	1.4
Private Households	17 124	11.1
Undetermined	10 580	6.9
<b>Total</b>	<b>153 657</b>	<b>100.0</b>

Source: Calculation based on Census 2001 data (Stats SA, 2003)

**Figure 2.11 Vaal employed population by sector of employment (2001)**



Source: Calculations based on Census 2001 data (Stats SA, 2003)

## **2.5 STRUCTURAL COMPOSITION OF THE VAAL ECONOMY**

In this section an analysis is done regarding the various economic sectors within the Vaal region. The trends undergone by these sectors are discussed in order to gain insight into the prevalent economic activity within the Vaal and the possible sectors of development. The potentialities of each sector are also discussed as well as the relative contribution of each sector to the gross geographical product (GGP) of the Vaal. According to Mohr (2000:20) the GGP of an area is the total added value of production in that area.

The economic structure of the Vaal is set out in Table 2.5, and will be discussed in the followings sections. The activities included in each are detailed in Annexure A.

**Table 2.5 Economic structure of the Vaal region: GGP contribution (R million)**

Economic sector	1996	%	2003	%	% Growth per annum	
					Current prices	Constant prices
Agriculture	178	1.7	319	1.5	8.7	0.6
Mining	47	0.5	36	0.2	-2.8	-13.0
Manufacturing	4 092	39.5	7 974	38.7	10.0	3.1
Electricity / Gas / Water	472	4.6	850	4.1	8.8	3.0
Construction	375	3.6	609	3.0	7.2	2.5
Trade	1 250	12.1	2 288	11.1	9.0	2.6
Transport	787	7.6	1 855	9.0	13.0	8.6
Financing	1 315	12.7	3 171	15.4	13.4	4.4
Services & Other	1 830	17.7	3 045	14.8	7.5	0.5
Tourism & Entertainment	-	-	447	2.2	-	-
<b>Total</b>	<b>10 347</b>	<b>100.0</b>	<b>20 594</b>	<b>100.0</b>	<b>10.3</b>	<b>3.2</b>

Source: Slabbert (2005:48)

## **2.5.1 Analysis by sector**

### **2.5.1.1 Primary sector**

The primary economic sector consists of agriculture and mining. As illustrated by Table 2.5 the relative contribution of agriculture to the GGP of the Vaal decreased from 1.7 percent in 1996 to 1.5 percent in 2003. The average annual growth rate from 1996 to 2003 was 0.6 percent (constant prices). In 2003, mining only contributed 0.2 percent to the GGP of the Vaal, while the percentage growth experienced by this sub-sector from 1996 to 2003 was -13.0 percent. Both the agricultural and mining sector offer a relatively small percentage of the total economic activity in the Vaal.

### **2.5.1.2 Secondary sector**

Secondary economic activities in the VT consist of three sub-sectors, namely manufacturing, electricity/gas/water and construction.

#### **2.5.1.2.1 Manufacturing**

As shown in Table 2.5 the relative contribution of the manufacturing sector to the GGP of the Vaal decreased slightly from 39.5 percent in 1996 to 38.7 percent in 2003. The dominant economic activity in the Vaal region is clearly manufacturing.

Various manufacturing activities take place in the Vaal. From Table 2.6, it is clear that the production of metal, metal products and machinery is the dominant manufacturing activity of the Vaal region with its share in manufacturing's contribution to the GGP of the Vaal being 78.0 percent. There is, therefore a strong dependence on these of the Vaal economy on these industries.

#### **2.5.1.2.2 Electricity/Gas/Water and Construction**

Table 2.5 shows that the relative contribution of construction to the GGP of the Vaal declined from 3.6 percent in 1996 to 3.0 percent in 2003. The percentage growth of this industry from 1996 to 2003 was 2.5 percent (constant prices).

Electricity/gas/water contributed 4.1 percent to the GGP of the Vaal with an annual growth rate of 3.0 percent in 2003.

**Table 2.6 Manufacturing activities in the Vaal (2003)**

<b>Activity</b>	<b>Percentage share in manufacturing's GGP contribution</b>
Food, drink, tobacco	4.3
Textiles, clothing and footwear and wood products	2.0
Fuel, petroleum and rubber products	3.2
Other non-metallic mineral products	4.3
Metal, metal products and machinery	78.0
Electrical machinery & electronic appliances	2.7
Transport equipment	1.2
Furniture	4.3
Total	100.0

Source: Slabbert (2005:50)

### **2.5.1.3 Tertiary sector**

Tertiary activities consist of trade, transport, financing, services (including government services) and tourism & entertainment. In 2003 this sector contributed 52.5 percent (all tertiary activities combined) to the GGP of the Vaal. A relative growth rate of 8.8 percent and 4.4 percent was recorded by the transport and financing sectors respectively. These sectors experienced the highest percentage growth rate of all economic activities in the Vaal. The average annual nominal growth for the whole Vaal economy was 3.2 percent for 2003. For tourism & entertainment only the 2003 figure was estimated as this sector contributes a relatively small amount to the GGP of the Vaal.

### **2.5.2 Linkages and multipliers amongst the economic sectors of the Vaal**

Sectoral linkages refer to the interaction between different economic sectors in the

study area's economy. For example, the agricultural sector supplies inputs to the manufacturing sector (Slabbert and Slabbert, 2002a:79). The degree of linkages has a direct bearing on multiplier effects and provides an indication of agglomeration advantages that point to existing and potential development opportunities or constraints. Two types of linkages can be distinguished, namely the backward linkage effects and the forward linkage effects.

According to Slabbert and Slabbert (2002a:79) the backward linkage of a sector is the effect of a change in the demand for production of that sector, on its demand for intermediate inputs derived from other sectors. The higher/lower the backward linkage of a sector with other sectors is, the higher/smaller is the impact of change in economic activity within that sector on the economic activity. For example, because goods are transported through the proposed VICD instead of e.g. City Deep (that has administrative and capacity constraints), there is shorter delivery times of necessary inputs which in turn increases output. This increased productive capacity will increase the demand for available inputs, which will result in an increase in output for the suppliers of these necessary inputs.

Forward linkages illustrate the extent to which the rest of the sectors in the study area are dependent on the sector concerned for inputs. For example, the closure of a basic iron and steel industry will inescapably lead to the closure (or departure) of firms using iron and steel as inputs in their production processes as well as the decreased use of the proposed VICD. Due to the fact that the economy of the Vaal is dependent on manufacturing services and that 78.0 percent of the manufacturing sector is made up of the metal, metal products and machinery industrial activities, the use of containers for the shipment of these larger manufacturing inputs will not be necessary (Slabbert & Slabbert, 2002a:80).

According to Slabbert and Slabbert (2002a:80) and Slabbert (2005:76) the multiplier analysis assesses the effect on an economy of changes in the elements that are exogenous to that economy. An increase in final demand (exogenous change, which is consumption of final goods and services, exports, fixed investments in the Vaal,



and/or a change in inventories) leads to an increase in production, followed by an increase in turnover, household income and employment. The higher the multiplier, the larger is the impact of a change on the economy. The effect of such changes is measured most frequently in terms of:

- Output gain of the sectors of the economy;
- Income gain by households because of an increase in final output; and
- Employment (in physical terms) that is expected to be created.

Output multipliers are expressed in terms of the total change in the study area's economic output as a result of an increase in output of a specific sector; and household income multipliers are expressed in terms of the total change in household income as a result of a change in a sector's labour expenditure. Employment multipliers are expressed in terms of total change in employment as a result of a change in the final demand for a specific sector (Slabbert, 2005:77).

### **2.5.2.1 Primary sector**

#### **2.5.2.1.1 Agriculture**

Due to the relocation of farmers to areas outside the Vaal and the redistribution of arable land for the construction of urban residential areas, there has been a steady decline in agricultural activities in the area. These reasons may explain why the sector's GGP contribution to the region, only grew by 0.6 percent per annum in average from 1996 to 2003. The relative contribution of this sector to the GGP of Gauteng declined from 1.7 percent to 1.5 percent during the same period (Slabbert & Slabbert, 2002a:82 and Slabbert, 2005:78).

According to Slabbert (2005:78) the backward linkages of the agricultural sector show weak industrial connections, implying that the sector depends on 9.6 percent of local raw materials. Even if labour is included, the agricultural sector only depends on 16.4 percent of local inputs. A total of 73.8 percent of the agricultural sectors

inputs are imported from other South African provinces or the rest of the world.

With regard to the forward linkages, 60.2 percent of the agricultural output is sold to the local economic sectors. Local manufacturing enterprises take up 97.9 percent of intermediate agricultural output. An effort to improve agricultural output would cause a reduction in imports of agricultural products and stimulate the manufacturing sector, provided problems with climatic conditions could be overcome through improved technological and agricultural practices. Besides the purchase by the manufacturing enterprises, agricultural production is used largely for private consumption, which accounts for 52.17 percent of final demand, and to exports, which accounts for 44.6 percent of final demand (Slabbert, 2005:78).

According to Slabbert (2005:78), with the multiplier effect, incentives to expand the agricultural sector may be less effective to boost income earned by households, employment creation, and output. An increase of R1 000 000 in the formal agricultural sector's final demand would increase:

- Income earned by households by R111 000;
- The contribution to the GGP by R240 000;
- Imports by R861 000; and
- Job opportunities by an additional 8 throughout the Vaal economy (Slabbert, 2005:78).

The formal agricultural sector is not regarded as an economic activity that can contribute substantially to growth in the Vaal. This sector has the ability, however, to improve household income and to stimulate growth in the manufacturing sector (Slabbert & Slabbert, 2002a:83).

#### **2.5.2.1.2 Mining and quarrying**

The Vereeniging and Metsimaholo coalfields are the most important mineral resource in the Vaal Area. The discovery of coal and its exploitation has significantly

influenced the spatial-economic structure in the Vaal. It has played a major role in the decision to establish Vanderbijlpark as a planned industrial city in the earlier PWV Complex, states Slabbert (2005:79). According to Vaalmet (1994:38), local coal reserves are not expected to influence export markets substantially. The mining sector's relative GGP contribution to that of the Vaal economy declined from 0.5 percent in 1996 to 0.2 percent in 2003, which is a decline of -13.0 percent per annum of its contribution to the Vaal GGP (Slabbert, 2005:79).

The backward linkages of the mining sector are weak. Of all the inputs needed in this sector, only 22.3 percent is provided by the local economy. It purchases most of its inputs from the manufacturing and services sectors. These sectors are also influenced by the downward trend in the mining activities in the Vaal (Slabbert, 2005:79).

According to Slabbert and Slabbert (2002a:84), mining activities developed strong forward linkages with manufacturing activities in the Vaal. Most of the output is taken up by local economic sectors. The most important buyer of mining products remains the manufacturing sector with 95.2 percent of the total intermediate output. Most mining activities are located in Metsimaholo and for this reason this sector has a relatively small effect on the Emfuleni economy, but plays a major role when looking at the Vaal economy.

Slabbert (2005:79) states that mining activities have strong forward linkages with manufacturing activities in the Vaal. Of the output of this sector, 75.1 percent is taken up by local economic sectors with the manufacturing sector being the most important buyer of mining products, taking 95.2 percent of the immediate output.

An increase in the final demand of the mining sector of, for example, R1 000 000 per annum would have the following effects:

- An increase in household income throughout the economy of approximately R 108 000;
- A creation of 5 job opportunities of which most will be in the mining sector itself

and in the manufacturing activities. The opposite will apply to a closure of a mine which will undoubtedly result in a loss in the mining sector and in the rest of the economy;

- An increase in GGP-contribution of about R268 000; and
- An outflow of capital through imports of R831 000 (Slabbert, 2005:80).

According to Slabbert and Slabbert (2002a:84) the high capital cost in the mining industry is a major constraining factor when endeavouring to develop new mines and only a few organisations in the country can raise the necessary capital in this respect. Therefore, because there are no anticipations for new large-scale mining development in the medium term, this sector should not be regarded as a major growth stimulus for future economic development in the Vaal.

#### **2.5.2.2 Secondary sector**

Secondary economic activities consist of three sub-sectors, namely manufacturing, electricity/ gas/ water and construction.

##### **2.5.2.2.1 Manufacturing**

As shown in Table 2.4, the single economic activity which is responsible for most employment opportunities, is manufacturing. Based on Census 2001 data, the formal employment profile of manufacturing in 2001 is 34 122 or 22.2 percent of all the employment opportunities in the Vaal (Stats SA, 2003). In this sector, the basic metals and metal products manufacturing sectors themselves are responsible for almost 66.4 percent of all the manufacturing employment opportunities as illustrated by Table 2.6 (Slabbert, 2005:50). A loss of employment opportunities in the manufacturing sector will also lead to the loss of employment opportunities in other sectors of the economy, especially those activities which are linked with industrial activities.

Due to the importance of the manufacturing sector to the economy of the Vaal, its

backward linkages are significant. Of the total inputs 49.1 percent originates in the Vaal. This implies that a decrease in manufacturing activities would lead to a significant decrease in the demand for the output of other economic activities in the Vaal (Slabbert, 2005:81). These economic activities are for example:

- Agriculture;
- Mining;
- Other manufacturing activities;
- Electricity/ gas and water;
- Services; and
- Labour (Slabbert, 2005:81).

The development of inter-industrial linkages, especially with the above-mentioned activities, has led to agglomeration advantages and high turnover multipliers in the industry (Slabbert & Slabbert, 2002a:87).

Slabbert (2005:82) states that there are, however, relatively weaker forward linkages in region. The industry sells 33.5 percent of its total output to other economic sectors within the region. Buying sectors are mostly other manufacturing industries, construction, trade and services sectors with 82.4 percent, 5.8 percent, 4.0 percent and 4.2 percent of total intermediate output respectively. There is, however, 53.9 percent of total output going outside the region as exports.

The high (72.3 percent of the total intermediate inputs) inter-industrial linkages experienced by the manufacturing sector are regarded as an opportunity for further diversification in this sector. This implies a high potential for the development of new industrial sectors linked to existing industries, which are important markets for suppliers of intermediate products. However, a decline in certain manufacturing activities will have a strong negative impact and multiplier effect on industries, using intermediate inputs from manufacturing activities that decline (Slabbert, 2005:82).

According to Slabbert and Slabbert (2002a:87), it is estimated that an increase in final demand of an industrial enterprise in the study area of R1 000 000 per annum, would have the following effects:

- Output would increase by R396 000 per annum;
- Household income would increase by about R229 000 per annum;
- Imports would also increase by R813 000; and
- 5.1 employment opportunities would be created in all sectors of the Vaal economy.

#### **2.5.2.2.2 Electricity/gas and water**

This relative contribution to the Vaal GGP of this sector decreased from 4.6 percent in 1996 to 4.1 percent in 2003. The annual growth of this sector was recorded at 3.0 percent from 1996 to 2003. This is shown in Table 2.5.

A decrease in the consumption of water and electricity in the Vaal will not only lead to a decrease in employment opportunities to provide and maintain these services, but will also lead to a decrease in employment opportunities in all sectors of the economy. This is because of the other sector's linkages to electricity and water provision (Slabbert, 2005:83).

According to Slabbert (2005:82) backward linkages are weak with only 36.7 percent of inputs (labour included) purchased from within the Vaal. Contrary to backward linkages, forward linkages show that 75.7 percent of output is consumed within the region with 45.3 percent of output being used by the manufacturing sector.

An increase in the total consumption of water and electricity of R 1 000 000 per annum can have the following effects (Slabbert & Slabbert, 2002a:88):

- GGP would increase by R 785 000;
- About 6.2 new employment opportunities would be created; and

- Household income earned throughout the economy would increase by R 404 000.

### **2.5.2.2.3 Construction**

According to Slabbert (2005:83) the construction sector is responsible for 5.1 percent of the total employment opportunities in the Vaal area. The relative GGP contribution of construction activities to the Vaal decreased from 3.6 percent in 1996 to 3.0 percent in 2003. The sector's contribution to the GGP grew with 2.5 percent per annum.

The construction sector's role in the economy is much the same as electricity/gas and water in the sense that its growth is dependent on the performance of other economic activities (Slabbert & Slabbert, 2002a:89). Factors that impact on construction activity's economic performance are:

- Overall economic growth and stability;
- Demand for capital investment in property and urban development, including transportation infrastructure;
- Household investment in housing; and
- The availability of capital at affordable interest rates.

This sector has relatively strong backward linkages as 49.2 percent of its total inputs (labour included) come from the local economy. Improved building activities will therefore require substantial inputs from other existing sectors in the Vaal (Slabbert, 2005:84). Some of these sectors are:

- Manufacturing of bricks, tiles, roof sheets, pipes, paint, board, etc.;
- Other construction activities (subcontractors);
- Financing and business services (bonds, loans, professional services); and

- Households (as labour force) (VAALMET, 1994:45).

The forward linkages are much weaker with only 11.3 percent of the total output being consumed by other local economic sectors. Of the 88.7 percent of output that constitutes the final demand for construction activities, 76.6 percent goes to fixed investment whereas 23.4 percent is contracted outside the study area (Slabbert & Slabbert, 2002a:90).

According to Slabbert (2005:84) construction activities have strong household income and employment multiplier-effects. An increase in final demand of about R1 000 000 can generate an additional household income of about R270 000; an increase in GGP of construction activities of about R434 000 and can generate about 7.2 jobs throughout the VT economy. The construction sector has limited potential to form the basis for sustained growth in the Vaal as it is dependent on productive investment which is influenced by factors exogenous to the building industry.

### **2.5.2.3 Tertiary sector**

Tertiary activities consist of a number of sub-sectors such as trade, transport, financing, services & other and tourism & entertainment.

#### **2.5.2.3.1 Trade**

The trade sector's relative contribution towards the aggregate GGP decreased from 12.1 percent in 1996 to 11.1 percent in 2003 as seen in Table 2.5. The sector's contribution to the GGP of the Vaal grew with 2.6 percent per annum. According to Slabbert (2005:48) the sector is responsible for 25 717 employment opportunities or 16.7 percent of total employment in the Vaal. According to VAALMET (1994:50) the trade sector has a relatively well-developed trade structure and finds itself in the midst of growing local consumer markets, but it is constrained by the comparatively low affordability levels of communities that are further enhanced by high unemployment.

This sector has developed strong linkages, both forward and backward, with other



sectors in the Vaal economy. This implies that the sector is dependent on the local economy for 83.2 percent of its inputs (labour included) and provides 88.7 percent of its output to other sectors of the economy (households included) (Slabbert, 2005:85).

An increase in the output of trade activities will increase the input requirements of the sectors with which they are 'backwardly' linked. These sectors are for example:

- Manufacturing (20.3%);
- Other trade activities (8.0%);
- Financing and business services (7.0%); and
- Households (31.5%) (Slabbert, 2005:85).

Slabbert and Slabbert (2002a:92) state that an injection of R1 000 000 in the final demand of trade business would cause the following effects:

- About R867 000 increase in the sector's GGP;
- About R551 000 increase in income earned by households throughout the Vaal economy;
- About 14.3 additional employment opportunities; and
- About R637 000 flowing outside the VT for imports of food, clothing, furniture, motor vehicles and tools.

#### **2.5.2.3.2 Transport**

For this study, the transport sector is of the utmost importance. The Vaal economy is built upon a firm industrial base which requires a strong transport and telecommunication infrastructure. It is for this reason that there is a need to determine the impact of an inland container depot as part of a logistical hub in the Vaal area. With the establishment of this hub, the upgrading of the Vereeniging airport, construction of an ICD and the resulting development of an IDZ in the area are

possible.

Plans to establish an inland container depot in the Vaal area are under discussion due to the proximity of the VLH to local markets and due to the fact that City Deep is being hampered by administrative and capacity constraints that hamper the transport of necessary inputs to the producers of final products (Viljoen, 2006a).

The transport sector's relative GGP contribution increased from 7.6 percent in 1996 to 9.0 percent in 2003, with a growth in GGP contribution of 8.6 percent per annum. It is responsible for 7 277 employment opportunities (4.7 percent) in the Vaal economy (Slabbert, 2005:86).

According to Slabbert (2005:86), the transport sector has relatively weak backward linkages (15.4 percent). These linkages are mainly with households for labour (12.5 percent) and manufacturing (1.5 percent). Forward linkages are also weak with only 10.5 percent of the total output taken up by households (private transport) and 49.3 percent is exported.

An injection of R 1 000 000 in the final demand of transport services would cause the following effects (Slabbert, 2005:87):

- A small household income multiplier effect of R 167 000;
- A GGP multiplier effect of R 293 000, which is just above that of mining and agriculture; and
- About 2.8 additional job opportunities.

#### **2.5.2.3.3 Financing**

This sector consists of financial intermediation, insurance, real estate and business services such as computer and related activities, legal, accounting, auditing activities, architectural, advertising, engineering and related technical activities. The financing sectors' current employment capacity is 13 228 jobs and its relative GGP contribution increased from 12.7 percent in 1996 to 15.4 percent in 2003 (Slabbert, 2005:87).

This sector grew over the last decade at an annual growth rate of 4.4 percent. Most of these services are located within the central business areas of the EMA, MLM and MMA (Slabbert, 2005:87).

This sector has comparatively strong inter-industrial forward linkages with especially the manufacturing sector (45.7 percent of total intermediate output), trade sector (19.3 percent) and services sector (16.3 percent) in the Vaal, while 52.8 percent of its total output is exported. Its backward linkages (16.9 percent of its total input comes from the local economy – labour included) are comparatively small which implies that the provision of inputs in this sector is only to a limited extent dependent on the other sectors. Slabbert and Slabbert (2002a:94) state that the employment and household income multipliers are very low compared with sectors such as manufacturing, trade and services.

#### **2.5.2.3.4 Services**

According to VAALMET (1994:54) this sector includes public and personal services, which in turn include regional and local authorities, education and health services. A decrease in the contribution of the services sector towards the aggregate GGP of the Vaal from about 17.7 percent in 1996 to 14.8 percent in 2003 was experienced. An annual growth rate of 9.0 percent was achieved (Slabbert, 2005:88).

This sector has strong linkages with almost all other sectors of the Vaal economy, of which manufacturing is the most prominent. About 67.9 percent of inputs required by this sector (labour included) are provided by local economic activities, whilst more than 91 percent of this sector's output is taken up by the local economy of the Vaal.

An increase in final demand of this sector of R1 000 000 can generate the following effects:

- An additional household income of about R428 000 in the region;
- An increase in the sector's GGP of about R866 000 per annum; and

- Creation of 20 additional employment opportunities throughout the economy.

#### **2.5.2.3.5 Tourism and entertainment**

Traditionally the tourism and entertainment industry is not interpreted as a separate economic sector but rather as an economic activity which falls mainly under tertiary activities such as the trade and services sectors. However, because of its potential to expand rapidly in the Vaal area, this sector is analysed as a separate economic sector. The growth potential of the tourism and entertainment sector in the Vaal is due to the extensive tourism destinations that can be found in the region, such as the Vaal Dam, the Vaal Meander, the Emerald Resort and Casino, etc. It is estimated that the tourism and entertainment sector employed 2,176 people and contributed 2.2 percent to the GGP of the Vaal (Slabbert, 2005:88).

Although the tourism and entertainment sector is one of the smaller sectors of the Vaal Triangle economy, it has great development and expansion possibilities (Slabbert and Slabbert, 2002a:96). Labour expenses comprise almost 40 percent of its inputs, indicating that a growth in this sector will have a considerable effect on employment in the Vaal. This sector also has strong backward linkages with the manufacturing (37.3 percent of its total intermediate inputs) and services sector (29.3 percent). Local households receive 46.7 percent of the total outputs of this sector.

The sector shows strong multiplier effects. An increase in the final demand of R1 000 000 will cause the following effects:

- 14 new employment opportunities would be created throughout the economy;
- The sector's GGP contribution would increase by R942 000; and
- Household income would increase by R640 000.

## 2.5.2.4 Summary of linkages and multipliers and relevance to the establishment of an inland container depot

### 2.5.2.4.1 Summary of linkages

Tables 2.7 and 2.8 provide a brief summary of the forward and backward linkages of the different sectors of the Vaal economy.

**Table 2.7 Backward linkages of the different sectors of the Vaal economy (2000)**

Sector \ Linkages	Sector									
	Agriculture	Mining	Manufacturing	Electricity/gas & water	Construction	Trade	Transport	Financing	Services	Tourism
Backward linkage (labour included)	16.4	22.3	49.1	36.7	49.2	83.2	15.4	16.9	67.9	87.2
Backward linkage (labour excluded)	9.6	19.9	38.1	6.3	36.7	51.7	2.9	6.4	46.4	48.4
Labour / Total input	6.8	2.4	11.0	30.4	12.6	31.5	12.5	10.5	21.4	38.8
Import / Total input	73.8	69.3	43.7	33.0	45.9	2.9	75.2	68.7	6.6	3.0

Source: Slabbert (2005:90)

**Table 2.8 Forward linkages of the different sectors of the Vaal economy (2000)**

Sector \ Linkages	Sector									
	Agriculture	Mining	Manufacturing	Electricity/gas & water	Construction	Trade	Transport	Financing	Services	Tourism
Forward linkage	60.2	75.1	33.5	58.6	11.3	23.3	10.5	16.5	62.0	42.6
Export / Total output	17.7	24.9	53.9	24.3	20.7	10.0	49.3	52.8	9.0	9.3

Source: Slabbert (2005:90)

As shown in Table 2.7, the sectors with the highest backward linkages are:

- Tourism and entertainment 87.2 percent;
- Trade 83.2 percent;
- Services 67.9 percent;
- Construction 49.2 percent; and
- Manufacturing 49.1 percent.

An increase in the demand for tourist and entertainment services would also mean a higher increase in demand for the products of the economic sectors supplying inputs to the tourism and entertainment sector. Although the trade, services and construction sectors also have high backward linkages, these sectors should not be considered as key sectors to stimulate the economy as their growth is mainly dependent on the growth of the local economy. If the economy of the Vaal grows as the result of an increase of money flowing into the region, then there will automatically be an increased demand for services, trade and construction. As the main purpose of these sectors is to 'serve' the local economy, and as they have little potential to become more export orientated, these sectors cannot be used to stimulate the local economy. Only 10.0 percent (trade), 9.0 percent (services) and 20.7 percent (construction) of these sectors' output is exported (Slabbert, 2005:91).

Although the manufacturing sector does not have such a high backward linkages as the tourism & entertainment, trade, services and construction sectors, it has the potential to concentrate more on export and in this way to increase its final demand, which in turn will lead to a growth of the local economy. It should also be noted that manufacturing imports 43.7 percent of its total input. Attention should be given to the possibility of import-substitution, in order to reduce the outflow of money out of the region (Slabbert, 2005:91).

The sectors of the Vaal economy with the highest forward linkages as shown in Table

2.8 are:

- Mining 75.1 percent;
- Services 62.0 percent;
- Agriculture 60.0 percent;
- Electricity, gas & water 58.6 percent;
- Tourism 42.6 percent; and
- Manufacturing 33.5 percent.

According to Slabbert (2005:91) an increase in the production of all of these sectors will mean an increase in the production of the forward linked sectors, provided there is sufficient demand for their products.

#### **2.5.2.4.2 Summary of multipliers**

Table 2.9 provides a brief overview of the sectoral multipliers of the Vaal economy. It states the effect that a R1 change in the final demand of a specific sector has on the economy of the Vaal.

The tourism and entertainment, trade and services sectors have the highest employment, remuneration and GGP-income multipliers. The trade and services sectors' growth is dependent on the overall growth of the Vaal economy. However, the tourism and entertainment sector has a great potential for attracting individuals and therefore, money from outside the Vaal region (Slabbert, 2005:94).

According to Slabbert (2005:94), the manufacturing sector has moderate multipliers and because it is the largest economic sector in the Vaal, a small percentage increase in the demand for the products of this sector will have a considerable effect on the economy of the Vaal as a whole.

**Table 2.9 Sectoral multipliers of the Vaal economy (2000)**

<b>Economic sector</b>	<b>Turnover</b>	<b>Income (GGP)</b>	<b>Imports</b>	<b>Labour (per R million)</b>	<b>Remuneration</b>
Agriculture	1.217	0.240	0.861	7.925	0.111
Mining	1.157	0.268	0.831	4.817	0.108
Manufacturing	4.772	0.396	0.813	5.120	0.2259
Electricity/Gas/Water	1.325	0.785	0.586	6.191	0.404
Construction	1.198	0.434	0.813	7.172	0.270
Trade	2.073	0.867	0.637	14.296	0.551
Transport	2.147	0.293	0.860	2.818	0.167
Financing	2.072	0.331	0.806	4.206	0.150
Services & Other	2.500	0.866	0.527	20.110	0.428
Tourism & Entertainment	1.202	0.942	0.645	14.033	0.640

Source: Nel (2001)

#### **2.5.2.4.3 Relevance to the establishment of an inland container depot in the Vaal**

As seen in Table 2.5, the transport sector has the largest growth rate in the Vaal at 8.6 percent from 1996 to 2003. However, according to Slabbert (2005:86) the forward and backward linkages experienced by the transport sector are relatively small.

However, the proposed ICD will not only have an effect on the transport sector but also on the manufacturing sector as the benefits of an ICD laid out in section 1.4.3 are realised. These benefits all lead to cost reductions for the businesses that will make use of the VICD infrastructure, which in the case of the Vaal economy is mostly manufacturing concerns (Viljoen, 2006a). These cost reductions would lead to increased productive capacity, which in turn would increase the output of the manufacturing industry. This would ultimately lead to a positive impact on the whole Vaal economy.



## **2.6 SUMMARY AND CONCLUSIONS**

The Vaal is formed by the Emfuleni, Midvaal and Metsimaholo municipalities, which are situated in the southern part of Gauteng and the northern part of the Free State respectively. These areas form a cohesive and intensively integrated economic unit that cannot be separated by politically demarcated boundaries. People living in these areas are, to a great extent, shopping, working or searching for jobs in one or more of the municipal areas and as a result there is a high incidence of commuting between these areas. Low income areas are almost totally dependent on the economic activities taking place in the high to medium income areas.

The total population of the Vaal area is estimated at 839 039, with Emfuleni having the largest portion of the population at 78.5 percent. The African population is estimated at 685 495, which forms 81.7 percent of the total population of the Vaal. In general, the inhabitants of the Vaal appear to be highly concentrated over the young, adolescent and twenties age categories. With the highest concentration of the population over the job-seeking ages and the current unemployment rate for the Vaal area at 53.6 percent many youths will probably not find gainful employment within the Vaal region.

A high incidence of employment occurs in the manufacturing (22.2 percent), trade (16.7 percent) and the services and other sectors (18.9 percent). The lowest employment figures are for the mining (0.8 percent), electricity/gas/water (1.5 percent) and tourism and entertainment (1.4 percent) sectors.

The largest contributor to the Vaal GGP is the manufacturing sector, contributing 38.7 percent, and is responsible for 34 122 employment opportunities. Therefore, a relatively small percentage increase in the demand for the products of this sector will have a considerable effect on the economy of the Vaal as a whole. The services sector is growing at a steadily increasing rate, with more than 27 percent of the employed population being employed in this sector. However, there is no evidence to show that it is the key to growth in the Vaal. The tourism sector, with its strong backward linkages, could be a positive growth stimulator in the Vaal area and more

should be done to promote its expansion and development.

If the key sectors of the economy, manufacturing and tourism, could be stimulated sufficiently, it would result in a considerable increase in employment and household income. This, in turn, would lead to a decrease in the extent and depth of poverty. These sectors have the largest potential to increase the exports of local products and to attract new business into the Vaal region. This will, in turn, automatically stimulate the other sectors that are currently not experiencing the same growth levels. With these stimulated towards growth and development, the Vaal economy can begin to thrive of a process of continued growth and investment.

The transport sector has experienced the highest percentage growth per annum of all the economic sectors of the Vaal, with 8.6 percent. Even though its relative contribution to the GGP of the Vaal area is low (7.6 percent in 1996 and 9.0 percent in 2003), with the proposed VICD as part of the VLH, the growth capacity of the transport sector can be enhanced. Also, the available employment opportunities provided by the transport sector can be increased.

The VICD could strengthen the already firm foothold that manufacturing activities have in the Vaal region. The increase in productive capacity that the VICD could bring about for manufacturing concerns would lead to an increase in output which would necessitate increased employment in this sector (from the already high 22.2 percent employment rate). This in turn would stimulate all other economic sectors, because of the forward and backward linkages.

## **CHAPTER 3: GOVERNING LEGISLATION AND DRIVING STRATEGIES OF TRANSPORT INFRASTRUCTURE IN SOUTH AFRICA**

### **3.1 INTRODUCTION**

The purpose of this chapter is to provide insight into Government's view of the establishment of an inland container depot and the objectives that it must meet in order to achieve the goals set out in the White Paper on National Transport Policy and the Draft White Paper on National Commercial Ports Policy. By clearly setting out the necessary objectives that the Vaal Inland Container Depot (VICD) must achieve in order to ensure that its workings are in line with the vision of Government, the establishment of the VICD can be legislatively justified.

The Moving South Africa Strategy and the National Freight Logistics Strategy are discussed in order to illustrate the need for improved freight infrastructure and to outline the current obstacles faced by the commercial freight system in South Africa.

### **3.2 BACKGROUND TO THE COMMERCIAL FREIGHT SYSTEM IN SOUTH AFRICA**

The freight system in South Africa and its links with the Southern African Development Community (SADC) are a collection of networks that are both excellent and poor, depending on the infrastructure and operations, and the specific modal challenges in that area. The growth of freight traffic has, according to DoT (2005:ii), surpassed most of the growth forecasts made by the Moving South Africa strategy (MSA) in 1998. As a result this has placed massive pressure on infrastructure and operations to deliver acceptable services while the system is being transformed to respond to the growth and level of demand.

Transport plays a significant role in the social and economic development of any country, and the government has recognised transport as one of its five main

priority areas for socio-economic development. The effectiveness of the role played by transport is to a large extent dictated by the soundness of the transport policy and the strategies utilised in implementing the policy (DoT, 1996).

The broad goal of transport is the smooth and efficient interaction that allows a society and the economy to assume their preferred form. To play this role, policies in the transport sector must be outward looking, shaped by the needs of society in general, of the users or customers of transport and of the economy that the transport has to support. Transport can thus play a leadership role, in as much as acting as a catalyst for development or in correcting spatial distortions (DoT, 1996).

According to DOT (1996), it then follows from these that the priorities in providing and using the transport system should be consistent with those that have been set for the country as a whole. These are summed up in the elements of the Reconstruction and Development Programme (RDP), namely meeting basic needs, growing the economy, developing human resources, and democratising the state and society.

According to the White Paper (DoT, 1996), the vision for the South African transport is of a system which will provide safe, reliable, effective, efficient, and fully integrated transport operations and infrastructure which will best meet the needs of freight and passenger customers at improving levels of service and cost in a fashion which supports government strategies for economic and social development whilst being environmentally and economically sustainable.

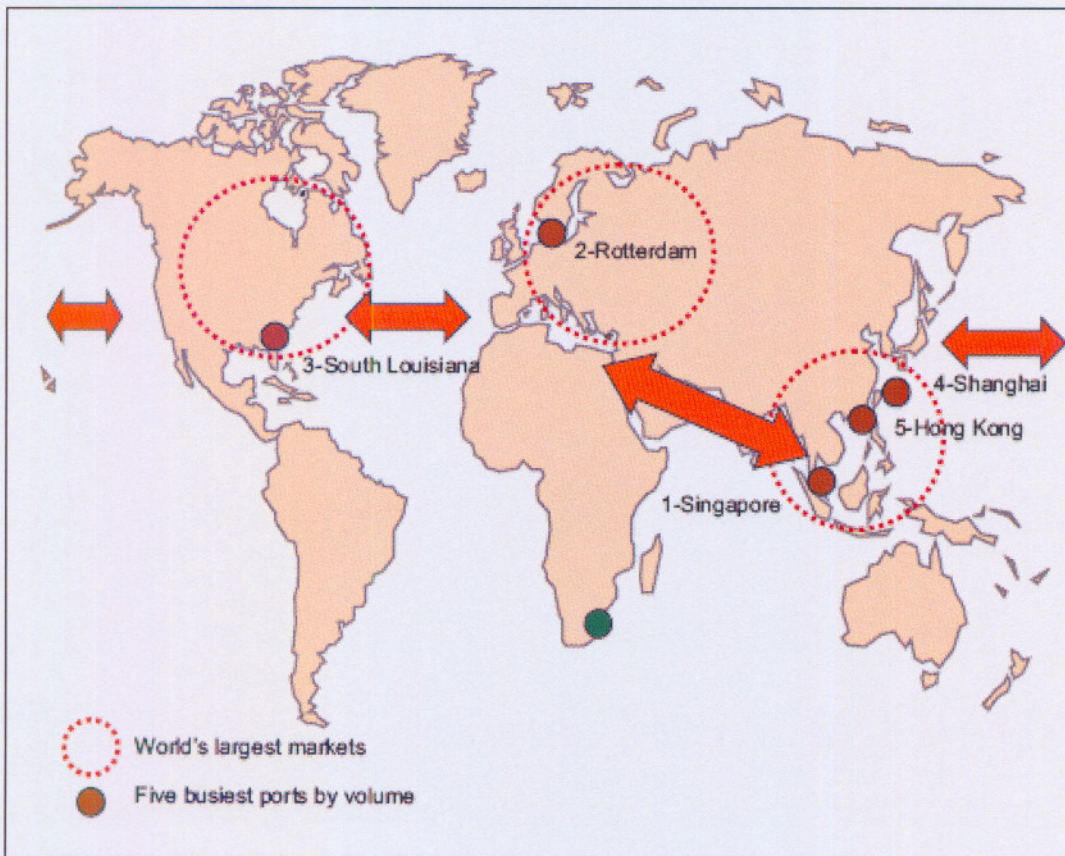
However, the findings of the National Freight Logistics strategy (NFLS) show that the current level of transport infrastructure is hampering the vision proposed by the Department of Transport (DoT). For this reason, NFLS has developed a problem statement that is used to define the key challenges within the system. It is as follows (DoT, 2005:ii): *“The freight system in South Africa is fraught with inefficiencies at system and firm levels. There are infrastructural shortfalls and mismatches; the institutional structure of the freight sector is inappropriate, and*

*there is a lack of integrated planning. Information gaps and asymmetries abound; the skills base is deficient, and the regulatory frameworks are incapable of resolving problems in the industry”.*

In response to this, the NFLS (DoT, 2005:ii) developed a vision of the freight logistics system, which is to respond to problems in institutional and regulatory frameworks, infrastructure, ownership, management, operations, skills, financing structures, and methodologies for the freight system. This vision of the freight logistics system is concurrent with the vision for transport proposed in the White Paper on National Transport policy. The vision set out by the NFLS requires that Government take a more interventionist approach to regulating the freight system, to ensure that the incidental costs of externalities and inefficiencies are not merely passed on to cargo owners, but are correctly allocated.

The MSA strategy, among others, seeks to address a number of issues that undermine the competitive advantage that South Africa enjoys and renders it less competitive and relevant in the world markets. According to MSA (DoT, 2005:3), South Africa’s geographical position, relative to global routes, is a disadvantage in itself. It is therefore important that the transport system support South African products/goods and services in order for them to be and remain competitive in global markets that are not skewed in their favour already because of our geographical location. The DoT (2001) states the globalisation pressures make it essential that nations integrate their transport systems into the global logistics network. Figure 3.1 illustrates the well-developed global routes around efficient port systems with a huge base market that South Africa’s products must compete with.

**Figure 3.1 Global routes around international port systems**



Source: CSIR (quoted in DoT, 2005:3)

### **3.3 SOUTH AFRICAN TRANSPORT AND FREIGHT INFRASTRUCTURE LEGISLATION**

#### **3.3.1 White Paper on National Transport Policy**

In order to realise the above-mentioned vision of the South African transport system mentioned in section 3.2, several strategic goals were identified (DoT, 1996):

- To support the goals of the RDP for meeting basic needs, growing the economy, developing human resources, and democratising decision making;

- To enable customers requiring transport for people or goods to access the transport system in ways which best satisfy their chosen criteria;
- To improve the safety, security, reliability, quality, and speed of transporting goods and people;
- To improve South Africa's competitiveness and that of its transport infrastructure and operations through greater effectiveness and efficiency to better meet the needs of different customer groups, both locally and globally;
- To invest in infrastructure or transport systems in ways which satisfy social, economic, or strategic investment criteria; and
- To achieve the above objectives in a manner which is economically and environmentally sustainable, and minimising negative side effects.

Along with these objectives, several other aspects of the White Paper are significant in terms of freight movement, available infrastructure and the various policy statements that the DoT has made to overcome the issues identified within these areas.

One of the important aspects of the White Paper on National Transport policy is transport infrastructure. It comprises all physical elements upon which transport operations take place. It includes roads, railways, airports, harbours, pipelines, interchange facilities, and the associated dedicated power and communications systems. Transport infrastructure represents a significant proportion of the government's total financial investment in fixed assets, and as such needs to be well managed. The adequacy or inadequacy of transport infrastructure can have a significant enhancing or inhibiting effect on social and economic development (DoT, 1996).

According to the DoT (1996), as part of the overall long-term vision for the South African transport system, transport infrastructure will:

- Be in place for South Africa to be a hub of transport within the Southern African Development Community (SADC);
- Be promoting sustainable economic development by removing constraints on latent demand in development corridors at local, provincial, national and regional level and be providing the catalyst for private investment;
- Be structured to encourage public passenger transport and to discourage excessive private passenger transport in urban areas;
- Allow for seamless intermodalism;
- Be financed through a combination of user charges and private/public sector investments;
- Provide adequate accessibility together with safety and security within the constraints of social affordability;
- Incorporate technological advances which promote and enhance the role of transport in the economy and development; and
- Be structured to ensure environmental sustainability and internationally accepted standards.

The mission for transport infrastructure is to provide an integrated and well-managed, viable and sustainable transport infrastructure meeting national and regional goals into the 21<sup>st</sup> century, in order to establish a coherent base to promote accessibility and the safe, reliable, effective and efficient movement of people, goods and services (DoT, 1996).

### **3.3.2 Land freight transport**

Land freight transport as a focus area of transport policy embraces both domestic and international conveyance of goods by road and rail and is concerned with the equality of service to the satisfaction of customers and users; seamless, inter-



modal operations; optimised use of capacity and management of operations; protection of its infrastructure; and minimised impact on the environment and natural resources (DoT, 1996).

The mission for land freight transport is identical to the vision of national transport policy. The mission is as follows: to provide safe, reliable, effective, efficient and fully integrated land freight transport operations and infrastructure which best suits the needs of customers at improving levels of service at an equitable cost in a fashion which supports government strategies for economic and social development while being environmentally and economically sustainable (DoT, 1996).

Thus it is clear that the overall vision for national transport policy, according to the White Paper (DoT, 1996), is identical to the mission statement of each level of transport infrastructure. By focusing on the achievement of these objectives, land freight transport can enable local producers to take advantage of any competitive advantages that they have in the global market and facilitate the development of a sound economic base for the country.

### **3.3.2.1 Goals of land freight transport**

In order for the mission for land freight transport to be fulfilled, the strategic goals must be met. These goals, according to DoT (1996) are:

- Develop a comprehensive land freight transport information system;
- Promote the provision of seamless inter-modal services;
- Optimise current capacity and maintain and develop the land freight transportation system;
- Prioritise issues in terms of sustainable economic and development needs;
- Find a practical and reasonable solution that leads to an equitable distribution of infrastructure capital, management, operating and maintenance costs;

- Promote a strong, diverse, efficient and competitive transport industry within the limits of sustainable transport infrastructure;
- Promote environmental protection and resource conservation, with specific reference to all aspects of transporting hazardous substances and goods;
- Enhance the quality of freight transport services by providing transport customers with a safe, secure, reliable and cost-competitive system;
- Advance human resource development and expand participation in the freight industry through the creation and growth of entrepreneurial opportunities, training and skills development; and
- Optimise road transport law enforcement.

### **3.3.2.2 Policy statements regarding key land freight transport issues**

The DoT outlines several issues that need specific attention from Government in order to realise the strategic objectives of land freight transport. In the White Paper, the DoT (1996) has formulated specific policies to resolve these issues so that the strategic objections may be realised.

#### **3.3.2.2.1 Infrastructure capital, operating and maintenance costs**

The issue in this regard is that there is no 'level playing fields' between the various transport modes in as much as equity in the recovery of infrastructure provision, management, operation, and maintenance costs. An equitable distribution of infrastructure cost recovery will make a positive contribution to reducing artificial modal shifts and distorted tariff structures created by cross-subsidisation (DoT, 1996).

The DoT (1996) proposes that a monitoring system be established, and specific and regular cost recovery studies will be undertaken to determine and equitably allocate costs for the provision of, management, operation, and maintenance of all freight transport infrastructure (including road, rail, port and airport).

#### **3.3.2.2.2 Seamless intermodal services**

The DoT (1996) states that importers, exporters and the local business community need seamless inter-modal services if the key thrusts of the national transport policy are to be met.

To achieve this, the White Paper (DoT, 1996) proposes that Government will encourage integration, intermodalism, and partnerships between the modes, provided this does not result in monopolies. There will be a national approach to a total freight transportation system, involving government, customers and users, owners and operators working together.

Modal, spatial and institutional integration must be encouraged. To remain customer focused the DoT states that the freight transport system must be responsive to changes in customer demands, logistical developments and market forces. Policies will be supportive of small and medium businesses, and will ensure operators without control over all elements in the logistic chain, are not disadvantaged (DoT, 1996).

#### **3.3.2.2.3 Small, medium and micro enterprises**

The road freight industry is currently dominated by large operators. High capital costs of modern road freight vehicle, the high level of service expectations of customers, and compliance with the road transport quality system (RTQS) make it difficult for small operators to enter the industry (DoT, 1996).

In order to counterbalance this, the DoT states that it will promote the entry of small, medium and micro enterprises (SMMEs) to the road freight sector, inter alia through formalisation of small operators, training in business management, operator, driver and vehicle requirements, compliance with quality and safety regulations, and identification of suitable niche markets (DoT, 1996).

### **3.3.3 Draft White Paper on National Commercial Ports Policy**

Ports are integrated and crucial nodal points in a transport system, and play a strategic role in the country's economic growth and social development. Port activity facilitates the meeting of the demand of the international market with means of production available in the country. Thus the port system, by virtue of being nodal points in the transport system, facilitates trade, which in turn fosters greater national economic activity (DoT, 2001).

The vision of commercial ports is a system of ports seamlessly integrated in the transport network that jointly and individually is self-sustainable through the delivery of high levels of service and increasing efficiency from a growing customer base, enhancing South Africa's global competitiveness and facilitating the expansion of the South African economy and creating a better life for all (DoT, 2001).

In terms of the White Paper (DoT, 2001), commercial ports play a crucial role in South Africa's transport system and its economic development. National benefits only accrue from the investment and management of ports to the extent of the value added to the national trade undertaking. Ports may be logistical and transport nodal points of multi-functional trade and industrial complexes where goods are not only in transit, but also handled, manufactured and distributed. Underlying the port system is the national, provincial and local transport planning effort to reduce the transport cost component of goods and services to the nation and the region.

### **3.3.4 Policy statements regarding commercial ports**

The White Paper (DoT, 2001) proposes several policy recommendations regarding commercial ports and their development. These are discussed in the following sections.

#### **3.3.4.1 National development strategy for commercial ports**

The commercial ports of South Africa will be operated on a national commercial port system basis, with the ports complementing each other rather than competing with each other (DoT, 2001).

According to the DoT (2001) port development cannot be considered in isolation, but should be integrated into any national provincial and local economic and spatial development initiatives, and also support the RDP. Long-term planning for ports should run parallel to provincial and regional economic development plans. Ports should also be planned together with other elements of the transport system in order to achieve the inter-modal objective that is required by the National Transport policy.

The policy advocates port and city co-operation through planning structures that will be facilitative and enabling of that particular intent. This shall be achieved by:

- Having the national port authority (NPA) established as a planning and development co-ordinating body; and
- Ensuring that the planning of each port is localised as much as possible to allow for flexibility and rapid response to changing market conditions and customer demands within the context of the national commercial port development framework and stakeholder consultation through the local port consultative committee (DoT, 2001).

#### **3.3.4.2 Improving the competitive position of South Africa's commercial ports**

Competitiveness, according to the DoT (2001), is defined as ensuring that the port and transportation system can meet the requirements of its users. To compete successfully for business in domestic and international markets, ports and other transport operators must have the ability to move people and cargo

efficiently, reliably and at a reasonable cost, without infrastructure impediments or congestion delays.

For exporters and importers, competitiveness translates into a demand for inter-modal services that provide speedy movement through ports and terminal transfer facilities. It also translates into a demand for the necessary transport information that is needed for the facilitation of transactions (DoT, 2001).

The future competitiveness of the port system and infrastructure will be influenced by the following states the DoT (2001):

- Land use in and around ports;
- Demand for and constraints of inter-modal connections; and
- Advances in technologies, particularly navigational systems.

#### **3.3.4.3 Supporting an integrated industrial strategy**

Industrial strategy seeks to utilise regional complementarities with the aim of promoting economies of scale and developing an integrated regional production system (DOT, 2001). Integrated logistics will play a critical role in the success of South Africa's industrial strategy.

### **3.4 STRATEGIES FOR DEVELOPING TRANSPORT INFRASTRUCTURE AND FREIGHT MOVEMENT**

#### **3.4.1 The Moving South Africa strategy**

The Moving South Africa (MSA) strategy was first developed in 1998. It was developed in order to assess the current level of inequalities in the transport system, covering all modes of transportation as well as passenger and freight movements. For the purpose of this study, only the strategy regarding freight movement will be discussed (DoT, 1998:5).

According to DoT (1998:6), at a minimum transport must function as a guarantor of national integration and should be viewed as an enabling industry. Transport is a critical input to other industries and the goals of the sector should be to meet the national and social objectives of the nation.

The guiding premise of the strategy is the satisfaction of the customers of transport on the service of fulfilling the national objectives. The strategy had developed a vision for transport that would consolidate the needs of the customers and the policy makers while ensuring that the transport system can fulfil the needs of its users in a sustainable fashion. MSA proposed that in order to achieve this, the benefits accruing from the system should be reinvested to enable lower costs and higher levels of services being made available to its customers (DoT, 1998:6).

MSA forecasted traffic flows up to 2020, with these flows moving along high volume corridors for freight and passenger transport that constituted the backbone of the system (DoT, 1998:9). MSA set various goals for realising the vision set out in the White Paper on National Transport policy. These are to create a system that has the lowest costs at maximum affordability, with improved reliability and increasingly differentiated services, set upon a dynamic platform. Three key components ground this vision:

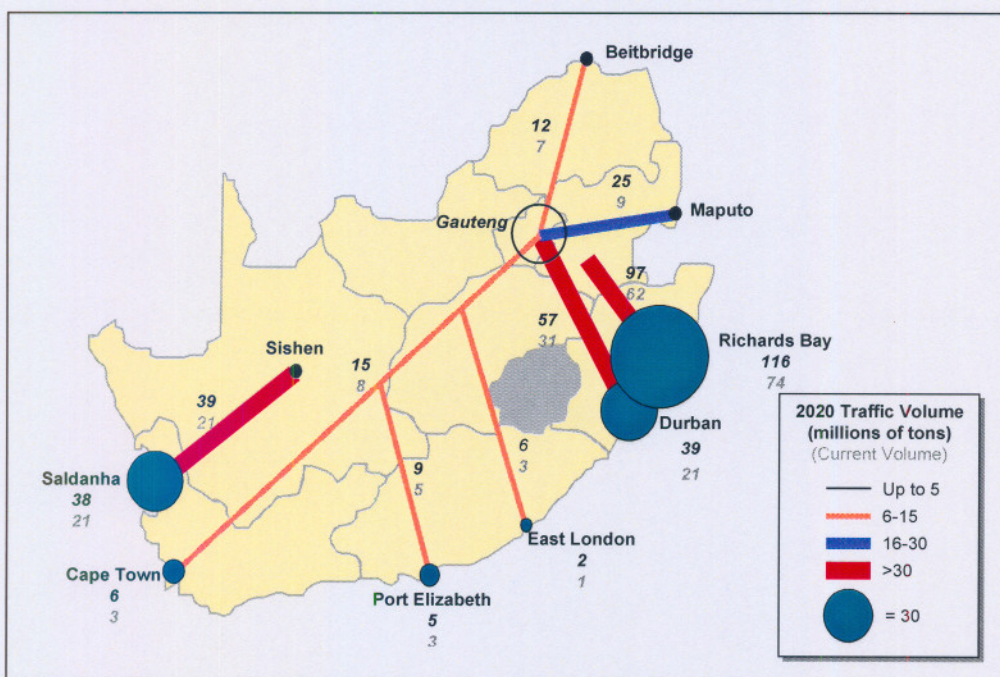
- High volume corridors;
- Sustainable operation; and
- Improved efficiency (DoT, 1998:9).

### 3.4.1.1 Strategy recommendations regarding freight customers and movements

#### 3.4.1.1.1 Customer needs and demand patterns

According to MSA (DoT, 1998:94), the freight system has been consolidating along major corridors with the industrial base concentrated in Gauteng.

**Figure 3.2** Current and 2020 freight volumes and destinations



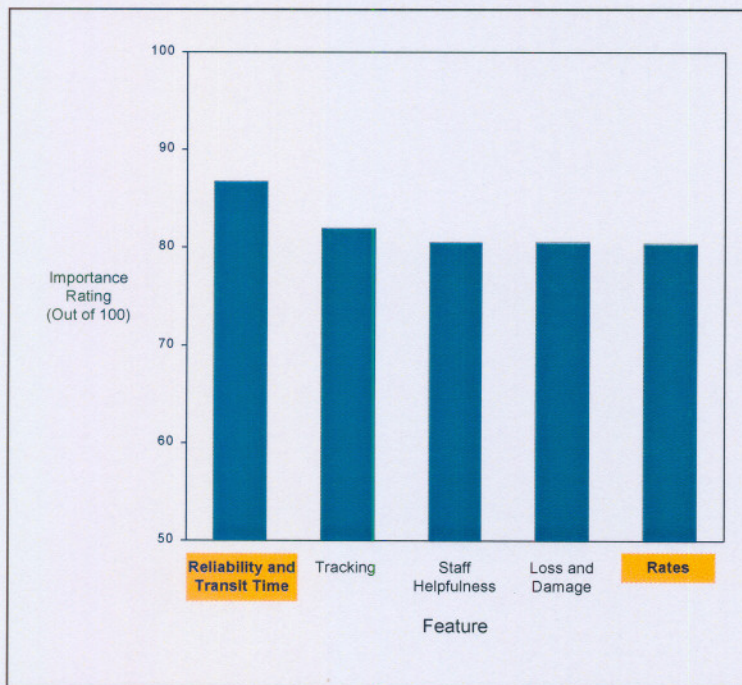
Source: MSA analysis (DoT, 1998:94)

As indicated in Figure 3.2, shipping patterns have radiated from the north-centre towards key nodes on the perimeter. The strategy proposed that the overall freight flows, looking forward to 2020, based on macroeconomic forecasts and current industrial strategy would continue to consolidate into a limited number of primary freight corridors representing almost half of the total freight flows in South Africa. This was forecast to occur despite efforts since 1994 to disperse growth along newer corridors and in spatial development initiatives (SDIs) (DoT, 1998:95).



Customer needs along these corridors of demand centre on the improvement of reliability and transit times as well as a reduction in prices. Their priorities focus on firm-level surface issues, which reflect the inability of the firms to innovate and upgrade, states MSA (DoT, 1998:95). Figure 3.3 represents the top features needing improvement in order of importance.

**Figure 3.3 Top five features ordered by importance**



Source: MSA analysis (DoT, 1998:97)

#### **3.4.1.1.2 Performance objectives regarding the freight system**

The freight system must deliver increased value creation in the long-run states the DoT (1998:96). To achieve this several performance objectives must be achieved:

- Increased value to the customers through increasing the competitiveness of businesses;
- Increased profitability and sustainability in the transport industry; and

- Decreased burden on the fiscus (DoT, 1998:96).

### 3.4.1.1.3 Performance challenges and strategic focus

The MSA (DoT, 1998:98) states that of the four interrelated systems in South Africa, general cargo import and export is the area requiring the most improvement. The various challenges faced by the freight system are illustrated in Table 3.1. The most important challenges that are faced by the general exporting and importing of cargo are the cost and service gaps that exist. With the existence of these performance challenges, issues such as export competitiveness and the sustainability of the cargo trade system take central place in identifying focus area for development of the freight system.

**Table 3.1 Challenges in the current freight system**

<b>System</b>	<b>Performance</b>	<b>Issues</b>
Domestic	<ul style="list-style-type: none"> <li>• Customers generally satisfied</li> </ul>	<ul style="list-style-type: none"> <li>• System sustainability</li> </ul>
		<ul style="list-style-type: none"> <li>• Externality costs</li> </ul>
Bulk export	<ul style="list-style-type: none"> <li>• World best practice</li> </ul>	<ul style="list-style-type: none"> <li>• Reinvest where required</li> </ul>
General cargo export and import	<ul style="list-style-type: none"> <li>• Service gaps</li> </ul>	<ul style="list-style-type: none"> <li>• Export competitiveness</li> </ul>
	<ul style="list-style-type: none"> <li>• Cost gaps</li> </ul>	<ul style="list-style-type: none"> <li>• System sustainability</li> </ul>
SADC	<ul style="list-style-type: none"> <li>• Cost gaps</li> </ul>	<ul style="list-style-type: none"> <li>• Priority of this system relative to other systems</li> </ul>
	<ul style="list-style-type: none"> <li>• Service gaps</li> </ul>	<ul style="list-style-type: none"> <li>• Barriers to cross-border traffic</li> </ul>

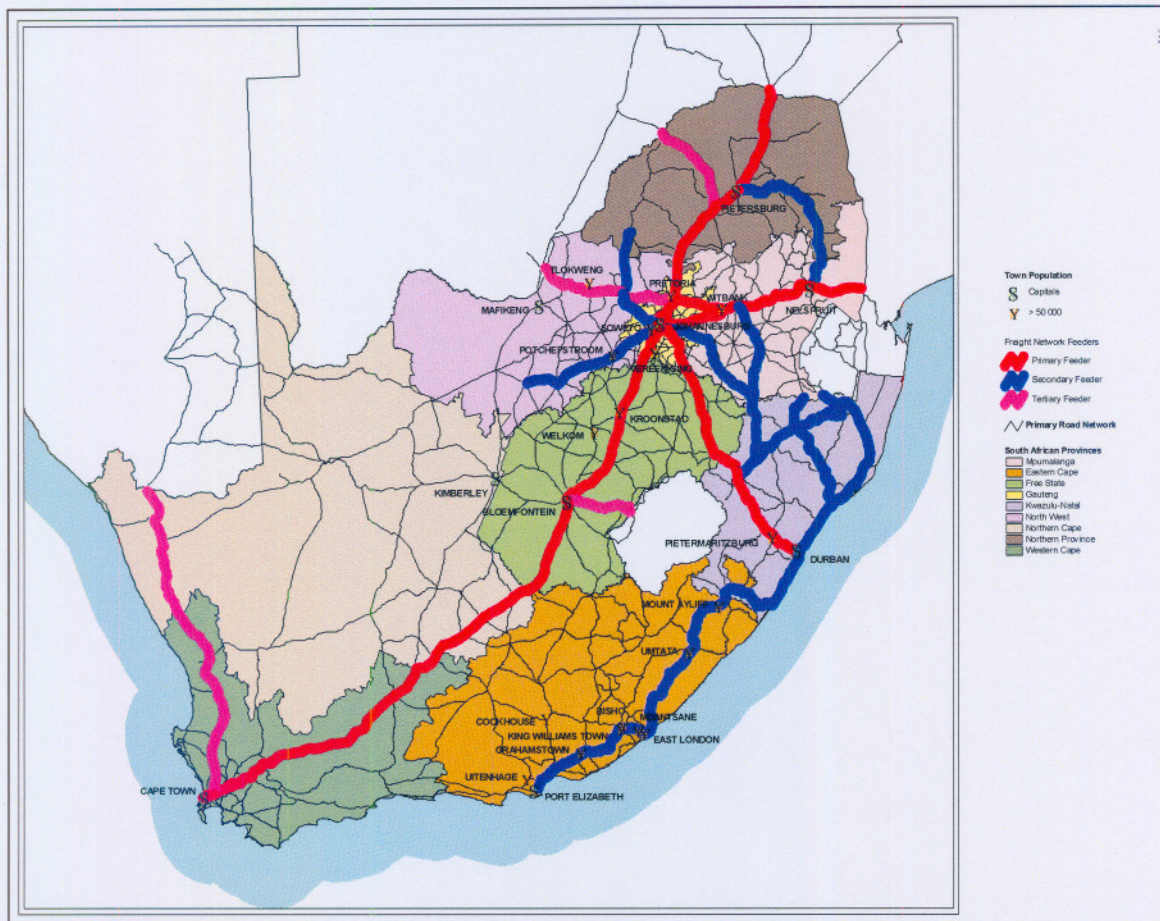
Source: MSA analysis (DoT, 1998:99)

The situational analysis conducted by the MSA showed that resources for the transport system are highly constrained and shrinking, leading to concerns about the overall sustainability of the system. The MSA proposed that by reducing system costs and focusing on investments of time, money, and effort, transport could achieve the most delivery to customers as possible out of the least amount of funding.

#### **3.4.1.1.4 Road freight systems**

With the road network, only a small proportion of the total network kilometres has significant volume and strategic importance, states MSA (DoT, 1998:110). This enables the limited investment funds available to be concentrated in a high-density network. Figure 3.4 illustrates the roads which constitute the strategic network for freight. The most important road networks all cross over the Gauteng province and thus the highest volumes of road freight occur in this region. This is largely due to the City Deep inland container terminal that processes freight from the larger port-locked container terminals (DoT, 1998:111).

**Figure 3.4 The road freight network in South Africa**



Source: Africon (quoted in DoT, 1998:111)

### 3.4.1.1.5 Inland container terminals

Inland terminals provide the essential inter-modal link between the rail and road freight systems. These terminals act as inland ports for container traffic, transferring imported containers from trains onto road vehicles near their inland destinations, and transferring export containers from their road vehicles onto trains destined for the port. City Deep, located south of Johannesburg, is the most important container terminal in South Africa (DoT, 1998:112).

According to MSA (DoT, 1998:113) there are several firm-level, operational problems that prevent the optimisation of the freight system:

- Vehicles arrive randomly, resulting in bunching;
- Customers are unable to receive containers which then have to be stored and delivered at a later stage;
- Incomplete documentation and insufficient technological advancements to eliminate excessive paperwork; and
- Lack of integration between the systems of the different role-players.

The MSA (DoT, 1998:113) states that improving the firm-level performance of the inland terminals is crucial for the successful implementation of the strategy.

### **3.4.2 The National Freight Logistics Strategy**

The National Freight Logistics Strategy (NFLS) was developed to identify the areas in which the MSA strategy was unable to clearly define adequate measures to resolve the inefficiencies of the South African transport system (DoT, 2005:3).

The NFLS (DoT, 2005:4) states that the freight system in South Africa is fraught with inefficiencies at system and firm levels. There are infrastructural shortfalls and mismatches; the institutional structure of the freight sector is inappropriate, and there is a lack of integrated planning. Information gaps and asymmetries abound; the skills base is deficient, and the regulatory frameworks are incapable of resolving problems in the industry.

The main challenges that face South African imports and exports are the inefficiencies that constrain the entire transport system from port operations to rail operations (DoT, 2005:5). These inefficiencies are the result of a number of issues:

- Low levels of investment in certain infrastructural and operational equipment. Ageing rolling stock and port operating equipment that undermines efforts by

government and port authorities to turn these entities around in order to respond to the demanding global growth of freight movement.

- Rigid management practices formed by supply driven strategies. In the rail sector, management should change its rigid approach to rail service, which places customers at the end of a supply driven strategy and service delivery ethos, and thus undermines their clients and results in lost business.
- Rigid costing approaches that are not customised. Costing methods used to develop and set tariffs are rigid and are not activity based. If the cost of business were to be reduced, there should be reform of the tariff setting regime in both the ports and rail sectors (DoT, 2005:6).

The efficiency of inland transport in serving an increasing and often disputed hinterland is critical to the socio-economic development of South Africa. According the NFLS (DoT, 2005:1), the majority of freight movement is internal, contrary to the perceived importance of corridor movements that maintain exports and imports through the country's ports.

An important consideration highlighted by the NFLS is the importance of a balance between the public and private sector. This involves a clear definition of the public sector mandate and of its relationships with its private partners, with a view to fostering private-sector led investment, capacity and development and operational efficiency (DoT, 2005:6).

Functions for the public sector within the transport sector are:

- To regulate the freight system to ensure economic efficiency;
- To own and provide financing for strategic or common user infrastructure components in the infrastructure utilities and to pave the way for increased private financing of facilities;

- To promote better physical and operational integration of seaports, airports and land transport networks;
- To ensure appropriate safety conditions in transport activities, and to exercise effective supervision of the environmental and security elements of the freight system; and
- To contribute to the trade facilitation process at all borders and interfaces, and thus to help ports and land transport entities to act as creative partners in international trade development (DoT, 2005:6).

Functions for the private sector in the transport sector:

- To provide superstructure and/or operations investment;
- To provide operational management within an appropriate regulatory environment, free from unnecessary public sector activity crowd-out;
- To promote operational integration and efficiency in order to foster economic growth and development; and
- To invest in infrastructure from both a debt and an equity perspective (DoT, 2005:7).

#### **3.4.2.1 Situational analysis**

An analysis of the South African freight system shows that world class infrastructure and operations environment co-exist with under-funded and badly serviced infrastructure and operations, states the NFLS (DoT, 2005:7).

According to the NFLS (DoT, 2005:7) the transport system can be divided into components that function very efficiently and are adequately capitalised and managed and those that face infrastructure and operations challenges. Because of the harsh cost/revenue structures facing marginal operators, they often operate by decapitalising their fleet through lack of maintenance; overworking

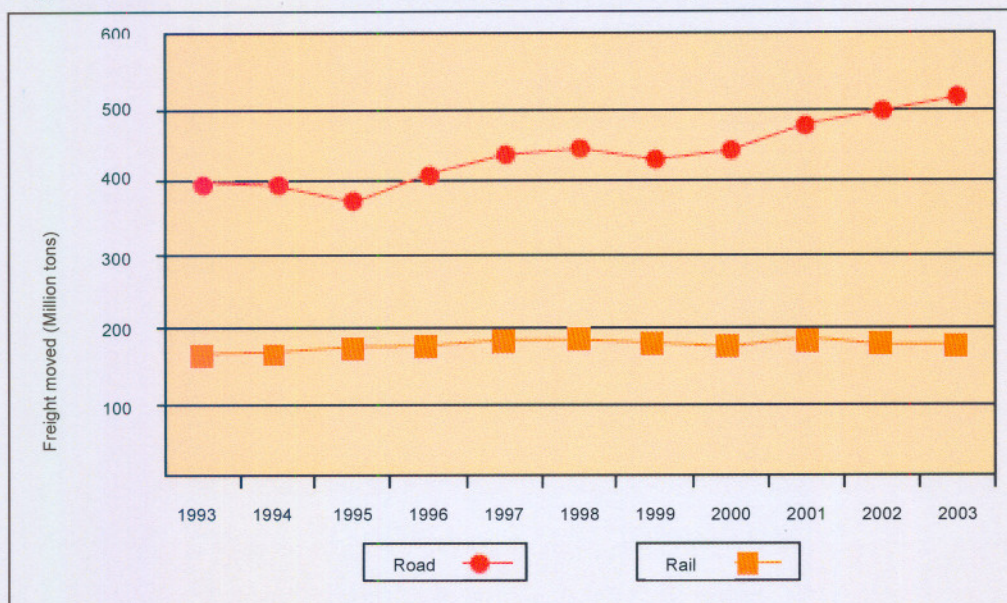
their staff; overloading their vehicles, and damaging the roads. These overloaded vehicles damage the secondary network to such a degree that the total road network capital stock is reduced over time, if left uncorrected.

According to the NFLS, the interplay between the positive and the negative needs to be managed by regulation, and addressed by the sub-sectoral strategies in an integrated manner (DoT, 2005:7).

### 3.4.2.2 Limitations of road transport

South Africa moved 693 million tons of freight domestically in 2003, 74 percent by road and 26 percent by rail (DoT, 2005:12). Figure 3.5 illustrates the shift between road and rail over the last decade and indicates a 4 percent annual growth rate per annum for road freight since 2000 in comparison to rail, which has shown a slight decline in tonnages moved.

**Figure 3.5 South African tonnages carried by road and rail (1993-2003)**



Source: NFLS (DoT, 2005:12)



### 3.4.2.3 Inter-modal interfaces

Inter-modal transfers and load consolidation occur at a range of locations concentrated in urban areas and usually at points of modal transfer such as ports, airports and container terminals such as City Deep in Gauteng (DoT, 2005:21).

According to NFLS (DOT, 2005:21) the inter-modal interface is poor. Operational issues, poor asset quality and poor customer interfaces result in bottlenecks at the inter-modal terminals. This particularly applies to the higher value container and break-bulk supply chain, but is less of a problem at bulk inter-modal facilities. Delays occur due to multiple handling of containers, which is exacerbated by inadequate handling equipment and the poor condition of infrastructure at the terminals. Table 3.2 illustrates challenges concerning inter-modal connectivity.

**Table 3.2 Key challenges concerning inter-modal connectivity**

<b>Financial / Economic</b>	<b>Customer / Stakeholder</b>
<ul style="list-style-type: none"> <li>• Inefficient inter-modal planning;</li> <li>• Management issues and allocation of responsibilities not focussed on strengthening integration;</li> <li>• Lack of appropriate modern infrastructure and facilities.</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of customer service focus;</li> <li>• Unwillingness to share supply chain information between customers and operator and between operators;</li> <li>• Lack of value-added services</li> </ul>
<b>Human resource / Social</b>	<b>Operations</b>
<ul style="list-style-type: none"> <li>• Poor environmental quality at many inter-modal interchanges is a deterrent to potential investors and developers;</li> <li>• Security.</li> </ul>	<ul style="list-style-type: none"> <li>• Inefficient processes and unreliable services at key inter-modal facilities;</li> <li>• Lack of appropriate technology to enable seamless intermodalism;</li> <li>• Capacity underutilisation.</li> </ul>

Source: NFLS (DoT, 2005:21)

In terms of infrastructure there is a general problem of shortage of capacity that compromises rapid cargo movement, coupled with underinvestment, and a failure to arrest deterioration resulting from a lack of appropriate maintenance (DoT, 2005:21).

According to DoT (2005:22), operational challenges include poor inter-modal planning inefficient use of inter-modal facilities and lack of appropriate technology to enable seamless movement. In addition, poor productivity and system unreliability result in poor efficiency in inter-modal processes. What has been found to seriously affect operations is the apparent unwillingness to share information and coordinate modal processor at inter-modal facilities (DoT, 2005:22).

### **3.5 SUMMARY AND CONCLUSIONS**

The various pieces of legislation governing South Africa's transport system such as the White Paper on National Commercial Ports Policy and the White Paper on National Transport Policy, all have certain objectives in common. The most prominent objective is that all policies must provide for inter-modal transportation and its seamless facilitation. Thus all modes of transport within the economy must be geared towards a framework of co-operation in order to take advantage of any economies of scale the country or various regions have.

The vision and mission of land transport policy, land freight transport, transport infrastructure and commercial ports are almost identical to each other. This further illustrates the importance of inter-modal transport in the South African economy since the governing legislation all points to its expansion and facilitation.

Despite the legislation that is aimed at the smooth running of the national transport and freight system, there are still numerous inequalities when looking at the different regions within South Africa, as well as the lack of adequate infrastructure that would enable South African products to compete in the global

market. For this reason, several strategies were developed in order to establish the current levels of service provision within the country, as well as what could be done to enhance and develop these further. These are the Moving South Africa (MSA) Strategy and the National Freight Logistics Strategy (NFLS).

These challenges or inequalities, identified by the NFLS, present significant obstacles to ensure that the goals of transport legislation are met. The MSA strategy proposed several key strategies to bring about reform in the transport system. However, these strategies do not take into account the full extent of the current levels of infrastructural development within the economy. For this reason, many of the goals set out in the MSA could not be reached. The NFLS provides an in-depth analysis of the current levels of development, providing a clear picture of what needs to be done in the system to meet legislative targets.

One such inequality mentioned by these two strategies is that the road freight network is already operating at high density levels. The high-density road network is similar to the heavy freight flows along high-density corridors. Freight movements within the country are predominantly road based, which provides links between sea ports, rail networks and the Gauteng industrial hub. However, the quality of infrastructure in the freight logistics sector is insufficient to sustain a world class logistics system. The operations on that infrastructure is further not targeted at fulfilling demand, but rather at tailoring demand around the supply structures and constraints.

For this reason the proposed Vaal Inland Container Depot (VICD) would be able to ensure the smooth running of the freight logistics system in the Gauteng province by providing another outlet for the distribution of cargo along the high-density freight corridor. With City Deep already labouring under administrative and capacity constraints, the VICD would provide a much needed opportunity to take advantage of the economies of scale brought about by the concentration of manufacturing activities in the Vaal region as well as contributing to the Gauteng industrial hub. Much must still be done to the national transport system for both

freight and passengers to enable the country to take full advantage of economies of scale and be able to compete in the global economy.

## **CHAPTER 4: THEORETICAL ASPECTS OF FIRM LOCATION**

### **4.1 INTRODUCTION**

The choice of a location for production is one of the most important long-run decisions that a manufacturing firm must make. Carod (2004:106) states that economic activities are influenced by the territory in which they take place and that these activities have specific characteristics that require special environments, which are provided in different ways by different types of cities.

With the Vaal region, economic development associated with coal mining and the iron and steel industries originally dictated the urban development pattern in the area as well as the socio-economic development of the inhabitants in the area. Due to the large quantities of available resources found in the area, industrial concerns such as the Iron and Steel Corporation of South Africa (Iskor) and the South African Synthetic Oil Limited (SASOL) company came into being which prompted the development of the central business districts in the region as well as the establishment of urban areas to supply labour to these industries (Slabbert, 2005:3).

The purpose of this chapter is to highlight the reasons why businesses locate in certain areas and thus why the establishment of the proposed Vaal Inland Container Depot (VICD) as part of a logistical hub, would have such a great influence on the industries of the Vaal area. Also, the factors that would make the Vaal region an excellent location for the VICD are discussed. For this reason, classical location theories as well as modern location theories are analysed in order to determine if the Vaal has the potential for growth as a result of the establishment of the ICD. Historically, the establishment of the coal and steel industry led to the establishment of the thriving metropolises of the Vaal region today. With the proposed VICD, the Vaal region could again undergo an industrial boom, which could have a great impact on the inhabitants of the area.

## 4.2 IMPORTANCE OF FIRM LOCATION

The bulk of an industrially developed country's economic activity takes place in cities. Chatterjee (2003) states that spatial concentration of employment develops for two different reasons. The first is that a location attracts people and businesses because of the presence of some valuable natural resource. However, the natural resource reason does not explain the full extent of the spatial concentration we see in reality. Studies of urban evolution suggest a second reason for spatial concentration: a concentration of workers and businesses in one location lowers production costs because proximity permits workers and businesses to save on the costs of transporting goods and people. A good example of this would be the establishment of Iscor and SASOL in the Vaal as a result of the extensive coal and steel resources in the area, which led to the expansion of urban centres supplying labour to these industries and the resultant industrial concerns utilising these products (Slabbert, 2005:3).

Apart from the important factors affecting location decisions, Stonebraker and Leong (quoted in Karakaya & Canel, 1998:323), stress that the decisions to locate a facility should be consistent with the long-term strategic direction of the company. For this reason, Simonis (2002:3) adds that additional arguments have to be introduced in order to explain the advantages of concentration that is unrelated to natural resources, such as economies arising from transport cost advantages, increasing returns to scale and factor mobility. These clusters are known as agglomeration economies and are the result of these non-pecuniary factors.

The main concept, states Ellinger (1977:295), is that a firm will locate at the least-cost of maximum profit location. This assumes, among other things, firstly, that the entrepreneur knows the exact cost of each of the factors of production. Secondly, it assumes that there will be no innovations that change the point of the 'best' location, since once the location is chosen, in most industries, the sunk cost can only be recovered through the long-run use of the location.

A second explanation of the location of manufacturing firms, which was elaborated by Tiebout (cited in Ellinger, 1977:295) suggests that there are two possible polar views of the economic system, i.e.:

- Economic activities adapt themselves to the society in which they are placed;
- Economic activities do not, out of ignorance, adapt themselves to the economic system, but those who are lucky are adopted by the system.

In reference to this, two new terms are introduced by Ellinger (1977:295), i.e. locationally decisive firms and locationally indecisive firms. Locationally decisive firms are those firms that adapt to their environment in a process of mutual adjustment. A given firm chooses a location on the basis of the best information available to it by adapting to their economic environment. The firm also attempts to rectify any problems it has with the chosen location by adapting the environment to the firm's needs. It will do this by using various economies of agglomeration.

Locationally indecisive firms are those that choose a location based not on long-run locational cost considerations, but for certain short-run benefits. A few of these locationally indecisive firms would be successful in the long-run because they chose a location very close to the least cost point. The process would lead to a high concentration at the point of least cost (Ellinger, 1977:295).

Better understanding of the process by which firms and workers move is crucial, states Mueller and Morgan (2002:204), not only to the theory of industrial location but in developing public policies, for instance, to minimise the difficulties resulting from tariff reductions or to help depressed areas. Three kinds of location decisions are distinguished:

- The location of new firms;
- The decision of the existing firm to stay at their present location, or relocate;

- And location decisions which occur in connection with the expansion of facilities (Mueller & Morgan, 2002:204).

With the location of new firms there is a genuine decision in the sense that possible alternatives are carefully weighed and an optimum is sought. Often new companies which start on a small scale with limited resources seem to have little choice in the matter of location. New entrepreneurs are most numerous in the older, heavily industrialised areas. Local business relationships and the attraction of familiar places seem to have a tendency to keep them in this area. Thus the impact of non-pecuniary factors may well be in the direction of slowing down shifts in the geographical distribution of manufacturing activity. For a small firm in particular, a location decision is made as the consumer as well as a business owner and the preferences of the individual include both consumer and business preferences (Mueller & Morgan, 2002:206)

Mueller and Morgan (2002:206) stresses that as firms grow older and expand, many remain at or near their original locations, even though these locations may have become far from ideal. Besides the financial cost of relocating, stability in plant locations result from inertia, from uncertainty, from personal attachment of owners or managers to the place, or from reluctance to disrupt tested methods of operating or established business connections. Manufacturing firms have important ties to other business firms such as retail and wholesale customers, their suppliers, subcontractors, etc. The emphasis placed on cost factors in connection with relocation decisions is clarified when relocation plans are related to recent growth of the firm.

New capital investment by established firms constitutes a major source of flexibility in location patterns. When growth in business leads to the need for expansion, a genuine choice of location is required, unless the contemplated addition to facilities is small or important indivisibilities exist. The advantages of having the new facilities close by will then be weighted carefully against the cost and marketing advantages of more distant locations (Mueller & Morgan,



2002:213). In general, according to PDC (2002:2), firms choose locations they believe will allow them to maximise net revenues: if demand for goods and services is held roughly constant, then revenue maximisation is approximated by cost minimisation.

### **4.3 THE DEVELOPMENT OF INDUSTRIAL LOCATION THEORY**

According to Jones and Woods (2002) the contributions to location theory can be divided into several distinct stages. During the initial stage, primary attention was directed toward identifying factors that affected production costs. Land rent and raw materials were considered important factors in theories of the location of economic activity. In later stages, the influence of transportation costs and proximity to markets as well as raw materials were incorporated into cost minimising theories. Finally the concept of competition, profit maximisation and personal factors were added to modern location theory.

#### **4.3.1 Traditional theories of industrial location**

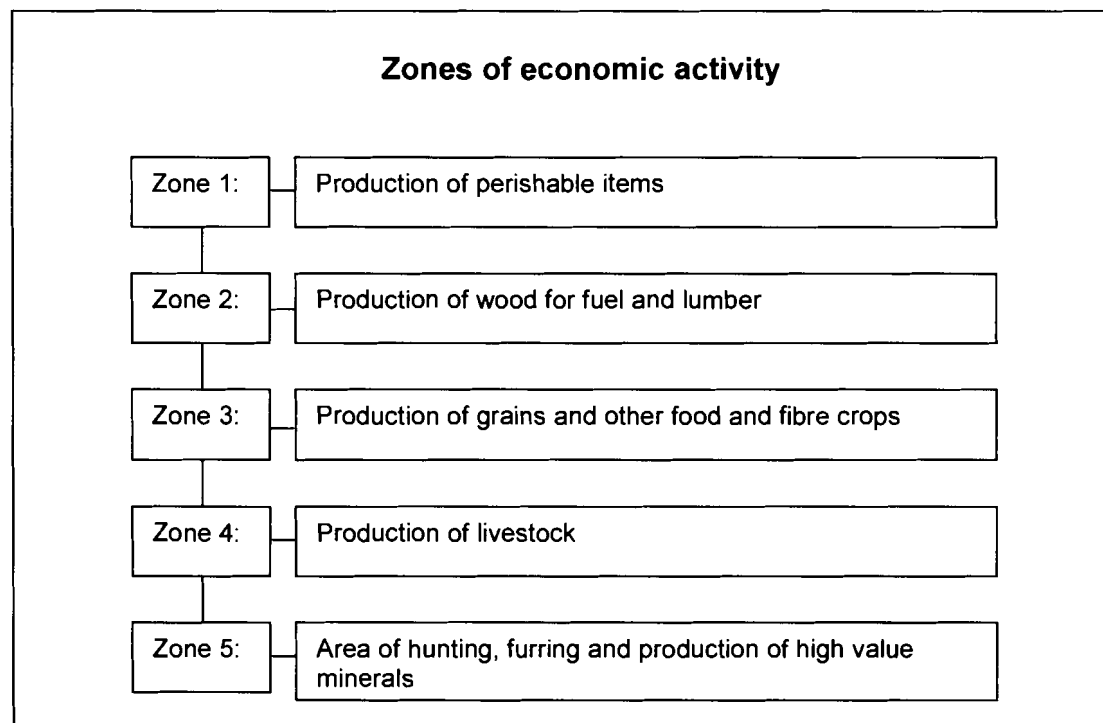
##### **4.3.1.1 The von Thünen land use model**

Von Thünen explored the economic forces that affect agricultural prices, land rent and the relationship of these forces to the pattern of land use (Carod, 2004:107; Jones & Woods, 2002).

Von Thünen's analysis is based upon the presumption that the geographical pattern of agricultural production was directly related to the competition among alternative uses, such as timber, crops, livestock, etc. for a single plot of land and the use of that earned the highest "rent" determined land use at that location. He assumed that a single, central city located on a homogenous plane purchased all agricultural produce and that labour and capital were not mobile (Jones & Woods, 2002).

According to Jones and Woods (2002) distance from the central market place was the prime determinant of land use. Land near the city would be used for the most intensive agricultural production such as dairying and garden vegetables. As distance increased from the centre, transportation costs increased and land prices declined because only less intensive uses could be supported. Von Thünen constructed concentric rings around the city centre, each dominated by a different economic activity. Examples of industries locating in the concentrated zones are shown in Figure 4.1.

**Figure 4.1 Zones of economic activity**



Source: Jones & Woods (2002)

Von Thünen's major contribution was to introduce the space dimension and the effect of transport, distance and cost on the location of economic activity. The major weakness of his theory is that it is dated. Modern firms have many interdependent factors affecting location. It is no longer possible to observe a simple homogenous plane surrounding a single market centre and devoted to

agricultural production and exploitation of natural resources, states Barlowe (1986:102).

Nevertheless, von Thünen's theory established the concept that economic advantage determines the location of economic activity and so serves as the major springboard from which modern location theory is derived (Barlowe, 1986:102).

#### **4.3.1.2 Weber's theory of industrial location**

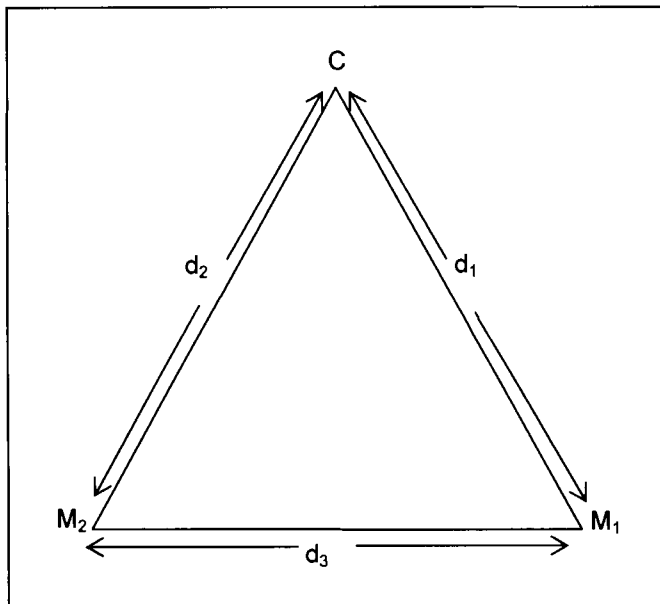
The second major phase in the development of modern location theory came with the work of Alfred Weber (Jones & Woods, 2002). He formulated a theory of industrial location in which an industry is located where the transportation costs of raw materials and the final product is a minimum. Richardson (1996:45) states that in a Weberian context transport costs alone influence the choice of location. The determination of the optimum location is reduced to finding the point which minimises transport costs. Weber singled out two single cases:

- The weight of the final product is less than the weight of the raw material going into making the product. This is the weight-losing case;
- The final product is heavier than the raw material that requires transports. Usually this is the case of some ubiquitous raw material, such as water, being incorporated into the product. This is called the weight-gaining case (Jones & Woods, 2002).

Considerations of varying combinations of transport costs would lead plants to locate either near the source of consumption, near the source of raw materials or at intermediate points, state Jones and Wood (2002). The location selected by a given plant depends upon which cost is most important to the type of process in question. In a simplified case the minimum transport location may be obtained by geometric means with the aid of Weber's locational triangle (Richardson, 1969:45).

An example of a locational triangle is illustrated in Figure 4.2, where C, M<sub>1</sub> and M<sub>2</sub> represent the place of consumption and the two raw material sources and the sides of the triangle represent the relative actual distances between the three points (d<sub>1</sub>, d<sub>2</sub>, d<sub>3</sub>).

**Figure 4.2 Weber's locational triangle**



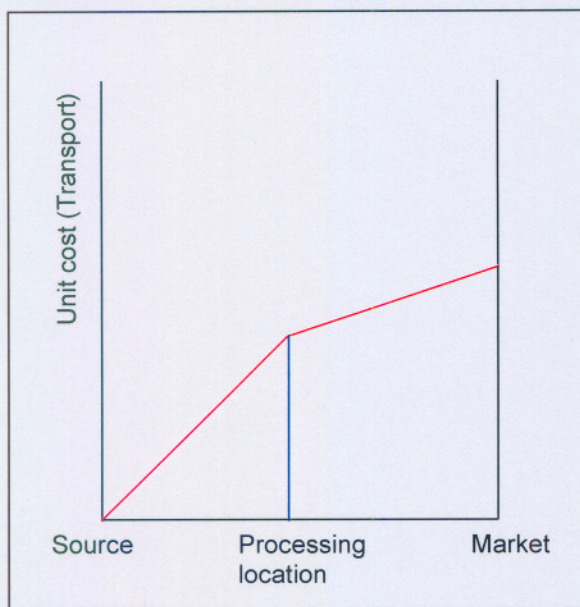
Source: Richardson (1969:47)

In his analysis of transportation costs, Weber looked at what happens to a raw material during processing as being the determining feature in plant location. He classified raw materials as: weight-losing raw materials, pure raw materials and ubiquitous raw materials. Weight-losing raw materials lose bulk or weight in processing and transport cost will be less for finished goods than for raw materials. A factory processing such materials will be drawn near their source. All these processes tend to locate nearer to sources of raw materials than markets if other costs are more or less the same. Pure raw materials are those that do not lose weight or bulk during processing. Since there is no difference in the bulk or weight that must be transported before and after processing, the plant may be located at the source of raw materials, thus accommodating some other cost factor. If the raw material is ubiquitous then a plant would locate at the

market since at that point the lowest transport cost would prevail for such raw material and product (Jones & Woods, 2002).

Anon (2000) explains the situation in which a plant is located somewhere between the source and the market. In Figure 4.3, the increase in transport cost to the left of the processing plant is the cost of transporting the raw material from its source. The rise in the transportation cost to the right of the processing plant is the cost of transporting the final product.

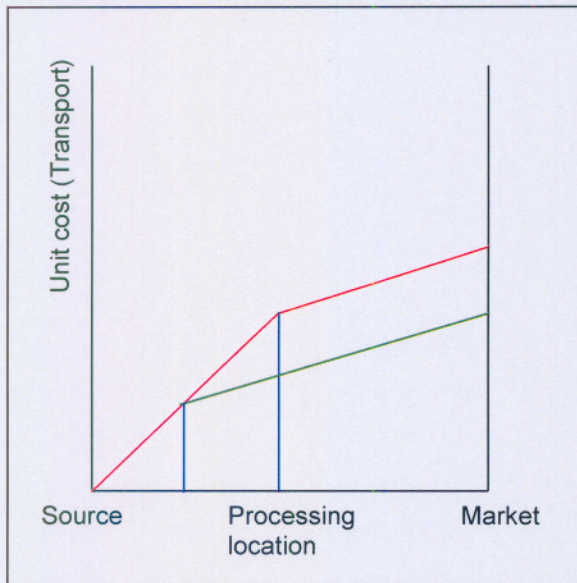
**Figure 4.3 Processing plant is far from the source of raw materials**



Source: Anon (2000)

Figure 4.4 shows the situation if the processing plant is moved closer to the source of raw material. The transport cost of the final product delivered to the market is lower than in the previous location.

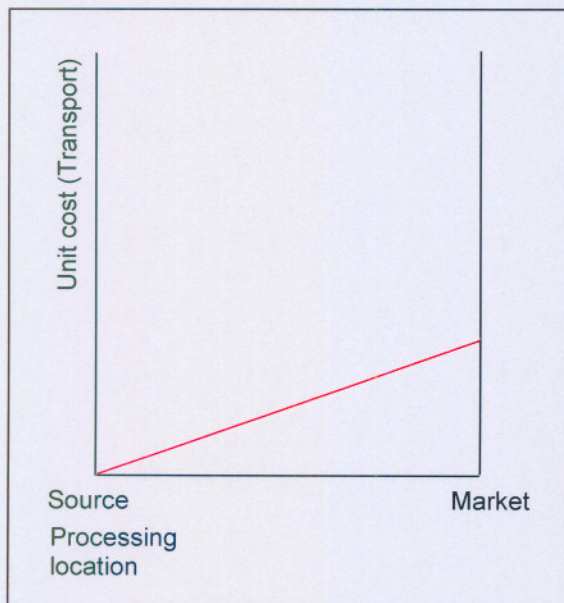
**Figure 4.4 Processing plant is moved closer to the raw material**



Source: Anon (2000)

The transportation cost for the product delivered to the market will be lowest of all if the processing plant is located at the source of the raw material, as shown in Figure 4.5.

**Figure 4.5 Processing plant is located at the source of the raw material**



Source: Anon (2000)

Weber's contribution to location theory also addressed labour costs as a determinant in location. He recognised that labour costs varied spatially and in some locations high transportation costs may be offset by lower labour costs (cited in Jones & Woods, 2002).

### **4.3.1.3 Shortcomings of classical location theories**

#### **4.3.1.3.1 Profit maximisation**

According to Jones and Woods (2002), by focusing attention on cost factors only, earlier theories either implicitly or explicitly assumed that perfect competition existed within the marketplace and that a producer need not consider the influence of plant location on the quantity of product that could be sold or its price. In reality, a firm seeking to maximise profit may choose a certain location to gain competitive advantages over other firms.

Greenhut (cited in Jones & Woods, 2002), argues that the more competitive the market, the more industry will be inclined to seek and adjust to the maximum profit location. The location selected will depend in part upon such demand factors as:

- Elasticity of product demand;
- Location of competitors;
- Importance of proximity to customers;
- Importance of direct contact with customers;
- Extent of market area (regional, national and international); and
- Relative competitiveness of the industry (Jones & Woods, 2002).

#### **4.3.1.3.2 Personal factors**

Greenhut (cited in Jones & Woods, 2002) also included the influence of personal factors in the profit maximisation theory of location. Personal factors have become an important influence in industrial location decisions. Industry evaluations of alternative locations involve a detailed analysis of not only factors contributing to production requirements of the plant, but also characteristics of a community as a place to live and work. Such factors typically include community facilities and services, cultural qualities of the community, community leader's cooperation, recreational facilities and quality of schools.

The influence of personal factors grows in those cases where the owner or manager is personally involved in selecting plant location, states Carrier and Shriver (1968:453). They concluded that most location decisions were based on cost and profit considerations with extraordinary attention being directed toward intangible personal factors and characteristics of the site. Worker productivity is also affected by these personal factors. This leads to attraction of quality labour and management in a particular geographic area.

#### **4.3.2 Modern industrial location theory**

While earlier theories of location include important factors that are still relevant, their simplistic approach is not adequate to explain the location of industrial activity in the modern economy (Jones & Woods, 2002). Some of the obvious weaknesses include:

- A preoccupation with minimising transportation, production, raw material and wage costs;
- Disregard for the profit maximisation motives of industrial decision makers;
- Disregard for the market structure within which the locating firm operates and its effect on the demand for products compared with its competitors.



#### **4.3.2.1 New economic geography**

According to Simonis (2002:3), the new economic geography (NEG) relies on the concept of “agglomeration economies”, i.e. economies arising from the interplay of transport costs, increasing returns to scale and factor mobility, in order to explain the clustering of firms, workers and consumers. Eckey and Kosfeld (2004:1) state that NEG represents a rediscovery of space in economics and presents a synthesis of polarisation and neo-classical theories.

The NEG proposes general equilibrium models in which the spatial distribution of economic activities can be explained by endogenous location decisions. The central idea is that the population and production patterns result from the interaction between centripetal forces (forward-backward linkages) and centrifugal forces (immobility of factors of production). The NEG can be useful to define the conditions under which a movement of firms toward the core can be expected and when this trend can reverse. The predominance of agglomeration forces could extend the imbalance between a core and a periphery and create spatial inequalities (Simonis, 2002:5).

Eckey and Kosfeld (2004:3) explain that the core of NEG is the model of monopoly competition evolved by Dixit and Stiglitz. According to this, consumers prefer as broad a range of products as possible. Producers adjust to the wishes of the consumers, but at the same time an endless quantity of products is rendered impossible by the fixed and variable costs of producing goods.

##### **4.3.2.1.1 Increasing returns to scale**

The NEG considers that the geographic concentration of economic activity reflects the interaction between the presence of increasing returns to scale and transport costs. In such a world, increasing returns activities are predicted to locate in the larger market, giving rise to a ‘home-market’ effect. When transport cost matter, attractive locations for production of goods subject to economies of scale are those locations, which are close to markets (backward linkages) and

suppliers of intermediate goods (forward linkages), *ceteris paribus* (Simonis, 2002:6).

Then, concentration of production in some location tends to attract the mobile factors of production. Workers have better job and consumption opportunities where production is concentrated. The resulting concentration of the labour force leads to more demand for consumption goods in that location, which makes the region more attractive for producers. Concentration of population and economic activities in one region may drive land rents and housing prices up and lead to congestion and environmental problems. Moreover, as immobile factors remain in peripheral areas, firms from the centre may want to move there to supply these areas (Simonis, 2002:6).

#### **4.3.2.1.2 Agglomeration economies**

The NEG starts from the observation that economic activity is unevenly distributed across space. The concentration of economic activity can only be partly attributed to differences in underlying characteristics. A main explanation of the spatial concentration of firms and consumers is related to the existence of externalities, the so-called 'agglomeration economies', which means that spatial concentration itself creates a favourable environment for the location of economic activity, enhancing productivity and growth (Fujita *et al.*, 1999:3).

The NEG distinguishes between pecuniary and non-pecuniary externalities. Pecuniary externalities refer to the effects of interactions mediated by markets. These interactions, which contribute to the formation of agglomeration economies, can be divided into two types (Fujita *et al.*, 1999:4):

- Interactions between firms and households: these externalities relate to employment or consumption of goods and services. The proximity between firms and households facilitates the matching process in terms of skills on the labour market and the access to a larger variety of goods and services.

- Interactions between firms: the proximity between firms facilitates forward-backward inter-industry and intra-industry linkages such as the access to a larger variety of intermediate goods and business services, as well as intra-firm relations between front and back office.

According to Fujita *et al.* (1999:5) non-pecuniary externalities, such as knowledge spillovers, refer to the effects of non-market interaction due to proximity. Non-pecuniary externalities are realised through processes directly affecting the utility of an individual or the production function of a firm. The reason for clustering is the fact that these externalities between firms are assumed to decline rapidly with distance. Knowledge spillovers are channelled through face-to-face communications and casual diffusion of information between firms.

#### **4.3.2.1.3 Cumulative or circular causation mechanism**

The theory of cumulative and circular causation, developed by Gunnar Myrdal, focuses on how changes in infrastructure may trigger off circular and cumulative growth processes. Myrdal focused on the trade between rich and poor countries and advocated that traditional theories of location do not capture what actually happens when trade intensifies between two countries (or regions) that are initially on different levels of economic development (Bråthen, 1998:15). Economic development in central areas may cause centripetal forces (forces that promote spatial concentration), attracting capital and labour from weaker regions, resulting in draining of enterprises from surrounding areas (Fujita *et al.*, 1999:9).

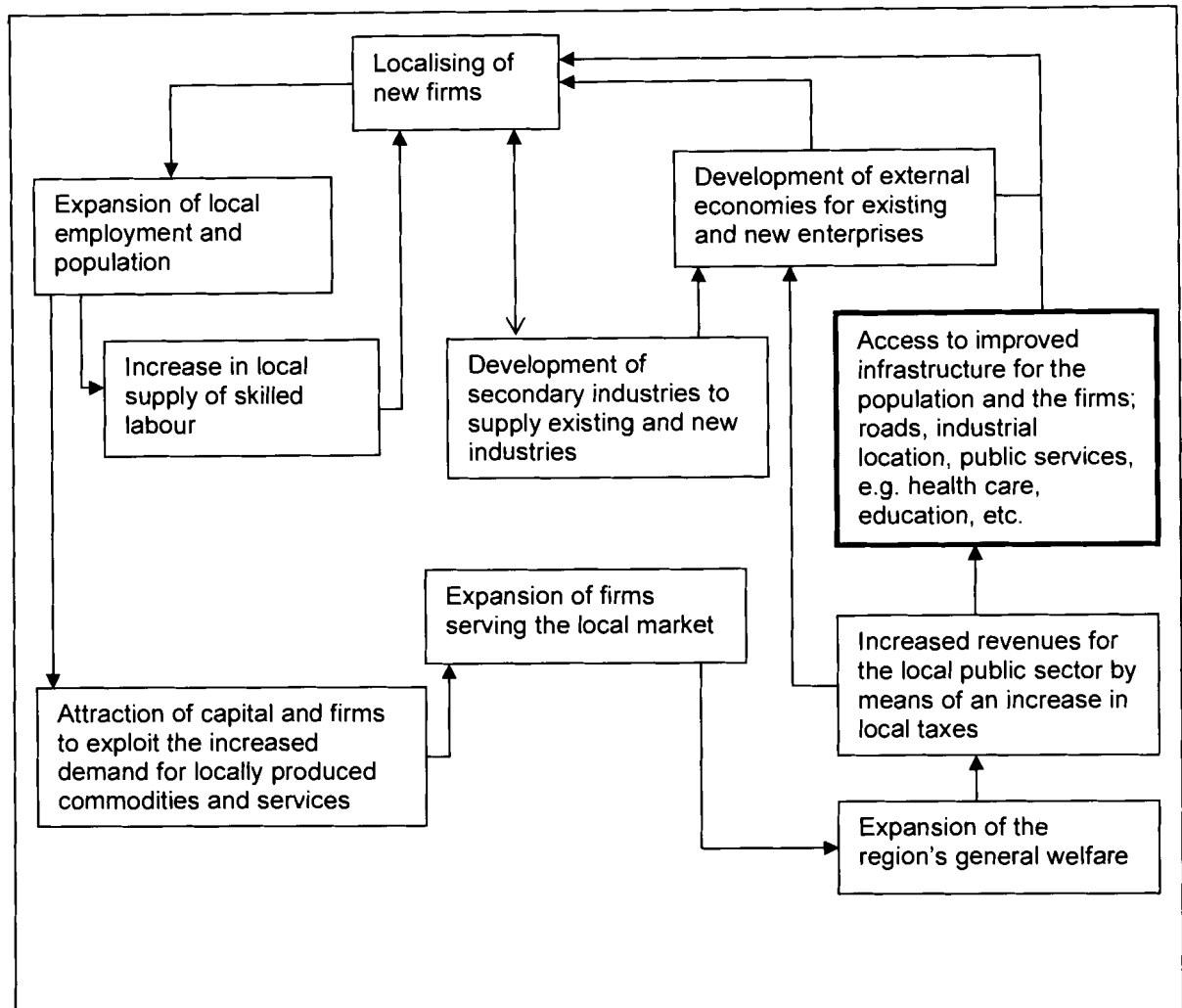
According to Simonis (2002:8), the NEG considers that the concentration of economic activity in a location creates a favourable economic environment that supports further concentration. The interaction of demand, increasing returns and transport costs creates a circular causation process. In the presence of increasing returns and transport costs, firms tend to agglomerate in a single place and to choose a location with a large local demand.

The circular causation reinforces small differences in the production structure and can differentiate similar markets into large and small. Locations with large population will tend to specialise in the production of goods for which scale economies, product differentiation and transport costs are significant. With a large home market, producers of highly differentiated products can potentially obtain enough local demand to exploit economies of scale. Locations with small home markets will tend to specialise in standard products, or products for which transport cost or scale economies are less significant (Simonis, 2002:8).

Figure 4.6 illustrates the possible causes and effects of an improvement in the supply of infrastructure. With the establishment of the proposed VICD as part of a logistical hub (with an IDZ), there would be increased revenue to the region as well as the development of secondary industries involved in activities associated with freight movement, e.g. repackaging of cargo, shipping cargo to users, etc. This in turn would lead to the development of external economies for existing and new enterprises due to the expansion of local markets in the Vaal to other regions within South Africa and to other countries in general.

Firms would relocate to the Vaal region as a result of the economies of scale, expanding local employment opportunities and increasing the supply of skilled labour in the region. Firms producing goods for the local market would also relocate to the region in order to take advantage of the increased demand for locally produced products. This is illustrated in Figure 4.6.

**Figure 4.6 Infrastructure and cumulative growth**



Source: Bråthen (1998:15)

#### 4.3.2.1.4 Relevance of new economic geography

When two regions have absolutely identical location conditions, agglomeration processes can occur. The derivation takes place in demanding and internally consistent mode. However, according to Eckey and Kosfeld (2004:19) there is still the question of whether the suppositions made in the model depict human behaviour appropriately.

The suggested pattern of utility, income and profit maximisation are in line with neo-classical arguments. In this sense, appropriate objections cannot be made

against the NEG model, but against neo-classics in general. The following objections are more serious (Eckey & Kosfeld, 2004:19):

- The decisions of households and firms are not referred to an inter-temporal decision calculus, characteristics of modern consumption and investment theory;
- Firms set their prices by a mark-up of costs, without paying attention to the reaction of competitors;
- Firms produce one good respectively. There are no economies of scope;
- Despite fixed costs, firms remain totally mobile. 'Sunk costs' are not compatible with the model;
- The production factor 'capital' does not occur in the model. Production occurs exclusively by the use of the production factor 'labour';
- Agglomeration is slowed down only by transport costs, which have to take on utterly implausible dimensions to explain deglomeration processes. Other decelerating effects, such as rising property prices with concentration size, overload of (traffic) infrastructure and negative environmental impact, do not occur in the model;
- It is implausible that the industrial workers are mobile interregionally, but not intersectorally. Equally obscure is the complete immobility of the labour force in agriculture;
- Whereas transport costs occur in the model for industrial goods, agricultural goods move between the regions at no cost; and
- It remains an open question how regional winners can become losers and vice versa. The well-known phenomenon of aspiring mobile and declining regions cannot be explained by this model.

The NEG is thus still an incomplete instrument that leads to the recognition of factors already well-known in regional economics.

#### **4.4 FACTORS AFFECTING LOCATIONAL DECISIONS**

Liu *et al.* (1999:2) regard location as the primary goal of real estate and one of the keys to an investor's success. A firm's location and that location's effect on performance is not given much attention in advanced market economies. However, regions within developing economies often compete to create the most efficient political and economic conditions possible, including free trade and movement of capital, minimum government interference in wage and price setting, protection of property rights and enforcement of contracts. In an ideal system, investment returns, costs and benefits across locales would converge towards equilibrium. Developing economies such as South Africa often do not even come near such equilibrium.

Advantages to businesses in a region derive primarily from that region's ability to provide some factors at a better value than competing regions, states PDC (2002:1). It is not just the cost of these factors that matters, but their quality as well. Greater expenses for some of the factors are justified if they are more productive. Factors such as land, labour and infrastructure directly influence production costs, while other factors such as environmental and cultural amenities have an indirect effect that can help maintain a skilled labour pool and other direct inputs.

##### **4.4.1 Direct factors affecting location**

The locational demands of a business undertaking will begin at the most basic level with decisions regarding the necessary mix of the required production factors. These are used to determine the size of the undertaking and thus the required space that the undertaking will occupy. Manufacturing undertakings will require a large open location while retail undertakings would only require small premises to begin operation (PDC, 2002:1).

#### **4.4.1.1 Capital**

The availability of capital can affect the location of an industry as well as the costs and methods of production. There are two types of capital required for industry: fixed capital and working capital. They differ in that fixed capital is relatively immobile once put in place and its value is derived from the output it produces. Due to this immobility, heavy investments in capital equipment are not readily written-off until a useful term of life has been served. Working capital is much more mobile, although its mobility depends on numerous economic, social and personal considerations (Jones & Woods, 2002).

#### **4.4.1.2 Labour**

PDC (2002:2) states that labour is often the most important factor of production. Other things equal, firms want productivity, in other words, labour output per rand. Productivity can decrease if certain types of labour are in short supply, which increases the cost by:

- Requiring either more pay to acquire the labour that is available;
- The recruiting of labour from other areas or;
- The use of the less productive labour that is available locally.

With the population of South Africa growing at a steady pace, it is likely that the size of the labour force available to industry will continue to grow in size and its makeup will have to change to keep pace with the changing labour requirements of the industry. As manufacturing processes become more and more mechanised, there is the threat of a constant reduction on the number of direct production employees per unit of output. Job requirements are becoming more complex and due to longer education and training of skilled workers, individuals are starting to work later in life, all of which will affect the supply of labour to the new undertaking (Fulton, 1965:41).



The cost of labour is another important element states Fulton (1965:42), even though as industrial processes become more automatic, the labour input for a unit of production diminishes. Particularly for those industries which are labour orientated, or for individual producers with an insufficient volume to justify mechanisation or automation, it will be more and more necessary to increase output per rand of payroll expended in order to stay competitive.

Wage differentials between areas must also be taken into account. The differences in wages paid to individuals within certain areas arise due to the relative status of the area. For example, a waiter at an upmarket restaurant in a wealthy area will certainly get paid more than a waiter at the local drive-in in less wealthy suburbs. Plant location decisions based of presumed wage area differentials must, in order to be sound, take cognisance of two concepts:

- Often intercommunity variations in wage rates are greater than inter-area variations;
- Areas of low wage level are those areas where there is a substantial population and large potential labour force relative to existing employment opportunities, where the labour force is predominantly made up of unskilled labour (Fulton, 1965:42).

Fulton (1965:42) further states that if the local conditions permit, it is quite conceivable that companies will refine their evaluations of the labour situation with psychological testing; investigation into the ethnic background of an area; predetermination of local population attitudes toward industry in general, the specific industry in particular, and the personnel running the plant and; polling of local social and political views.

#### **4.4.1.3 Land and access to raw materials**

According to PDC (2002:6), land requirements depend on industry and firm type. Research and development firms often want suburban campus locations. Manufacturing and distribution firms need to be close to major interstate

highways. High-tech manufacturing firms are more likely to be found in suburban industrial parks than in the central city. Suburban land and buildings are generally available at a lower cost per square metre and there is room to expand due to the higher land assembly in urban areas and redevelopment cost within the city core.

The number of employees per square metre varies widely by industry. Offices have higher employee per square metre ratios than factories, and factories have a higher ratios than warehouses. The employees per square metre decrease as factories become more automated, and rely less on human labour. The ratio of office space is expected to rise on the other hand, due to increased use of computers and shared office space (PDC, 2002:6).

Jones and Woods (2002) state that in recent years raw materials have been less important than labour and markets in attracting industry to a particular site. This is because most industrial growth has been in the lighter service-orientated industries. Modern efficient transportation systems have increased the feasibility of transporting raw materials over long distances. However, raw materials remain an important factor in location decisions of certain types of industry and many firms still find it advantageous to locate near the site of raw materials.

#### **4.4.1.4 Local infrastructure**

An important role of government is to increase economic capacity by improving quality and efficiency of infrastructure and facilities, such as roads, bridges, water and sewer systems, airport and cargo facilities, energy systems and telecommunications. Liu *et al.* (1999:21) state that infrastructure has the greatest effect on a firm's location decision. Infrastructure is vital in attracting manufacturing firms to a region, especially in developing economies such as South Africa, which generally has poor infrastructure.

Certain essential inputs, including power and telecommunications links are often inadequate. The level of infrastructure development varies from one region to

another, largely because of the lack of fully developed capital, land and labour markets. To ascertain the link between infrastructure and location choice, the infrastructure conditions for each province and municipality need to be measured. The variables used to determine infrastructure levels, are electricity use per capita, road-to-land ratio, and wage level. Purchasing power per capita and population density were used to gauge market size. The higher the figure for these factors, the more positive the effect on the choice of location (Liu *et al.*, 1999:21).

While businesses prefer localities that offer low tax rates, they will not likely choose an area if low taxes are reflected in poorly-maintained infrastructure, low-quality schools, and a substandard communications network states, PDC (2002:7). Locations with relatively higher taxes but with infrastructure and public services levels comparable to low tax rates and quality infrastructure is a key element of a location's competitiveness.

#### **4.4.1.5 Transportation**

Firms need to transport their product to the market. The type of transportation requirements depend on firm type and industry. For example, a firm's headquarters will look for a region with good airport access if its manufacturing operations need to have access to transportation systems that can cheaply carry large volumes. Fulton (1965:46) states that developments in transportation have had a tremendous impact on plant location and that companies will often locate in new areas and, within an area, will often locate factories, stores and warehouses differently in relation to one another.

Richardson (1969:42) states that if personal and subjective considerations are ignored and if processing costs and the location of competitors are held constant, then the choice of location depends upon transport costs. The maximum profit location for a plant is the one where transport costs are minimised. Even if these assumptions are relaxed, transportation may still be an important locational

influence especially when the freight/total cost ratio is high, and when this ratio varies widely between different sites.

New transportation technology and changing cost patterns have tended to improve the advantages for certain areas in recent years, states Jones and Woods (2002). Two transportation objectives are important to businessmen in selecting a plant location: low cost and satisfactory service. Where transportation costs are of major significance and competition among firms exists, an attempt will be made to locate where the cost of assembling materials and delivering finished products are at a minimum. In less competitive industries, pressure to reduce transportation costs may be less although rising fuel costs have increased the concern for transportation in virtually all industries. Quality and dependability of transportation services are sometimes more important in the location of industry than achieving the lowest possible transportation costs. Location of plants may be conditional upon the availability of regular shipments with certain time limits (Jones & Woods, 2002).

Another obstacle for businesses is the possibility that alternative transportation means will not be available everywhere. For part of the distance that the product is carried, one form of transportation may have to be used, and then a change of carriage may be necessary. The points where transport systems converge are usually called transshipment points. Costs are involved in transferring goods from one form of transport to another, and these costs can be evaded by locating a plant at the break in the transportation network. Transshipment points are therefore very desirable locations as well as raw material and market locations, particularly for plants engaged in intermediate stages of production, such as working up raw materials into finished products (Richardson, 1969:45).

#### **4.4.1.6 Markets**

The importance of nearby markets for industrial products is a major locational factor. It is important to distinguish between consumer markets and industrial markets. Consumer markets are generally related to population concentrations

and income levels while industrial markets are related to centres of manufacturing a specific product. The variety of goods and services consumed in consumer markets is extremely wide and competition for a share of the market of most products is national or even international in scope. The producer of a particular product for this market must recognise this fact since it directly affects his volume of sales and product price (Jones & Woods, 2002).

The needs of industrial markets are generally more specific than consumer markets. Industrial development should not overlook the market potential arising from the needs of new or existing local industry that may be acquiring production inputs from distant areas. Often these needs can be met more efficiently by local production that would enjoy a natural locational advantage, state Jones and Woods (2002).

#### **4.4.1.7 Entrepreneurship**

This input to production may be thought of as good management, or even more broadly as a spirit of innovation, optimism, and ambition that distinguishes one firm from another even though most of their other factor inputs may be quite similar, states PDC (2002:3). The entrepreneur takes all the other factors into consideration when deciding on an adequate site for the firm.

#### **4.4.1.8 Public policy**

The supply, cost and quality of any of the above factors depend on market factors: on conditions of supply and demand locally, nationally, and globally. However, they also depend on public policy, which affects them through regulation, taxes and financial incentives (PDC, 2002:3).

##### **4.4.1.8.1 Regulations**

Regulations exist to maintain the health, welfare and safety of a community. They are designed to make buildings safer, the air cleaner, and a variety of other protections. However, firms must work with local bureaucracies to meet

regulatory requirements, and some regulations and process can be rather onerous, states PDC (2002:8).

Shorter product life cycles have put pressure on companies to bring new products to market quickly. Simplified bureaucracies and a short predictable permitting process can help firms react quickly in a competitive marketplace. Quite often it is found that managers would rather have strict regulations that were clearly specified than unclear regulations that were less restrictive (PDC, 2002:8).

The attitude behind the implementation of the local regulatory and permit system is equally important. Locations that work to assist development within the context of meeting community's regulatory mandates fare better than locations that use their regulatory and permit system to keep undesired things from happening. It is the difference between viewing businesses as part of the community or an adversary to protect the community from (PDC, 2002:8).

#### **4.4.1.8.2 Taxes**

According to PDC (2002:8), economic theory supports the notion that firms will locate where they can optimise their after-tax profits. Consistent with this theory, a decrease in taxes will generate an increase in local employment. Taxes generally discourage economic growth; however tax rates only matter at the margin, after corporations have made decisions on labour, transportation, raw materials, and capital costs. Within a region where production factors are likely to be similar, differences in tax levels across communities become more important in the location decision. Manufacturing location decisions tend to be more sensitive to taxes than non-manufacturing location decisions.

#### **4.4.1.8.3 Financial incentives**

Governments offer firms financial incentives to encourage growth or to achieve other public goals. Generally, most types of incentives have very little effect on firm location between regions. Incentives are more effective at redirecting growth

within a region than they are at providing competitive advantages between regions. Incentive programs do play a significant role in competition among regions. While the monetary value of incentives may not be a significant factor in location decisions among regions, merely having financial incentive programs tends to keep a region in the running long enough for firms to evaluate and weigh the value of the location factors which are significant to the location decision. Having no incentive programs results in areas being dropped early from an analysis since information on incentives is one of the first items gathered (PDC, 2002:9).

The purpose and effect of incentives needs to be considered closely. Enterprise zones provide incentives to firms that locate in a specified zone, often in the central city, with the intent of creating job opportunities for zone residents and thereby reducing poverty. However, poor households in central cities may not have the skills required for jobs made available through these programs. Thus, policies that attempt to foster central city investment and job creation are unlikely to reduce poverty without companion policies and programs designed to address resident education and skill levels (PDC, 2002:9).

#### **4.4.2 Indirect factors affecting location**

It is often shown that firms locate in areas because of the presence of factors other than direct factors of production. These indirect factors include industry clusters, location amenities and innovative capacity (PDC, 2002:3).

##### **4.4.2.1 Industry clusters**

Another factor that is important with regard to location decisions is agglomerative economies or industry clusters. The agglomeration theory states that executives tend to locate their firms in areas where there is already a concentration of firms like their own. PDC (2002:10) states that the theory works in practice because firms realise operational savings when they congregate in a single location. New

firm births are more likely in an area where a cluster already exists and many communities actively pursue clusters as an economic development method.

Industry clusters occur for three reasons:

- Firms that require an especially skilled labour force locate where that labour force already exists. An easy way for firms to identify the presence of that labour pool is the presence of similar firms. The new firm draws from the same labour pool that the pre-existing firms helped to train. The cluster of similar firms also attracts skilled workers. An individual with the necessary skills will find it advantageous to relocate to that area because the chances of employment rise with the number of firms that need his or her skills. The two firms work together to create a large skilled labour force and many firms to employ them.
- As similar firms cluster together, firms that supply specialised products and services to these firms are also likely to locate in the cluster. Industry clusters save transport costs by proximity to these input suppliers.
- Industry clusters encourage knowledge spillovers. The exchange of information occurs in the work place, such as when suppliers work with their buyers to develop more efficient products, but it also occurs informally. As workers in one firm socialise with their counterparts in other firms the exchange knowledge and ideas, and new ideas take shape (PDC, 2002:10).

#### **4.4.2.2 Quality of life**

The factors that impact on an area's quality of life such as good schools, low crime rate, a clean environment and recreational opportunities draw workers to the region, and firms follow the workers. Households are attracted to regions by amenities that wages cannot provide. If amenities lure a large number of households to an area, the excess labour supply can exert downward pressure on wages and thus firms benefit by saving on labour costs (Casado-Izaga, 1999:31).



According to PDC (2002:11), many high-skilled technical workers can choose where they want to live; they can apply their skills to a variety of industries or have the ability to telecommute. Because they can choose their locations, they choose those with quality amenities. High-tech plants located in communities that rank low on a livability scale have difficulty in attracting technical and managerial personnel. Cities can build their economic base by focusing on what is desirable to technology workers. Amenities matter to firms as more than a way to cash in on their depressive effect on wages. People manage firms, and managers like to live in nice places just as much as workers do.

#### **4.4.2.3 Innovation**

PDC (2002:11) states that there is increasing evidence that suggests a culture promoting innovation, creativity, flexibility, and adaptability will be essential in keeping cities economically vital and internationally competitive. Innovation is particularly important in industries that require an educated workforce. High-tech companies need to have access to new ideas typically associated with a university or research institute. Government can be a key part of a community's innovative culture, through the provision of services and regulation of development and business activities that are responsive to the changing needs of business.

Innovation is tied to industry clusters. Firms operating within a cluster of similar and connected firms are often able to more clearly and quickly perceive new buyer needs. They can more readily perceive new technology, operating, or delivery possibilities. Regional leaders, public and private, can promote and shape regional institutions that affect the innovation process. They can build fundamental economic assets: education, research, and financial platforms (Casado-Izaga, 1999:31).

#### **4.4.2.4 Consumer tastes**

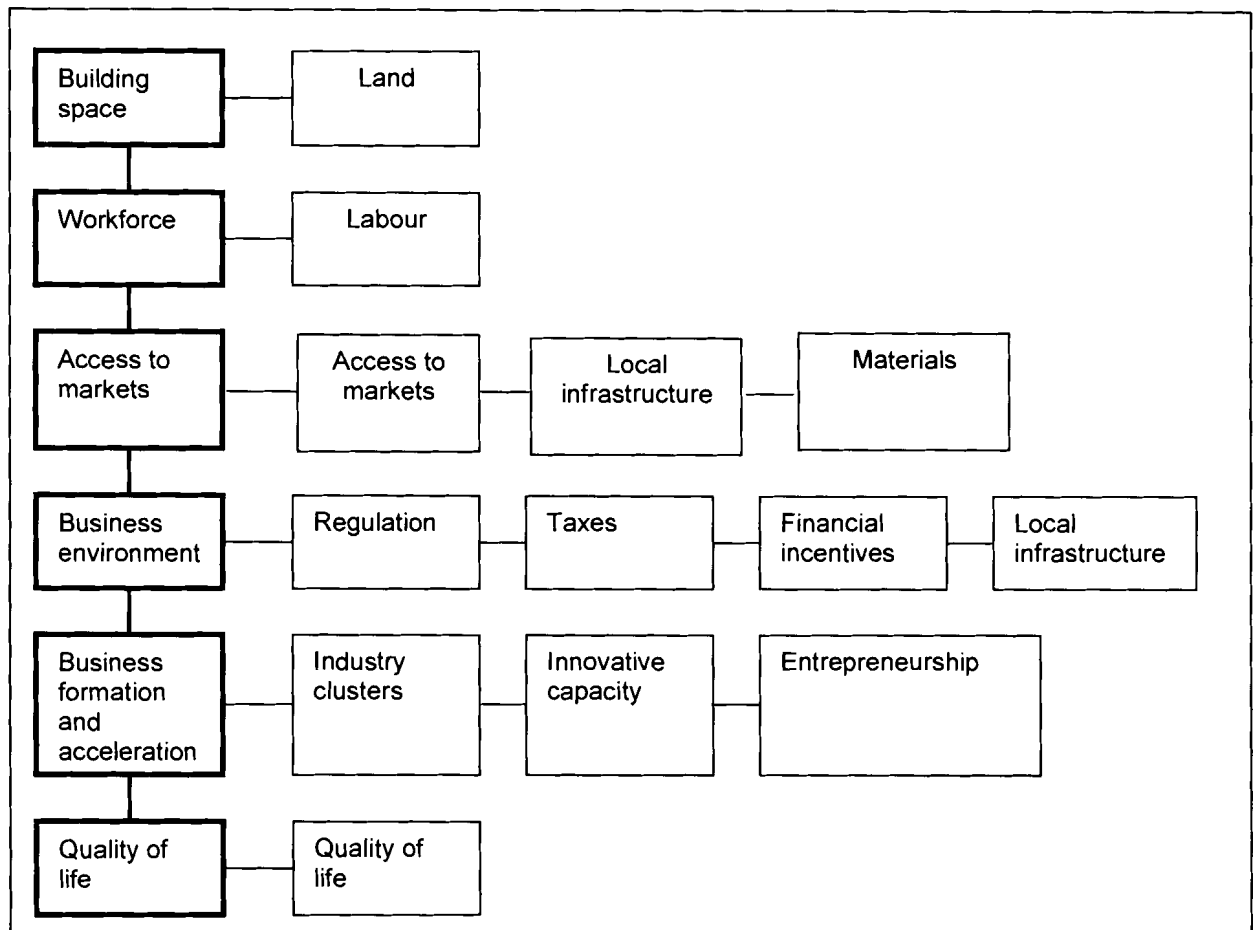
Casado-Izaga (1999:31) adds consumer preference to the list of indirect factors that affect a firm's location. Sometimes firms know their potential market but cannot recognise specific tastes or locations of consumers until they decide on the product characteristics, or the place in which they are going to establish themselves. Experience allows firms to adapt their products to existing tastes, but if reallocation expenditures are high, or in a one-shot game, the decision on product location is irreversible.

From the seller's point of view the determination of the specific variety to be produced when consumer tastes are unknown is decisive. Although firms can know the number of potential consumers in a market and the similarity of their tastes, they cannot know their real preferences in advance. To learn consumers' real tastes, firms must already be in the market, and therefore they must locate their products or choose their characteristics before knowing the real city or the real tastes of the consumers (Casado-Izaga, 1999:31).

#### **4.4.3 Categories of firm location factors**

In the former section the factors that influence the location and expansion of firms are discussed. These factors are grouped into six categories, which are illustrated in Figure 4.7.

**Figure 4.7 The categories of factors influencing location decisions**



Source: PDC (2002:12-14)

## 4.5 INPUT-OUTPUT ANALYSIS

According to Hoover and Giarratani (1985:320), the various types of models of regional economic interaction involve a framework of “regional accounts” describing transactions between the region and the outside world and among activities within the region; nearly all include some type of multiplier ratio that sums up the relation between an initial increase in demand and the ultimate effect on regional income or employment.

The model discussed in this study was implemented to measure the impact of positive (e.g. the establishment of new industries) changes in the Vaal economy

on employment and household income. Input-output modelling is based on internationally recognised econometric techniques. The result of an input-output modelling exercise is presented in the format of input-output tables. These tables are based on the national accounting system of a country. In South Africa, the main source for providing this information is Stats SA.

#### **4.5.1 Description of the input-output model**

The input-output framework of analysis was developed by Wassily Leontief in the late 1920s and early 1930s. In the beginning, it was designed for application at a national level; subsequent developments have extended it to the regional level (Miller 1998:42; Armstrong & Taylor, 2000:36). The first official input-output table in South Africa was compiled in 1956-1957 to serve as a basis for the Economic Development Plan (CSS 1978:18).

The input-output model depicts economic linkages that exist within and between different components of an economy. This approach identifies monetary flows (expenditures and receipts) between various units (Khun & Jansen 1997), and focuses on the interdependence of different sectors of economic activities. The fundamental notion of an input-output table is that the production of any output requires inputs. These inputs may take the form of raw materials or semi-manufactured goods, or inputs of services supplied by households or the government (Armstrong & Taylor, 2000:35).

As shown in Table 4.1, the input-output table has four quadrants. The content of each is as follows (CSS, 1978:15):

- Quadrant 1 is referred to as the transactions table, which contains the transfer of goods and services between different sectors for production purposes. They are referred to as “intermediate inputs”.
- Quadrant 2 shows the different “final demand” components: private consumption expenditure, government consumption expenditure, gross domestic fixed investment, change in inventories and total exports.

- Quadrant 3 represents the demand for “primary inputs” by the productive sector: imports, remuneration (salaries and wages which can also be divided into categories or social classes depending on the analyst’s objectives on income distribution analysis), gross operating surplus (savings and depreciation), as well as net indirect taxes (subsidies are subtracted).
- Quadrant 4 shows the portion of “receipts by primary inputs”, which is part of final demand. For example, part of income can be dispatched as dividend and interest, salaries to households for private consumption, investment expenditure, government transfer (e.g. pension) and transfer to the rest of the world.

**Table 4.1 Features of an input-output table**

<b>Quadrant 1</b>	<b>Quadrant 2</b>
Intermediate inputs	Final demand
<b>Quadrant 3</b>	<b>Quadrant 4</b>
Primary inputs	Primary inputs directly to final demand

Source: CSS (1978:15)

Input-output tables show the production function of a specific geographic area in terms of the value of transactions that have taken place between different sectors and sub-sectors in the economy. It also takes into account imports and exports to and from the specific geographic area. The classical input-output model therefore provides a framework that illustrates inter-industrial linkages and economic interdependencies (Urban Econ 1998:117).

The input-output technique provides a snapshot of economic production at a given point in time and, as such, has numerous application possibilities. An application of this technique includes determining the impact of changing production functions on the general economic equilibrium. It is imperative that the results of the model be

interpreted in the correct context and that cognisance be taken of its constraints, as is the case with almost any modelling exercise. The most important constraints and assumptions of this technique are briefly outlined below (Urban Econ 1998:77, 78):

- Classical input-output modelling provides a view of the economy in equilibrium at a specific instant in time and it therefore assumes fixed output production and pricing.
- Calculations are linear in two respects, firstly in terms of pricing and secondly in terms of production. Therefore, input-output modelling assumes that the output price will be directly proportional to demand, allowing for no economies of scale and other externalities. Similarly, production functions (the mix of inputs relative to outputs) are fixed for all output ranges.
- Input-output tables are sophisticated, costly and have extensive data requirements. The results are therefore dependent on data availability and quality.
- The model does not anticipate structural economic changes such as, for example, the impact of substitute products and technological innovation.

In spite of the limitations of input-output modelling, it is an empirical, internationally recognised econometric technique that has been widely applied in South Africa (Urban Econ 1998:117). The construction of an input-output transactions table for a regional economy is not confined to describing the input-output flows only. Once the interdependencies between sectors have been quantified, it is possible to estimate the effect of any change in the final demand on the entire system (Miller 1998:42). In this study, it will primarily be used to provide a model to measure the impact of any change in the final demand for the output of the Vaal and on the level of household income and employment in the Vaal.

#### **4.5.2 Methodology**

An input-output table of a region is a very useful instrument to indicate the degree of

interdependence of local industries, the dependence of the local economy on imports and the role played by exports. It depicts the flow of goods within, out of and into the economy and it has the potential to do so on a highly aggregated basis, by type of industry (Slabbert & Slabbert 1983:5).

As discussed in Slabbert and Slabbert (1983:5), the input-output table divides the economy into production sectors. For each of these sectors, the table lists the inputs by their source and the outputs by their destination. Each sector appears twice, as a column with its input pattern (purchases from other sectors) and as a row with its output pattern (sales to other sectors). More precisely, a row in the regional input-output table shows the distribution of the output (in Rand value at producer prices) of a particular local industrial sector listed at the left side of the row, in relation to:

- Every other sector in the same region or to local intermediate demand (part of the inter-sectoral matrix);
- Exports of the region;
- Direct domestic consumption and investment demand, i.e. to final demand.

An input-output table identifies in Quadrant 1 the inter-sectoral matrix which is indicative of the degree of local industrial interdependence; in Quadrant 2 the consumption pattern of the locally-produced goods and services as well as the export pattern of the region; and in Quadrant 3, the income accruing to the local factors of production (e.g. the households for their labour) for their participation in the local productive activity, as well as the import pattern of the region (Slabbert & Slabbert 1983:5).

It is clear that the input-output table is an excellent device for describing the flow of goods in the regional economy. However, in addition to its descriptive function, it also offers analytical qualities and can serve as an economic model for the region. The cornerstone for such a model is the technological relationship that the sales of any sector to any other sector depend, via an assumed linear and

constant production function, on the level of output of the purchasing sector. A skeletal input-output table (Table 4.2) will illustrate this technical relationship (Slabbert & Slabbert 1983:5).

**Table 4.2 A skeletal input-output table**

<b>Output</b> <b>Input</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>Final Demand minus export</b>	<b>Export</b>	<b>Gross output</b>
<b>1</b>	$X_{11}$	$X_{12}$	$X_{13}$	$Y_1$	$E_1$	$X_1$
<b>2</b>	$X_{21}$	$X_{22}$	$X_{23}$	$Y_2$	$E_2$	$X_2$
<b>3</b>	$X_{31}$	$X_{32}$	$X_{33}$	$Y_3$	$E_3$	$X_3$
<b>Value added</b>	$V_1$	$V_2$	$V_3$			
<b>Import</b>	$I_1$	$I_2$	$I_3$			
<b>Gross outlay</b>	$X_1$	$X_2$	$X_3$			

Source: Slabbert and Slabbert (1983:5)

Where:

$X_i$  = the gross output or outlay of sector i;

$X_{ij}$  = the intermediate sales of sector i to sector j from sector i;

$Y_i$  = the sales of sector i to final demand (direct consumption and investment);

$E_i$  = the sales of sector i to export;

$V_i$  = value added in sector i by the local factors of production which in this context stands mainly for household income;

$I_i$  = purchases of sector i from import.

The following equations can be drawn up from the skeletal input-output table (Slabbert & Slabbert, 1987:7):

$$\begin{array}{rcl}
 X_1 = & X_{11} + X_{12} + X_{13} & + Y_1 + E_1 \\
 X_2 = & X_{21} + X_{22} + X_{23} & + Y_2 + E_2 \\
 X_3 = & X_{31} + X_{32} + X_{33} & + Y_3 + E_3
 \end{array}$$



What sector 1 sells to sectors 1, 2 and 3 depends on the level of output of the purchasing sectors 1, 2 and 3 (Slabbert & Slabbert, 1983:7):

$$X_{11} = a_{11} x_1$$

$$X_{12} = a_{12} x_2$$

$$X_{13} = a_{13} x_3$$

Where:  $a_{11} = \frac{x_{11}}{x_1}$ ;  $a_{12} = \frac{x_{12}}{x_2}$ ;  $a_{13} = \frac{x_{13}}{x_3}$

In the above equation  $a_{11}$ ,  $a_{12}$  and  $a_{13}$  or more generally  $a_{ij}$  are called the direct input coefficients. In a  $n$  sector model of a region they represent the direct requirements of the product of any local sector  $i$  per unit of output of any other local purchasing sector  $j$  and they form the direct input coefficient matrix or technical matrix, as illustrated in Table 4.3 below (Slabbert & Slabbert 1983:7).

**Table 4.3 Direct input coefficient matrix**

Output Input	1	2	3
1	$a_{11}$	$a_{12}$	$a_{13}$
2	$a_{21}$	$a_{22}$	$a_{23}$
3	$a_{31}$	$a_{32}$	$a_{33}$

Source: Slabbert and Slabbert (1983:7)

One of the important analytical uses of a regional input-output table is to measure the effect or impact of a change in the final demand for a locally produced good, or a change in the output of a local sector on the total output of the region (Miller 1998:42). The direct input coefficients enable measurement of the direct or first effect: how much additional output is needed from all the local sectors as a result of an increase of R1.00 in the output of a particular sector. The direct input coefficients measure the effect on the industries delivering direct inputs to the expanding sector.

Referring to the skeleton input-output table and its technical coefficients matrix (Table

4.2 and Table 4.3): If the output of sector 2 increases by R1.00, then  $a_{12}$  indicates the direct input needed by sector 2 from sector 1,  $a_{22}$  the direct input needed from sector 2 and  $a_{32}$  the direct input needed from sector 3. An increase of R1.00 in the output of a local sector also produces an indirect effect: the industries delivering direct inputs to the expanding sector experience in turn an increase in their output and thus require additional inputs.

Measuring the direct and indirect effect of a change in the final demand for a locally-produced good or a change in the output of a local sector on the total output of a region can be done by calculating the Leontief-inverse of the matrix of direct input coefficients  $a_{ij}$  (Richardson 1972:26-30). Each direct and indirect input coefficient  $b_{ij}$  of the Leontief-inverse matrix measures the direct and indirect requirements of products from each local sector listed at the left hand side per Rand additional output of the local sector at the top.

**Table 4.4 Leontief inverse matrix**

Input \ Output	1	2	3
1	$b_{11}$	$b_{12}$	$b_{13}$
2	$b_{21}$	$b_{22}$	$b_{23}$
3	$b_{31}$	$b_{32}$	$b_{33}$
Sectoral Output Multiplier	$\sum_{j=1}^3 b_{j1}$	$\sum_{j=1}^3 b_{j2}$	$\sum_{j=1}^3 b_{j3}$

Source: Slabbert and Slabbert (1983:7)

According to Slabbert and Slabbert (1983:7) by summing all entries in the Leontief-inverse, in the column of a particular sector, the output multiplier of this particular sector can be derived. It measures the direct and indirect input requirements needed from all the sectors in the local economy by a particular local sector due to an increase of R1.00 in the output of that local sector. From the input-output table and its technical matrices also employment, remuneration, GGP income, etc. multipliers can be derived, which indicate the effect of a change in final demand on the level of employment, remuneration (household income), GGP income, etc.

## **4.6 SUMMARY AND CONCLUSIONS**

The location of the firm is often the primary goal of real estate and the key to the success of the investor. Advantages to businesses in a region derive primarily from that region's ability to provide some factors at a better value than the competing regions.

The von Thünen land use model and the Weber theory of industrial location are both classical theories of firm location that highlight the role of proximity to raw materials and the market place as the most important consideration of firm location. Transport costs, in this regard, are the governing determinant of business activity and the closer the plant is to the source of the raw material, the greater the benefit to the business undertaking concerned. The ideal location of the firm, according to the classical location theories, is one which is close to the site of raw materials and to the final market of the product. Therefore, proximity to transport networks that facilitate the flow from source to processing plant to final market is of the utmost importance.

Modern theories of industrial location have led to the identification of numerous factors relating to industrial needs and community attributes that can serve as guides to evaluating the potential for the type of industrial development feasible for any given location. The most significant development in modern location theory is the new economic geography (NEG), which explains the cumulative causation process leading to agglomeration.

Those factors that affect firm location can either be of a direct or an indirect nature. The direct factors affecting firm location are as follows: capital, labour, land and access to raw materials, local infrastructure, transportation, markets, entrepreneurship and public policy. The locational demands of a business undertaking will begin at the most basic level with decisions regarding the necessary mix of the required production factors that are used to determine, amongst others, the size of the undertaking, the products produced, the quantity of the product produced, etc. Indirect location factors do not directly affect the

production mix but aid in the choice of a firm location. These indirect factors include industry clusters, quality of life, consumer tastes and innovative capacity.

The various types of models of regional economic interaction involve a framework of “regional accounts” describing transactions between the region and the outside world and among activities within the region; nearly all include some type of multiplier ratio that sums up the relation between an initial increase in demand and the ultimate effect on regional income or employment. The input-output model depicts economic linkages that exist within and between different components of an economy. This approach identifies monetary flows (expenditures and receipts) between various units, and focuses on the interdependence of different sectors of economic activities. The model discussed in this study was implemented to measure the impact of positive (e.g. the establishment of new industries) changes in the Vaal economy on employment and household income.

In the Vaal area, urban areas are linked by well-developed road and rail infrastructures which, in turn, are interlinked with national road infrastructure such as the N1, N3 and R53 freeways, and provide very good access to the large metropolitan areas such as the Witwatersrand and the East Rand. The rail service provides commuter, freight and long-distance passenger services. The proposed Vaal Inland Container Depot (VICD) would be established in an area with excellent road infrastructure, facilitating the expansion of trade within the area as well as creating an outlet for other inland container depots, such as City Deep, where capacity constraints lead to lost revenue for business undertakings moving their freight through the City Deep container terminal. Also manufacturing and distribution firms need to be close to major interstate highways, further indicating the need for a source of intermodal transportation near industries.

With transport costs being the most important consideration in industrial location theory, the VICD would be a prime example of where the source of the raw

material, the processing plant and the market are in close proximity to one another. With the Vaal region already having firmly established coal and steel industries the VICD would be able to take advantage of flourishing markets and facilitate the flow of goods from these industries to their final users. This would bring about cost savings to business undertakings within the region.

The resultant spillover effects of these cost reductions would be an increase in productive capacity, which in turn would lead to increased employment opportunities in the Vaal region. Thus it is clear that by establishing the proposed VICD in the Vaal, the beneficial locational factors offered by the area can be taken full advantage of. The impact (increased employment opportunities and increased household income) on the inhabitants of the Vaal are far greater than they would have been had the proposed VICD be planned for another region.

## **CHAPTER 5: THE SOCIO-ECONOMIC IMPACT OF AN INLAND CONTAINER DEPOT AS PART OF A LOGISTICAL HUB IN THE VAAL**

### **5.1 INTRODUCTION**

In this chapter the industries in the Vaal area are classified according to economic sector and size of the undertaking. This was done in order to determine the prevalent economic activities in the region as well as to identify the possible end users of the facilities of the Vaal Inland Container Depot (VICD).

The origin and destination of goods imported into and exported from the Vaal are illustrated. This was done so as to highlight the need for intermodal transportation services, of which the VICD would be a provider. The method of transportation used to ship goods in and out of the Vaal is also analysed and the use of containers as a means of shipment is tested.

The data collected from an industry questionnaire (Annexure B) is analysed, in order to gain insight into the opinions of local business in the Vaal area in respect of the establishment of the VICD as part of the Vaal Logistical Hub (VLH). A questionnaire (Annexure C) that was sent out to members of the Transvaal Association of Freight Forwarders (TAFF) was used to test their willingness to use the infrastructure of the proposed VICD as well as to highlight current industry limitations. The volume of goods they are willing to channel through the VICD is calculated. Finally, the socio-economic impact of the VLH is measured in terms of its effect on household income, employment and poverty within the Vaal area.

### **5.2 RESULTS OF THE INDUSTRY QUESTIONNAIRE**

For the purpose of the industry questionnaire 194 respondents were surveyed from March 2006 to August 2006 using the simple random sampling method and structured interviews which were conducted by fieldworkers. The respondents

covered a wide range of economic activities in the ELM, MLM and MMA, with no specific business size being targeted.

### 5.2.1 Origin and destination of goods within the Vaal

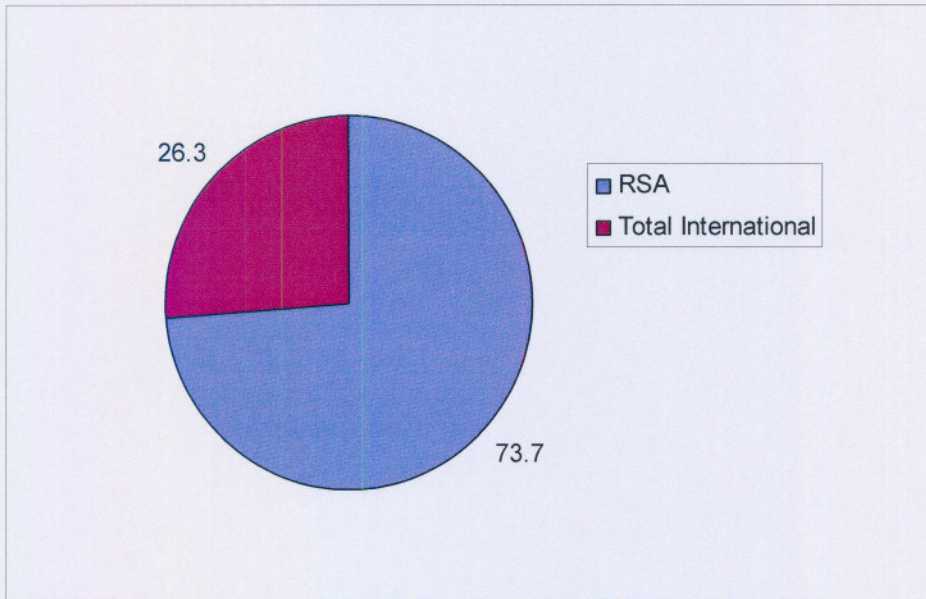
As shown in Table 5.1 and Figures 5.1 and 5.2, the majority of products either imported or exported into the Vaal are from or are being delivered to regions within South Africa. 73.7 percent of goods within the Vaal has South Africa as their country of origin, while 70.1 percent of goods have South Africa as their point of destination. The total percentage of goods with international origin and destination points is 26.3 and 29.2 percent respectively.

**Table 5.1 Origin and destination of products within the Vaal**

Country	Origin	Destination
RSA	73.7	70.1
Total International	26.3	29.2
<b>Total</b>	<b>100.0</b>	<b>100.0</b>
North America	6	4.9
South America	0.6	3.2
Africa	2.2	8.8
Europe	11.2	7.5
Far East	2	2
Middle East	1.4	0.5
Asia	2	2
Australasia	0.9	1
<b>Total</b>	<b>26.3</b>	<b>29.2</b>

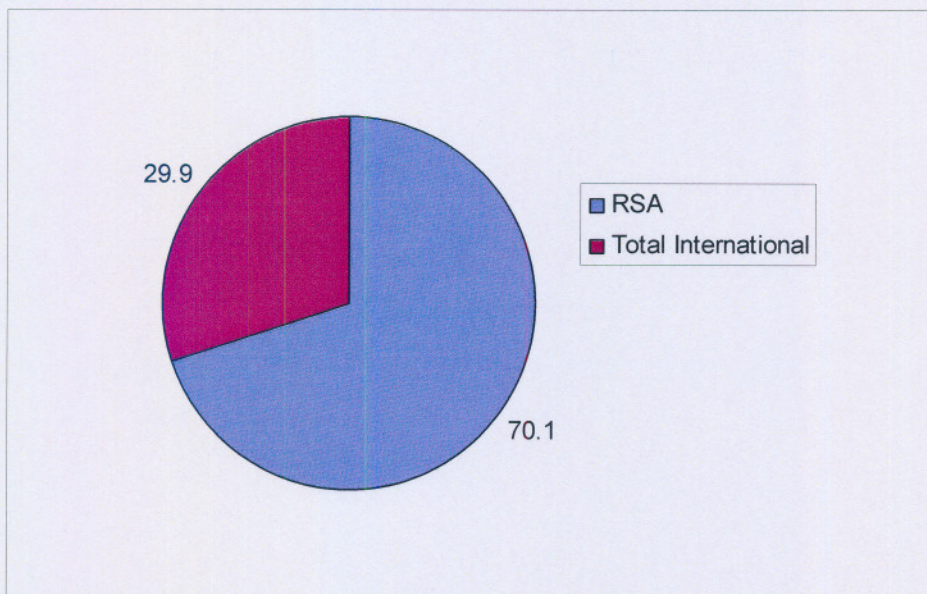
Source: Viljoen (2006a)

**Figure 5.1** Origin of products within the Vaal region



Source: Viljoen (2006a)

**Figure 5.2** Destination of products within the Vaal region



Source: Viljoen (2006a)



Table 5.2 indicates the regions to which and from which products are distributed and procured. 27 percent of the volume of goods in the Vaal is procured in South Africa (73.7 percent of all products in the Vaal) originates from Johannesburg/Pretoria (Table 5.2), while 30 percent of goods produced in the Vaal are distributed to the same region. Port Elizabeth has the lowest (0.3 percent) percentage share in volume of goods that are procured from the Vaal region. As indicated in Table 5.2, of the 73.7 percent of goods in the Vaal that originate in South Africa, almost one third (32.4 percent) originates from the Vaal region itself.

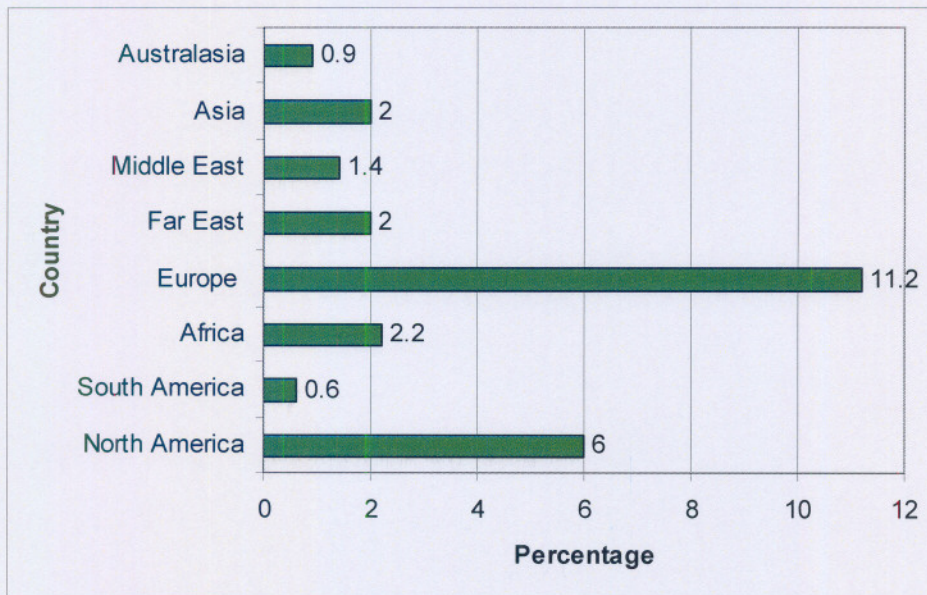
**Table 5.2 Regional distribution of goods in the Vaal**

Region	Origin	Destination
Vaal	32.4	25.7
Cape Town	16.0	17.5
Durban	13.0	15.6
Port Elizabeth	0.3	2.2
East London	1.3	2.0
Johannesburg / Pretoria	27.0	30.0
Other	10.0	7.0
<b>Total</b>	100.0	100.0

Source: Viljoen (2006a)

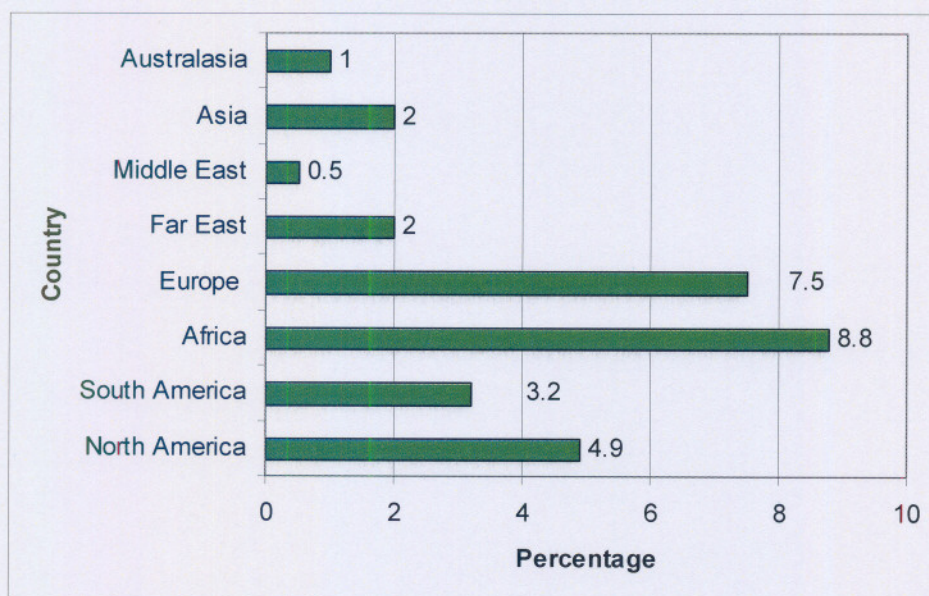
Africa and Europe, with 8.8 and 7.5 percent respectively, are the destinations that procure the highest percentage of goods from the Vaal region. This is illustrated in Table 5.2 and Figure 5.3. The Middle East procures the least amount of goods from the Vaal region. As indicated in Figure 5.3, business undertakings within the Vaal, procure the greatest volume of products from Europe (11.2 percent). Africa, Asia and the Far East each have a 2 percent share in the volume of goods imported into the region, with South America having the least share at 0.6 percent.

**Figure 5.3 Country of origin**



Source: Viljoen (2006a)

**Figure 5.4 Destination of products**



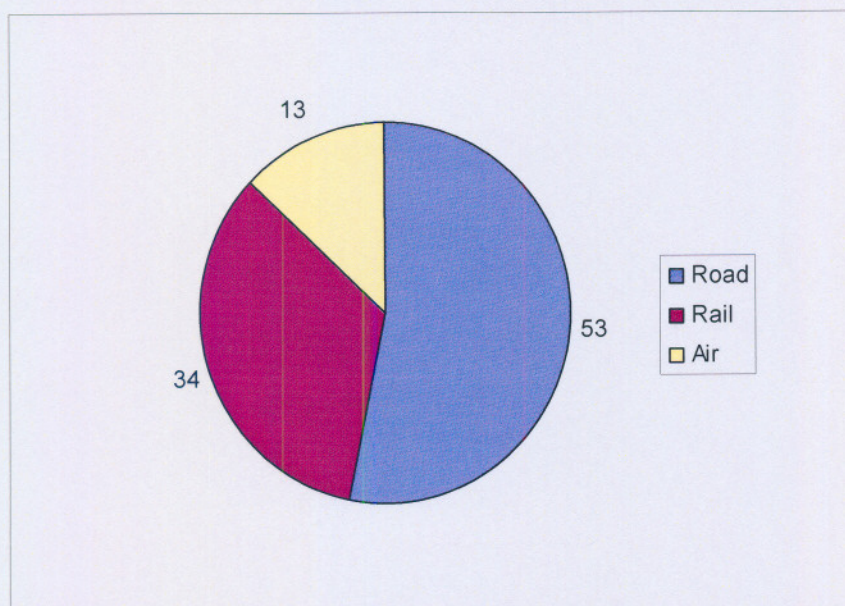
Source: Viljoen (2006a)

## 5.2.2 Mode of transport used and level of containerisation

Figures 5.5 and 5.6 depict the mode of transport used to deliver goods and the mode of transport used to procure goods respectively. In both cases over half of the goods were transported by road (53 percent for delivery and 56 percent for procurement). Rail is the second most used mode of transportation for goods within the Vaal with 34 percent being delivered via rail and 24 percent being procured using rail.

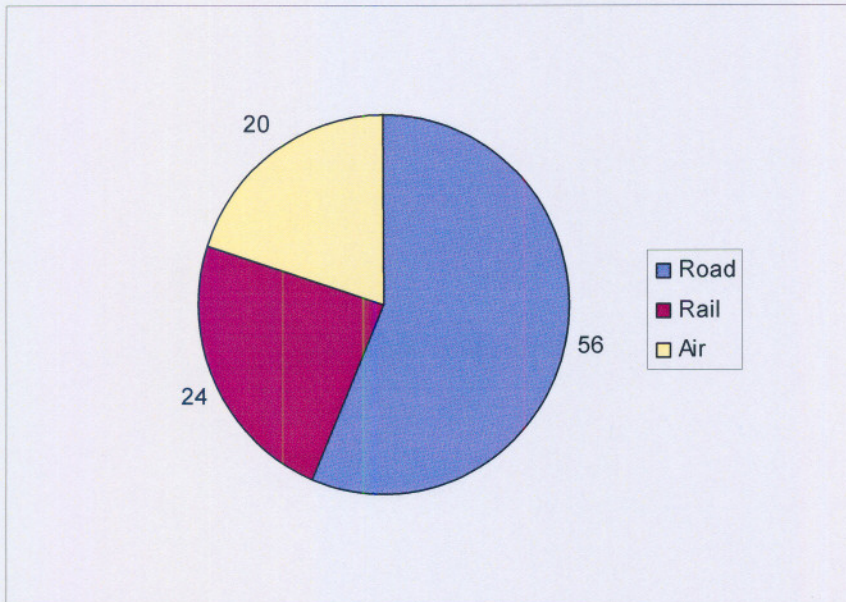
According to the survey data (Viljoen, 2006a), of all the modes of transport, an average of 42 percent of the volume of goods procured from the Vaal region are shipped to their destination using containers, while an average of 47 percent of the volume of goods procured by undertakings within the Vaal region arrive in containers. In Table 5.3, the percentage of containerised goods per transport mode is given. Of the 56 and 24 percent of goods that are transported into the Vaal by road and rail respectively, 50 percent is shipped in containers. On the other hand, 40 and 35 percent of the volumes transported by road (40 percent) and rail (35 percent) to destination outside of the Vaal are shipped in containers.

**Figure 5.5 Mode of transport used for delivery**



Source: Viljoen (2006a)

**Figure 5.6 Mode of transport used for procurement**



Source: Viljoen (2006a)

**Table 5.3 Containerisation of goods**

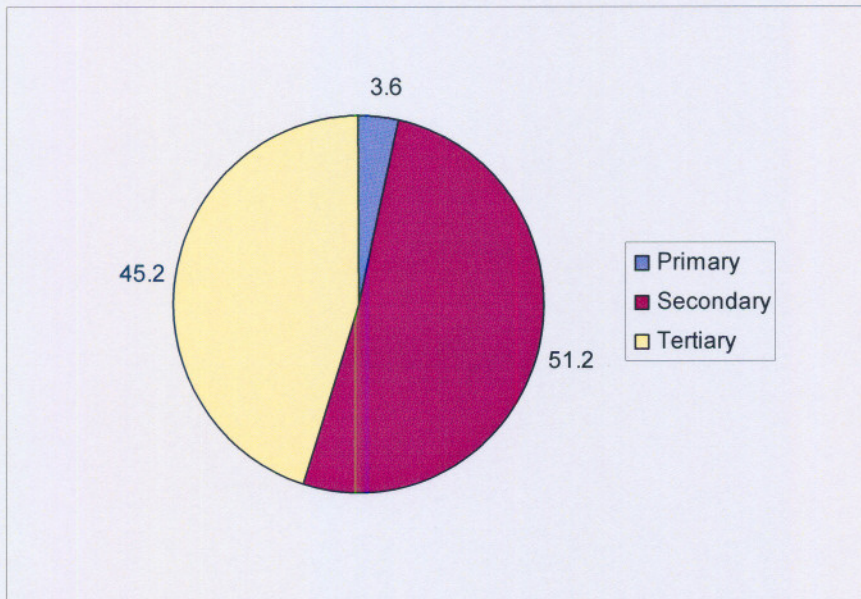
Mode of transport	Into the Vaal	Shipped by Container (%)	Out of the Vaal	Shipped by Container (%)
Road	56	50	53	40
Rail	24	50	34	35
Air	20	40	13	50
<b>Total</b>	<b>100.0</b>		<b>100.0</b>	

Source: Viljoen (2006a)

### 5.2.3 Prevalent economic sector and business size within the Vaal

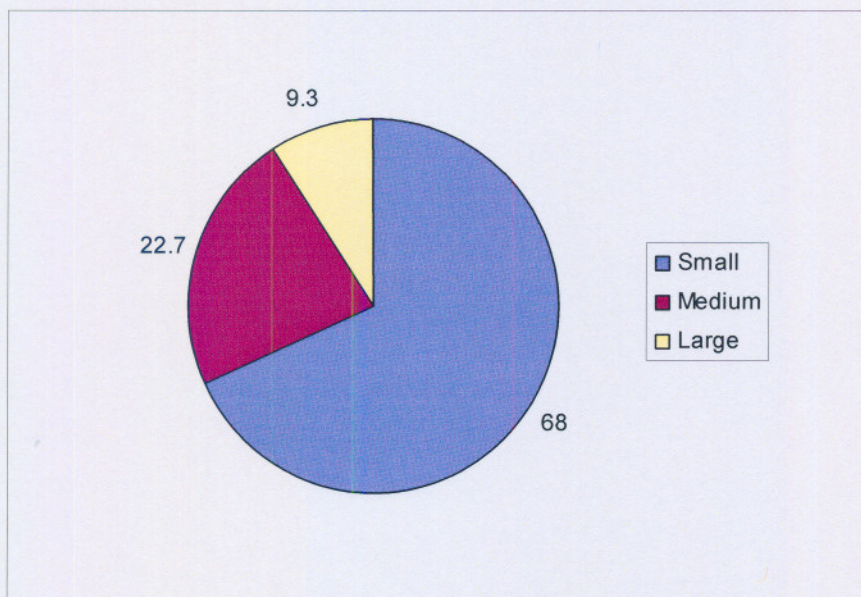
Figures 5.7 and 5.8 illustrate the economic classification and size of the undertakings within the Vaal region. More than half (51.2 percent) of the economic activities within the Vaal are secondary in nature. Primary sector activities only account for 3.6 percent of all respondents in the Vaal. Of all the respondents, 68 percent indicated that they are a small business. Large enterprises amount to 9.3 percent of the total respondents and 22.7 indicating that they are a medium-sized enterprise.

**Figure 5.7 Economic classification of business activities within the Vaal**



Source: Viljoen (2006a)

**Figure 5.8 Size of business undertakings in the Vaal**



Source: Viljoen (2006a)

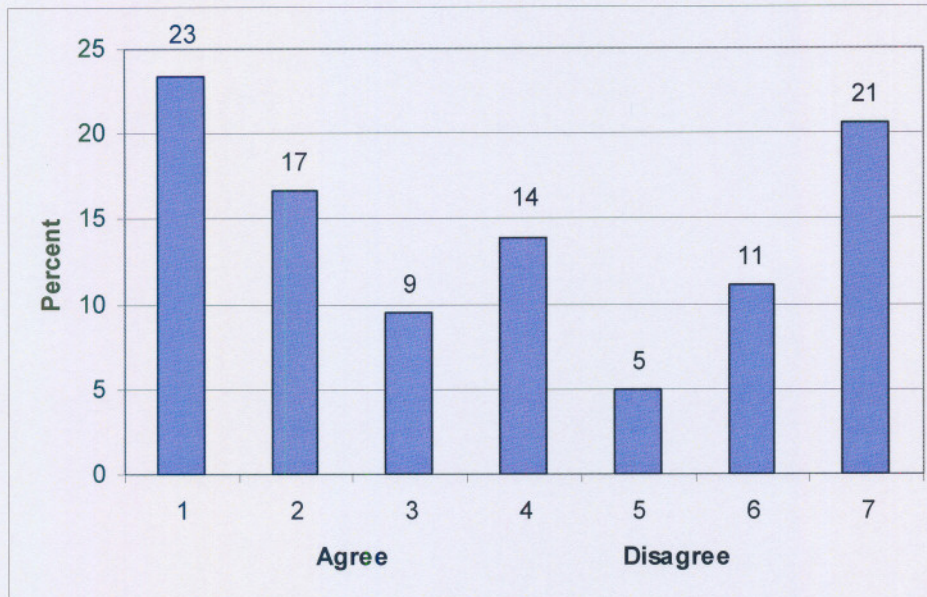
#### **5.2.4 Statements regarding the establishment of the proposed Vaal Inland Container Depot**

In the structured interview with industrial respondents an opinion scale of 1 to 7 was used where 1 represents “Agree strongly” and 7 represents “Disagree strongly”. Respondents were asked to rate the 17 statements in the Industry Questionnaire (Annexure B) according to this scale. Those that indicated 4 on the opinion scale are considered neutral with regard to the statement. The purpose of this was to identify the possible benefits that would accrue to business undertakings in the Vaal region as well as the resultant socio-economic spillover effects that could be felt throughout the Vaal Region.

##### **5.2.4.1 Statement 1: My business will make use of a container depot in the Vaal**

This statement was included in the questionnaire in order to establish the number of business within the Vaal area that would be interested in using the VICD infrastructure. As indicated in Figure 5.9, 23 percent of the respondents indicated that they would make use of the VICD (agree strongly), while 21 percent indicated that they would not (disagree strongly). Those respondents that indicated that they would not be making use of the VICD were either small chain retailers that order products from suppliers used by the main branch or those that order from suppliers that would make use of container shipping but would not make use of container facilities themselves.

**Figure 5.9 Statement 1: My business will make use of a container depot in the Vaal**



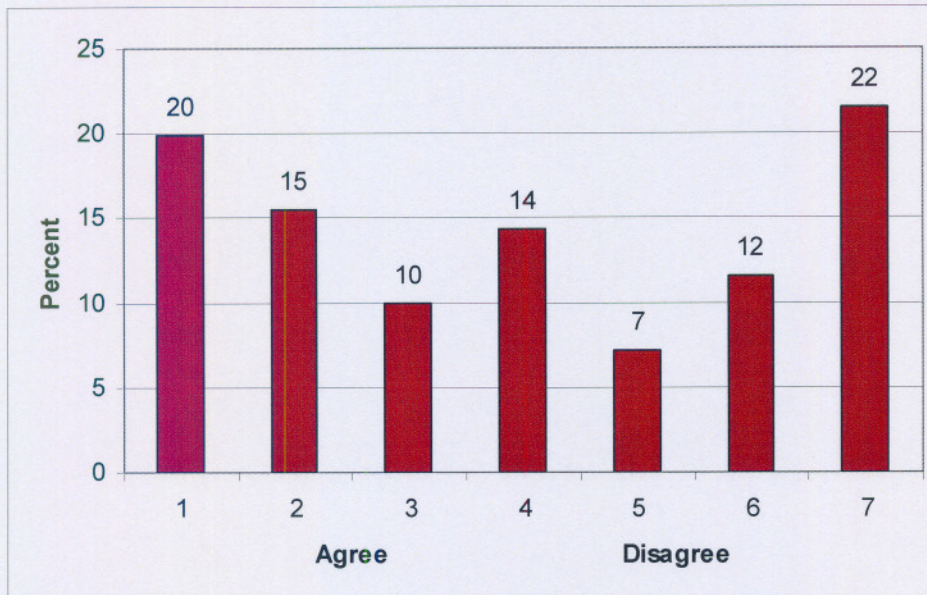
Source: Viljoen (2006a)

Of all of the respondents a greater number (49 percent) indicated that they agreed or agreed strongly to the statement, while only 37 percent of respondents disagreed or disagreed strongly with the statement.

#### **5.2.4.2 Statement 2: A container depot in the Vaal would lead to cost reductions for my business**

This question was included in the questionnaire as a means of measuring the benefits that would accrue to the businesses that would make use of the VICD infrastructure. As illustrated in Figure 5.10, only 20 percent of respondents agreed strongly to this statement, while 22 percent disagreed strongly. However, a slightly higher percentage of respondents (45 percent) indicated that they agreed that cost reductions would take place in their business, compared to the 41 percent overall that did not agree to the statement. Of the total respondents, 14 percent indicated neutral with regard to the statement.

**Figure 5.10 Statement 2: A container depot in the Vaal would lead to cost reductions for my business**



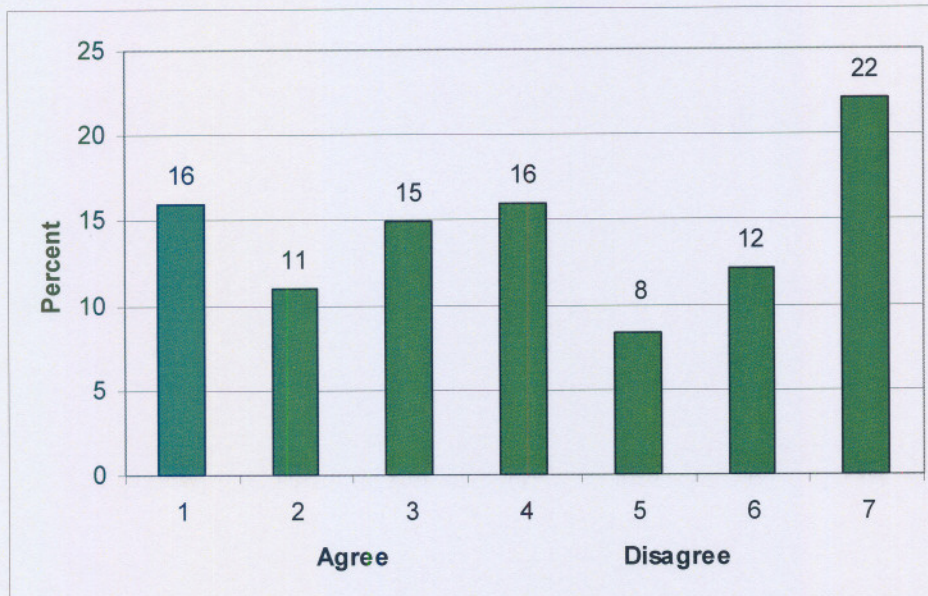
Source: Viljoen (2006a)

**5.2.4.3 Statement 3: A container depot in the Vaal will solve the problem of delays for my business**

The number of respondents that either agreed or agreed strongly and those that either disagreed or disagreed strongly to Statement 3 are equal at 42 percent. Of the total number of respondents, 16 percent indicated neutral to the statement that delay problems would be solved with the establishment of the VICD. However, at 22 percent, a higher percentage of businesses in the area believe that the VICD will not solve delay problems for their business. This is illustrated in Figure 5.11.



**Figure 5.11 Statement 3: A container depot in the Vaal will solve the problem of delays for my business**



Source: Viljoen (2006a)

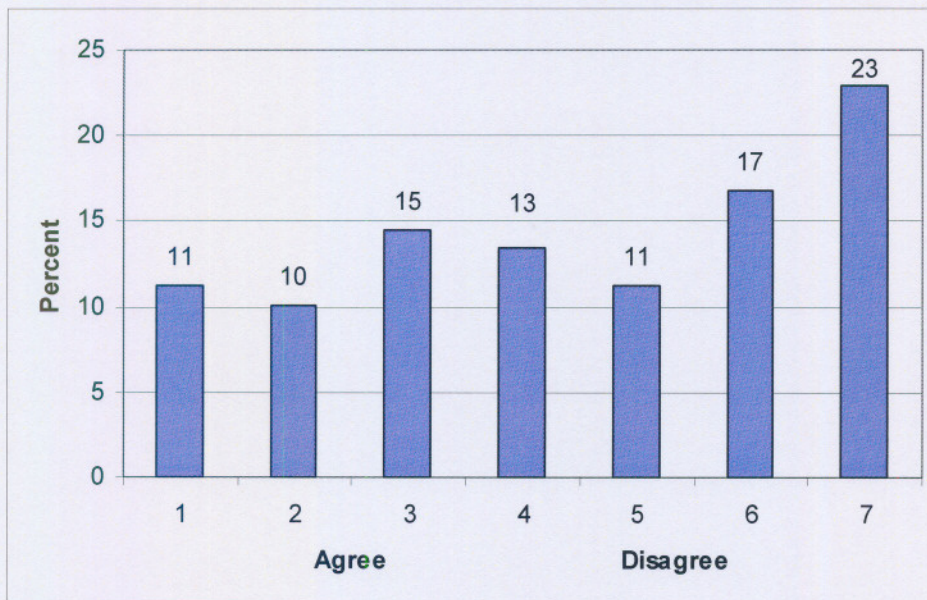
If Figure 5.11 is compared with Figures 5.10, then it is clear that respondents on the whole do not believe that delay problems would lead to cost savings for their business.

#### **5.2.4.4 Statement 4: A container depot in the Vaal will enable my business to carry fewer inventories**

This statement was included in the questionnaire to further illustrate the cost savings that businesses within the Vaal would gain if the proposed VICD was established. However, 23 percent of respondents disagreed strongly with the statement compared to the 11 percent that agreed strongly. Overall, more than half of the respondents, i.e., 51 percent did not agree with the statement.

When comparing this to Figure 5.10, the number of respondents that believed business cost savings would be achieved with the establishment of the VICD only came to 20 percent and in Figure 5.12, 23 percent of respondents did not agree that inventories would be decreased.

**Figure 5.12 Statement 4: A container depot would decrease inventories**



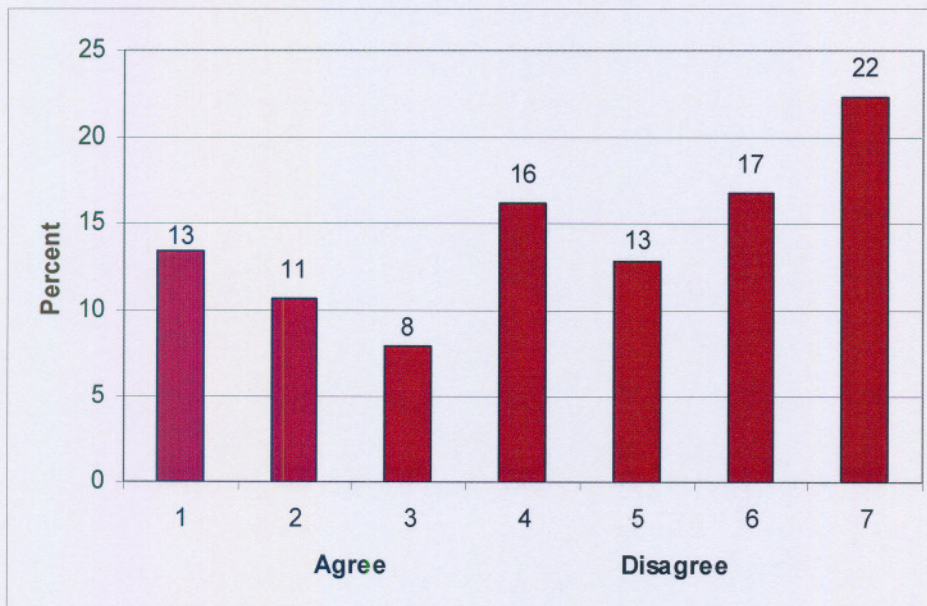
Source: Viljoen (2006a)

#### **5.2.4.5 Statement 5: The VICD would enable my business to use international best practice**

When looking at Figure 5.7, which indicates that 51.2 percent of business activities within the Vaal region form part of the secondary sector, it is clear that international best practice such as just-in-time procurement is not always the best practice for manufacturing concerns. For these businesses it is imperative to have quantities of productive inputs available for production when they are needed.

When comparing Figures 5.10, 5.11, 5.12, and 5.13, the conclusion that can be drawn is that most of the respondents did not believe that the VICD would offer any forms of cost saving at all. These activities include decreasing delays, inventories and the implementation of international best practice such as just-in-time procurement.

**Figure 5.13 Statement 5: International best practice can be used as a result of the VICD**

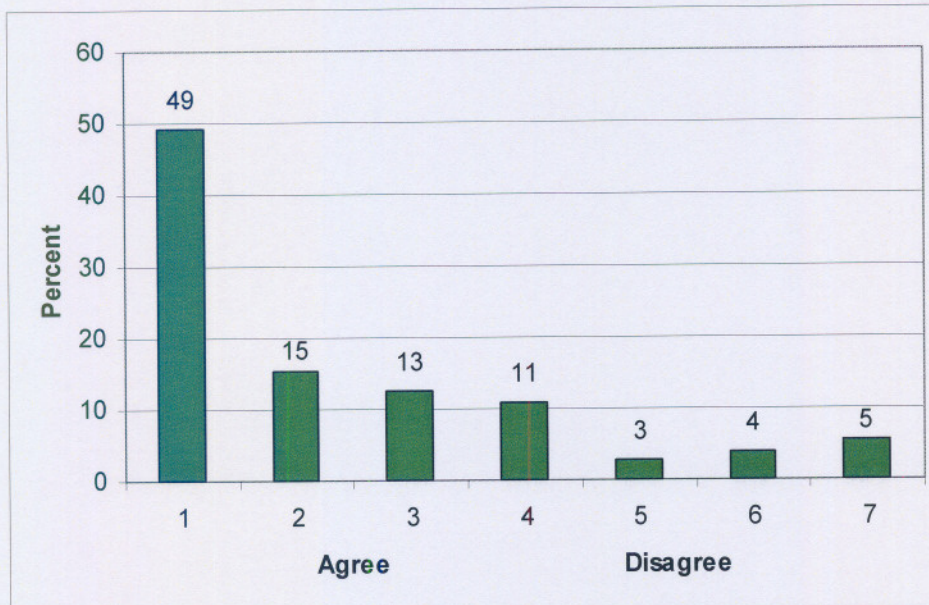


Source: Viljoen (2006a)

**5.2.4.6 Statement 6: My business fully supports the establishment of a container depot in the Vaal**

This statement was included in the questionnaire to gauge the level of support that businesses within the Vaal region would lend to the establishment of the proposed VICD. As illustrated by Figure 5.14, 77 percent of all respondents agreed to the statement, while only 12 percent of respondents disagreed with the statement. Almost half (49 percent) of the respondents agreed strongly that they are in full support of the VICD.

**Figure 5.14 Statement 6: My business supports the establishment of the VICD**

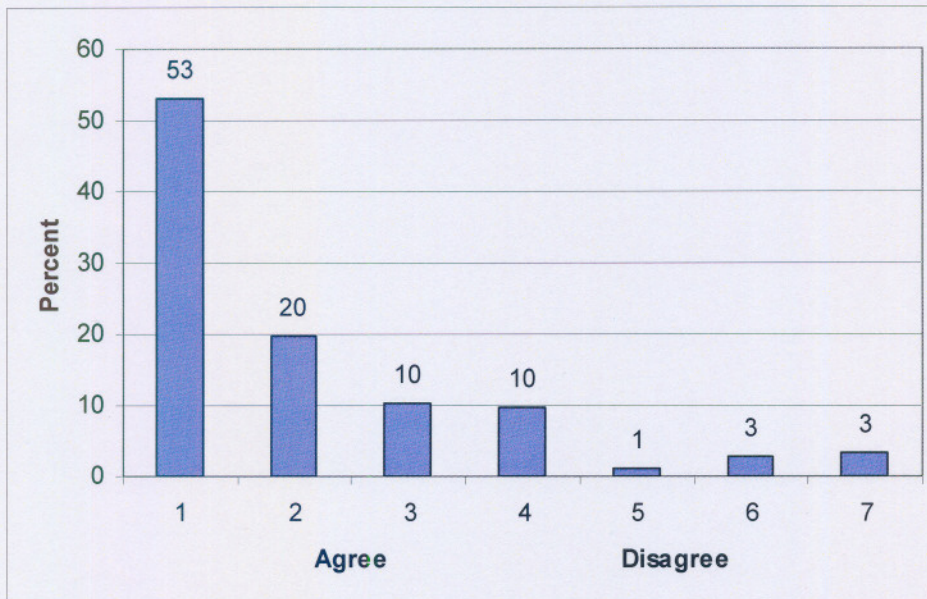


Source: Viljoen (2006a)

**5.2.4.7 Statement 7: A container depot in the Vaal would lead to higher business confidence in the area**

With the establishment of the VICD the businesses within the Vaal would be introduced to greater competition, and wider markets for their products will be available. This would lead to higher business confidence within the region, which may result in increased investment spending in the Vaal. 53 percent of respondents agreed strongly that business confidence within the Vaal region would increase as a result of the proposed VICD.

**Figure 5.15 Statement 7: Business confidence in the Vaal would increase as a result of the VICD**



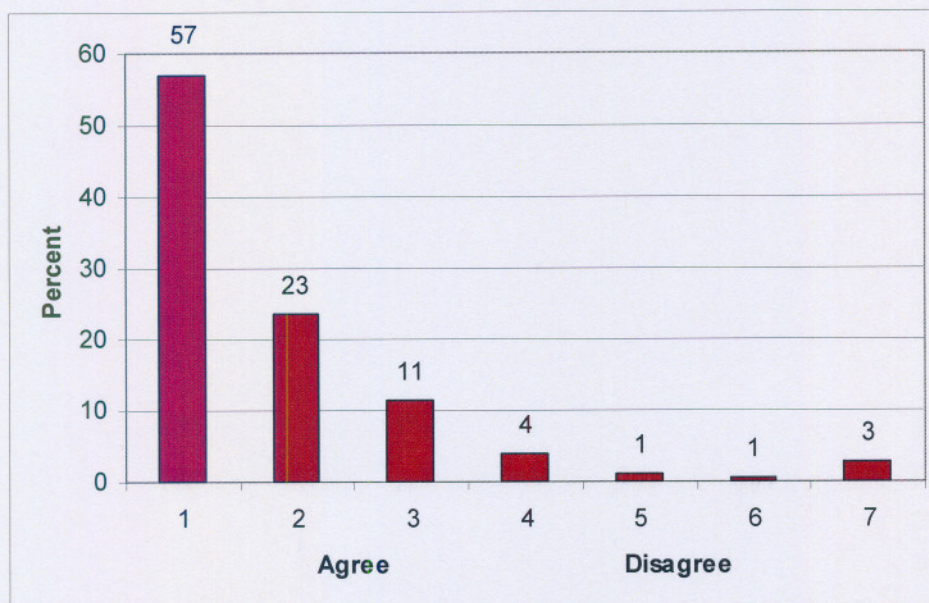
Source: Viljoen (2006a)

#### **5.2.4.8 Statement 8: A container depot in the Vaal would create more jobs**

This statement was included specifically to highlight the most important socio-economic benefit of the VICD. With increased job opportunities in the region, most of the obstacles toward human development can be overcome. The VICD would require a wide range of skills, giving employment opportunities to all levels of human resources. With more than half (57 percent) of the respondents, as illustrated in Figure 5.16, agreeing strongly that the VICD would create jobs in the Vaal, it is clear that the proposed project would boost the employment profile of the region.

Figure 5.16 shows that only 5 percent of the respondents did not agree with this statement. A staggering 91 percent of the respondents agreed that the VICD would create jobs in the Vaal region.

**Figure 5.16 Statement 8: Jobs in the area would increase as a result of the VICD**



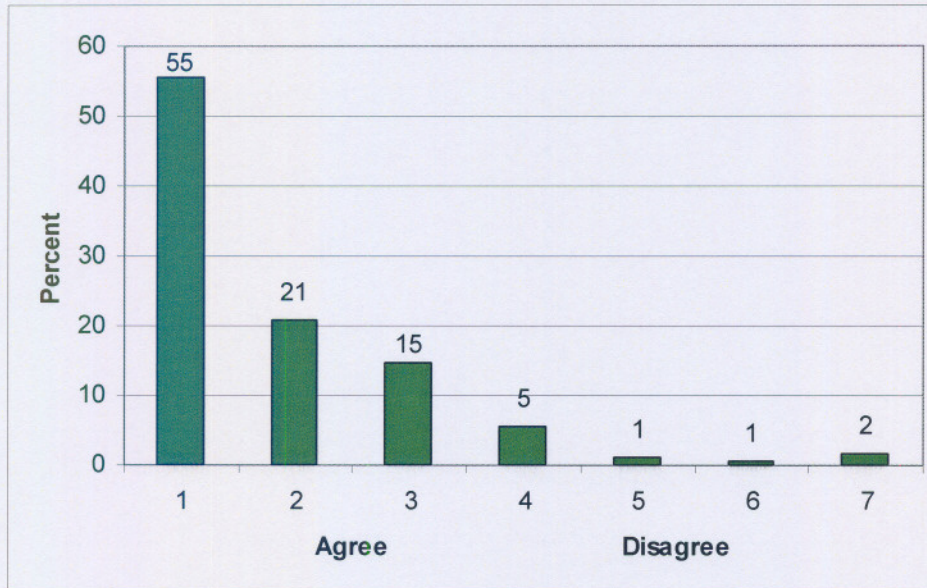
Source: Viljoen (2006a)

**5.2.4.9 Statement 9: A container depot in the Vaal will lead to a higher rate of industrial development in the area**

Of the respondents, 55 percent indicated that they agreed strongly to the statement. Apart from the 4 percent of respondents that disagreed strongly with the statement, 91 percent agreed that industrial development within the Vaal region would be improved with the establishment of the VICD.

Increased industrial development takes place after business confidence within a region has improved. With higher business confidence, business undertakings can attract more investment opportunities which in turn can raise levels of industrial development. By comparing Figures 5.15 and 5.17, it can be seen that respondents feel that the VICD would increase business confidence and thereby increase the rate of industrial development within the region.

**Figure 5.17 Statement 9: Industrial development in the area would increase as a result of the VICD**



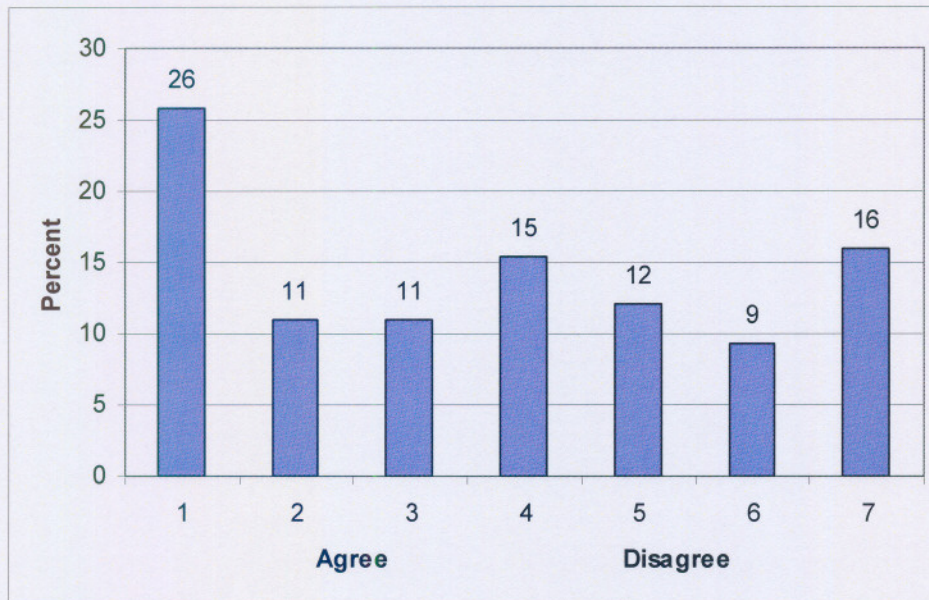
Source: Viljoen (2006a)

**5.2.4.10 Statement 10: My business will be exposed to more export opportunities with a container depot in the Vaal**

Figure 5.18 illustrates the number of respondents that believe their business will be exposed to more export opportunities. Here, 26 percent agreed strongly to the statement, with less than half (48 percent) of the respondents agreeing with the statement. 37 percent of respondents did not believe that export markets will be made available as a result of the establishment of the proposed VICD.

With the expansion of trade between the Vaal region and the rest of South Africa as well as the rest of the world, local industries would be exposed to greater competition and greater market access for current products. This would lead to greater productivity and the possible expansion of output. With this, more employees would be needed and, as illustrated in Figure 5.16, more than half of the respondents agree that this is possible.

**Figure 5.18 Statement 10: Export opportunities will increase for businesses with the area**



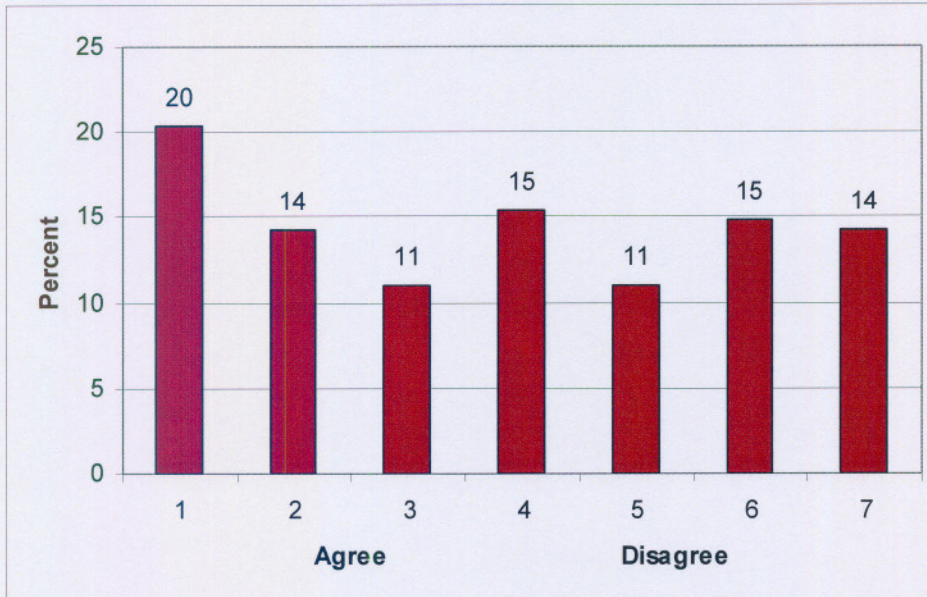
Source: Viljoen (2006a)

**5.2.4.11 Statement 11: My business will be exposed to more imported products with a container depot in the Vaal**

As illustrated in Figure 5.19, the number of respondents either agreeing (45 percent) or disagreeing (40 percent) to the statement is relatively even. As in Figure 5.18, 15 percent of respondents indicated neutral to the statement. With Figures 5.18 and 5.19, a greater number of respondents believe that trade (either import or export trade) can be facilitated by the establishment of the VICD.



**Figure 5.19 Statement 11: Business in the Vaal will be exposed to more imported products as a result of the VICD**

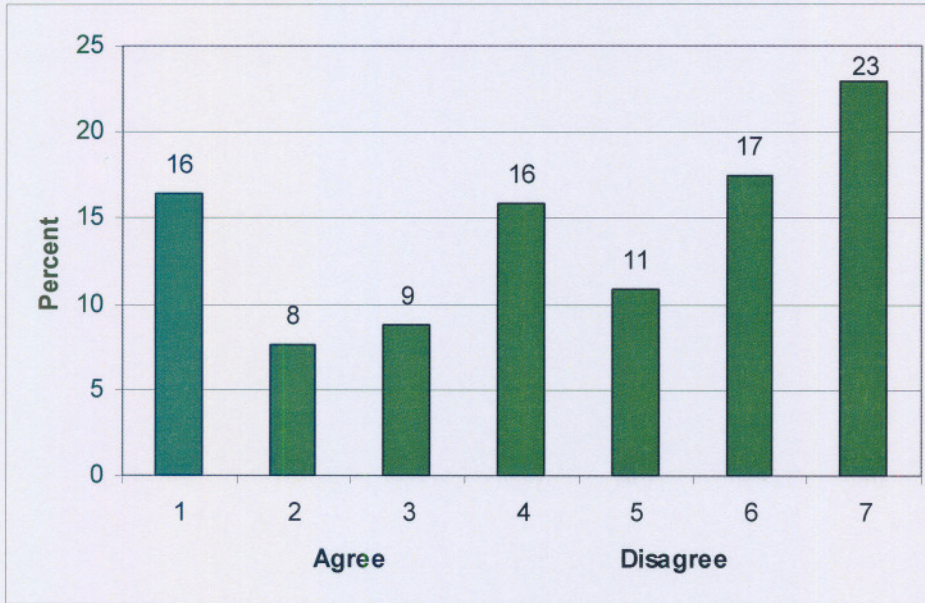


Source: Viljoen (2006a)

**5.2.4.12 Statement 12: My business will create more jobs as a result of a container depot in the Vaal**

Just over half (51 percent) of the total number of respondents disagreed with this statement (as shown in Figure 5.20). This is contrary to Figure 5.16 where more than half of the respondents indicated that the VICD would create new job opportunities in the Vaal region. This could be that many businesses within the region are small undertakings that may not have the capacity to expand their operations. This can be seen in Figure 5.8.

**Figure 5.20 Statement 12: My business would create more job opportunities in the Vaal as a result of the VICD**

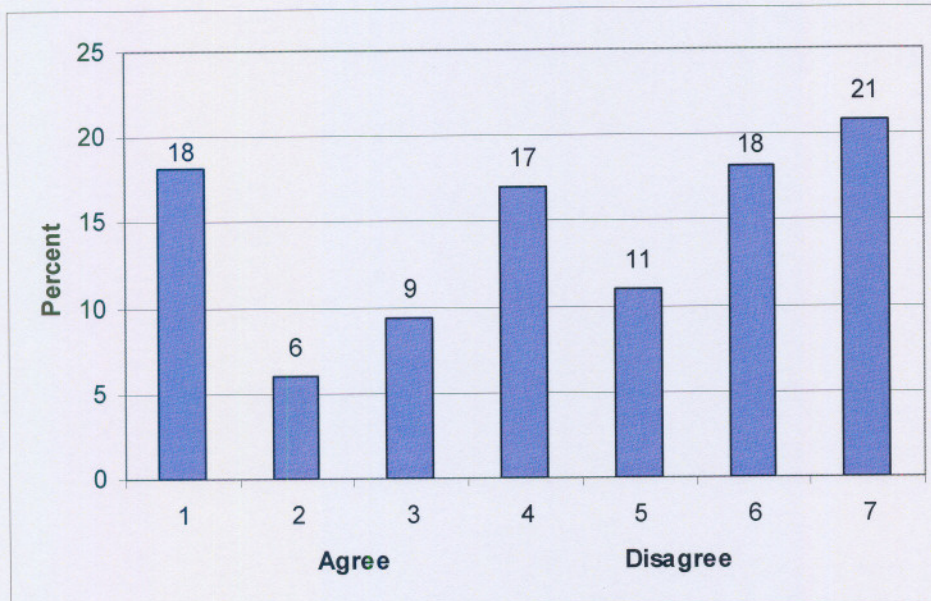


Source: Viljoen (2006a)

**5.2.4.13 Statement 13: My business will expand because of a container depot in the Vaal**

In this statement the capacity constraints of small enterprises are highlighted once again. By comparing Figure 5.8 with the data in Figure 5.21, the possible reason for 21 percent of respondents disagreeing strongly to the statement is that small enterprises do not have as much of the capacity to expand as medium and large enterprises. Available capital plays an important role here.

**Figure 5.21 Statement 13: My business will expand because of a container depot in the Vaal**

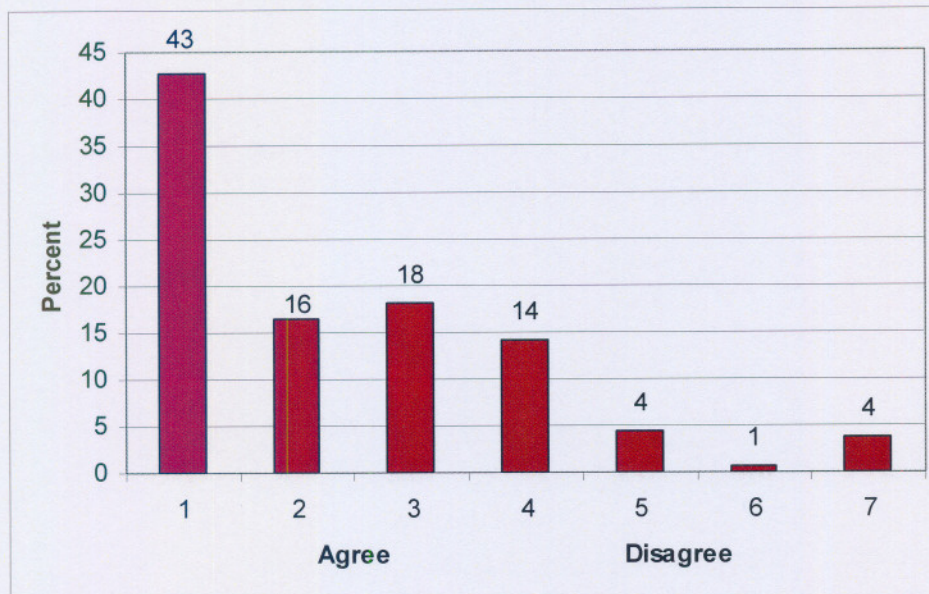


Source: Viljoen (2006a)

**5.2.4.14 Statement 14: It is a good idea to combine the container depot with an international cargo airport and an industrial development zone**

A large percentage (77 percent) of the total number of respondents agreed that the VICD should be combined with an international cargo airport, the VIA and an industrial development zone, the VIDZ. Only 9 percent of respondents disagreed with this statement. Thus, local industries are clearly of the opinion that the VICD should be established as part of a logistical hub in the Vaal area.

**Figure 5.22 Statement 14: The VICD should be combined with a cargo airport and an industrial development zone**

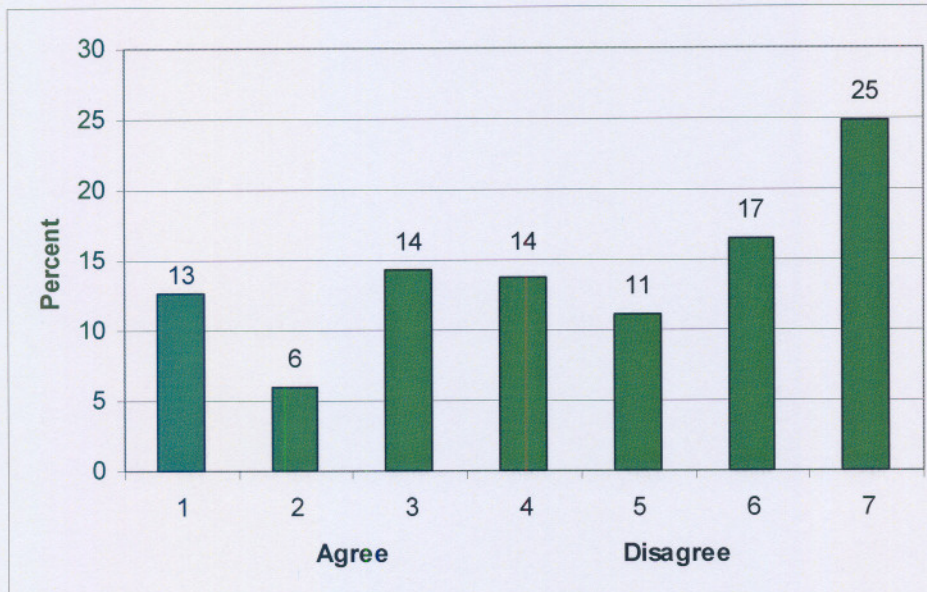


Source: Viljoen (2006a)

**5.2.4.15 Statement 15: My business will use the container depot to export/import primarily to/from African countries**

As illustrated in Figure 5.23, 25 percent of respondents disagreed strongly to the idea that the VICD would be used to expand export and import market between South Africa (more specifically the Vaal region) and the rest of the African continent. Only 33 percent of respondents agreed that the VICD would be used primarily for the purpose of expanding trade with the rest of Africa.

**Figure 5.23 Statement 15: The VICD will be used to import/export primarily to/from African countries**



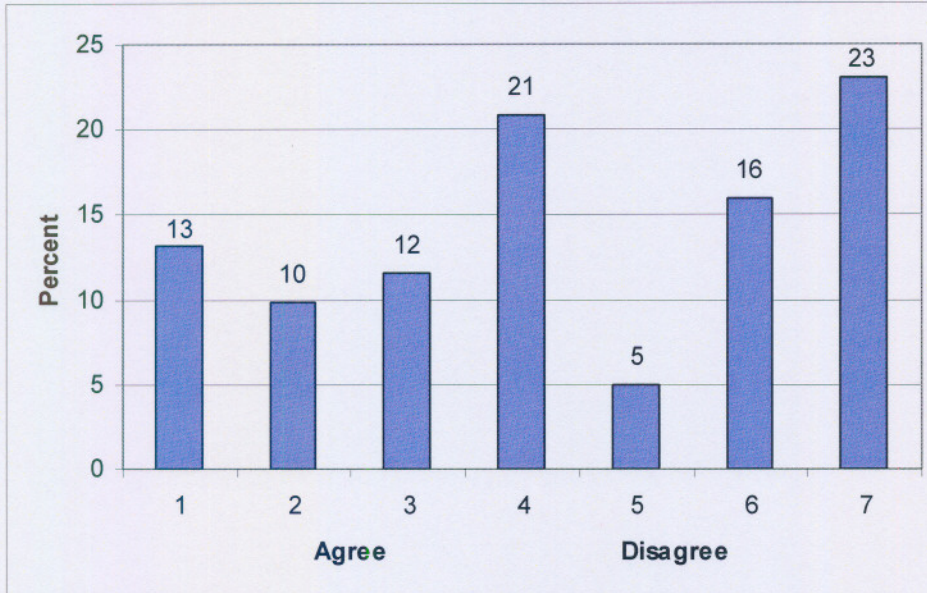
Source: Viljoen (2006a)

**5.2.4.16 Statement 16: My business will use the container depot to distribute/procure goods primarily to/from other cities/areas in South Africa**

21 percent of respondents indicated neutral in response to this statement. However, 23 percent disagreed completely that the VICD would be used for procurement from or distribution to other regions of South Africa.

By comparing Figures 5.23, 5.24 and 5.25, it is interesting to note that more than 20 percent of respondents in each case strongly disagreed with the notion that the VICD would be used as a transport node for the establishment of a primary market for products originating from the Vaal.

**Figure 5.24 Statement 16: The VICD will be used primarily to distribute/procure good from other regions in South Africa**

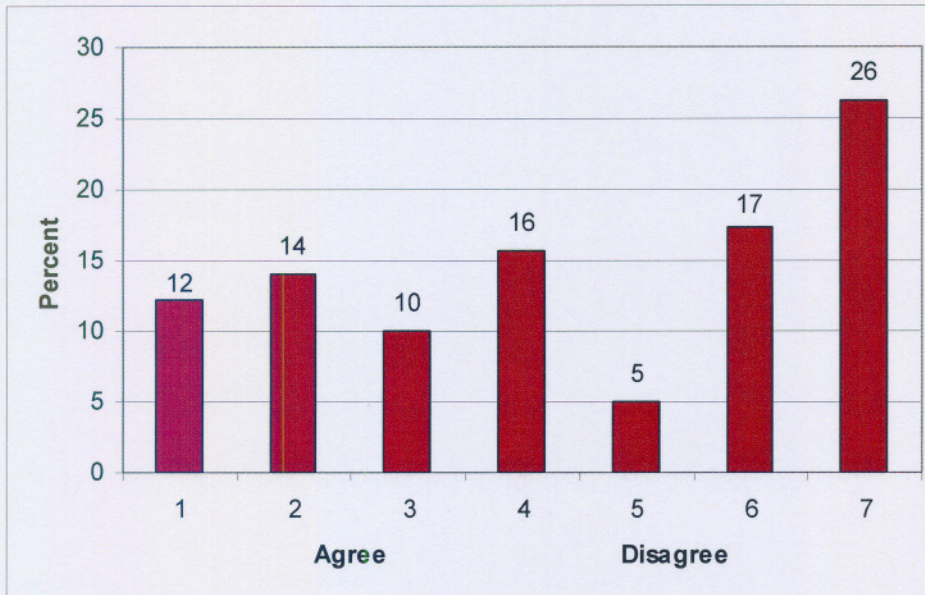


Source: Viljoen (2006a)

**5.2.4.17 Statement 17: My business will use the container depot to export/import primarily to/from international destinations other than Africa**

In Figure 5.25 the respondents not agreeing that the VICD will be used primarily to facilitate trade with international destinations other than Africa amount to 48 percent of the total number of respondents. On the other hand 36 percent of respondents agreed with the statement, with 12 percent agreeing strongly.

**Figure 5.25 Statement 17: The VICD will be used primarily to export/import from international destinations other than Africa**



Source: Viljoen (2006a)

### **5.3 RESULTS OF THE FREIGHT FORWARDER QUESTIONNAIRE**

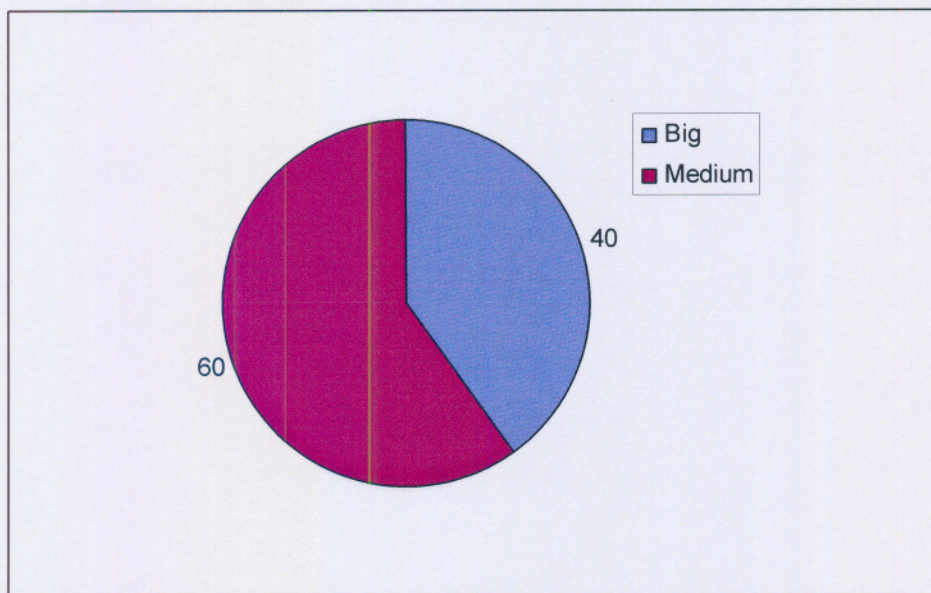
For the purpose of the freight forwarders questionnaire (Annexure C), 10 respondents were interviewed during October 2006. The respondents were chosen randomly from the Transvaal Association of Freight Forwarders (TAFF) (Mbendi, 1998). Respondents were asked to indicate the size of their undertaking in relation to the weight forwarded by road/rail in the past year, as well as to highlight current industry problems with regard to the City Deep inland container depot.

A series of yes/no type questions were asked. The respondents also had to indicate the volume of goods that they would channel through the VICD in respect of each question.

### 5.3.1 Size of the undertaking

In Figure 5.26, the relative size of the business activities of respondents is analysed. Of the total number of respondents, 60 percent are medium-sized enterprises, with 40 percent indicating that they are a large enterprise. Due to the fact that the size of the undertaking was determined by weight of goods forwarded and that the average weight of goods shipped in the last year for all respondents was 8 482.7 tons, there are no small enterprises in the sample (Viljoen, 2006b).

**Figure 5.26 Size of the freight forwarders' business activities**



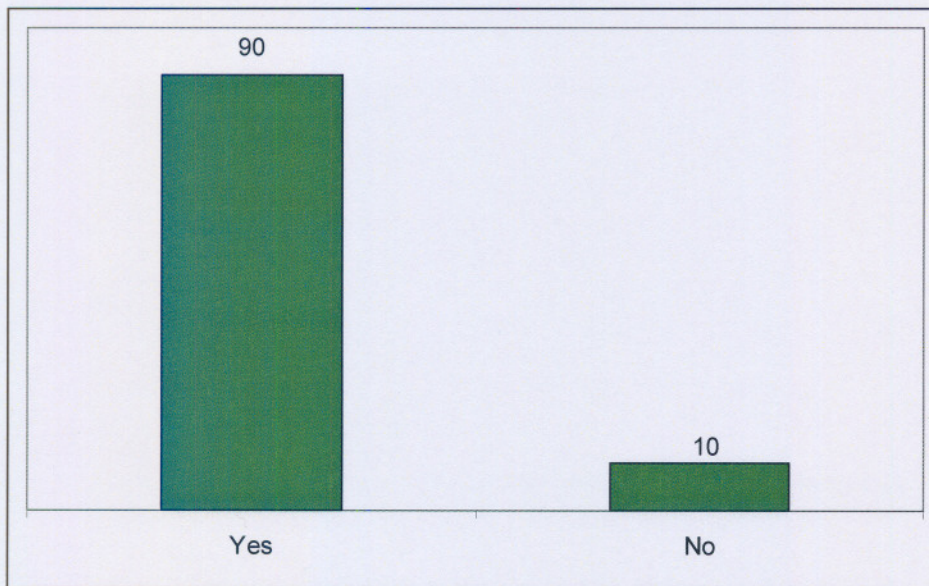
Source: Viljoen (2006b)

### 5.3.2 Current industry constraints

This section was included in order to determine whether or not constraints exist in the industry, and if so, what are the causes of these constraints. Respondents also had to indicate whether or not they believed that these problems would continue. The focus here is on City Deep as this is the closest ICD to the Vaal region. If the proposed VICD were established, its direct competition would be City Deep.



**Figure 5.27 Do constraints exist in the industry?**

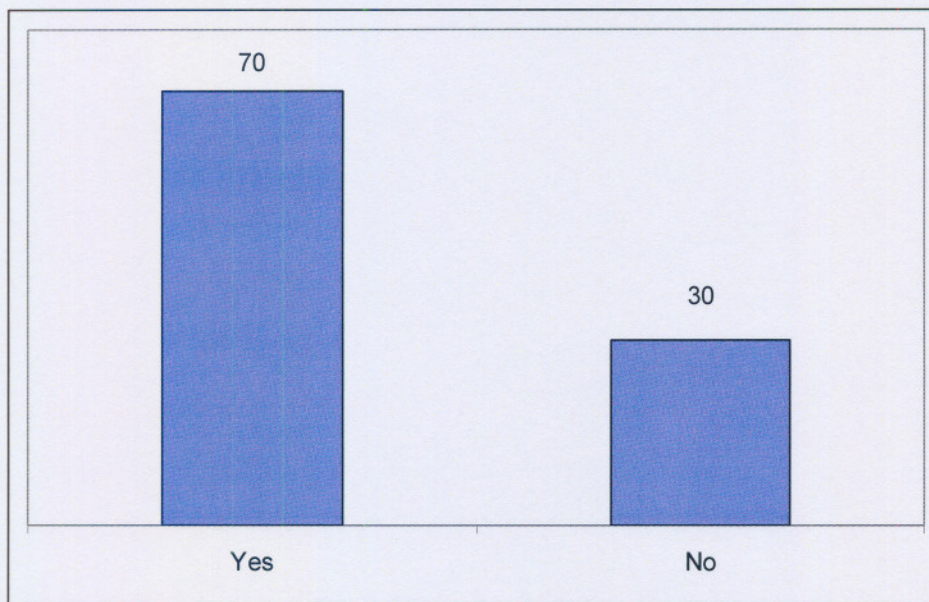


Source: Viljoen (2006b)

As illustrated in Figure 5.27, 90 percent of respondents believe that constraints do exist in the industry. Most respondents named long waiting periods, capacity and administrative constraints at City Deep as the causes of problems within the industry. Equipment failure was also noted by 20 percent of the respondents as the cause of the congestion at City Deep (Viljoen, 2006b).

When asked if the problems at City Deep were expected to continue, 70 percent of respondents indicated yes. This is illustrated in Figure 5.28.

**Figure 5.28** Are problems at City Deep likely to continue?



Source: Viljoen (2006b)

### **5.3.3 Preference of respondents**

As part of the freight forwarder questionnaire, respondents were asked to state their preference with regard to certain questions. Along with these questions, the respondents had to indicate the volume of goods that they would channel through the VICD.

#### **5.3.3.1 Would you make use of the proposed Vaal Inland Container terminal?**

All respondents indicated that they would make use of the proposed VICD that would be linked to an international cargo airport. On average, the respondents are willing to channel 35.6 percent of their products through the VICD (Viljoen, 2006b).

### **5.3.3.2 If the VICD is managed with less administrative constraints would you make use of it?**

Since one of the major constraints, indicated by respondents, to exist at City Deep is administrative congestion all respondents agreed that if the VICD was less administratively congested then they would make use of its facilities. On average 44.4 percent (which is the highest average recorded of goods that respondents are willing to channel through the VICD) forwarded by the respondents would be forwarded through the VICD (Viljoen, 2006b).

### **5.3.3.3 If the VICD rendered the same services as City Deep but at a lower fee structure would you make use of its facilities?**

According to Viljoen (2006b) respondents indicated that they were willing to channel 43.1 percent of their products through the VICD if it had a lower cost structure. All respondents would make use of the VICD if a lower fee structure was in place.

### **5.3.3.4 If the Vaal region does not have enough origin/destination demand, would you still make use of the VICD?**

Here, 90 percent of respondents indicated that they would still make use of the VICD. This is because the constraints experienced by the respondents at City Deep would still exist, thus despite the lack of origin/destination demand the VICD would still be a better alternative (Viljoen, 2006b).

## **5.4 THE SOCIO-ECONOMIC IMPACT OF AN INLAND CONTAINER DEPOT IN THE VAAL**

The proposed Vaal Logistical Hub (VLH) would have a profound effect on the economy of the Vaal, not only during the construction phase (short-term impact) but also in the long-term phase. The Vaal Inland Container Depot (VICD) would be situated in a prime position to take advantage of the well-developed road and rail infrastructures which is interlinked with some of the major national routes

such as the N1, N3 and R53 freeways, which provide access to other major metropolitan areas. Also, the Vaal area has established markets in the steel and coal industry due to the location of these resources within the area and, as a result, has a firm base of manufacturing industries.

In order to accurately determine the socio-economic impact of the VICD it must be analysed as part of a logistical hub of which the Vaal Industrial Development zone (VIDZ) and the Vaal International Airport (VIA) are essential components. The VICD would serve as a catalyst for growth in the region, facilitating the need for the establishment of downstream industries that would likely develop in the VIDZ. These industries could include those related to freight handling such as repackaging of cargo, delivery of goods, etc., as well as the activities that would use the good being transported through the VICD.

As the VICD would mainly act as a catalyst for growth, only the impact of the Vaal Logistical Hub (VLH), of which the VICD is a major component and the focus of this study, can be measured. To do this the estimated revenue for the City Deep Logistical Hub (CDLH) was used as a framework for the calculation regarding the VLH. According to Blue IQ (2002), the total estimated revenue for the CDLH is R 50 billion per year.

Of the respondents that took part in the freight forwarders questionnaire, 100 percent indicated that they would make use of the VICD. The respondents also indicated that on average they would channel 35.6 percent of their freight through the VICD (Viljoen, 2006b). Using an input-output analysis (as discussed in section 4.5) the assumption can then be made that the VLH would be 36 percent of the size of the CDLH. This value is based on the 35.6 percent volume that would be channelled through the VICD and the 100 percent of respondents that would make use of the VICD.

However, if one third of this value is used as the basis for the calculations then a more accurate view can be given of the impact of the VICD. This is done as the volume of freight the respondents are willing to channel through the VICD is only

an estimate and it is not guaranteed that this volume would indeed be channelled through the VICD. Thus if it is assumed that the VICD would be 12 percent (one third of 35.6 percent) of the size of the CDLH then the following would be generated by the revenue of the VLH:

**Table 5.4 Effect of estimated revenue generated by the VLH**

	<b>Value of effect of income generated by the CDLH</b>
<b>Household income (R billion)</b>	R 1 828 720 756
<b>Job creation</b>	40 887

Source: Calculations based on Blue IQ data (Blue IQ, 2002)

A logistical hub 12 percent of the size of the CDLH would generate over R 1.8 billion in household income within the Vaal region and would create 40 887 jobs. This is illustrated in Table 5.4. However, these calculations are based on the assumption that entirely new industries would be established within the Vaal as a result of the VLH. Thus all established local industries are ignored. If local industries locate in the VLH then the impact on the Vaal economy would be considerably less than that indicated in Table 5.4. On the other hand, if both existing and entirely new industries locate in the VLH the economic impact would be quite significant on the Vaal region.

#### **5.4.1 The effect on household income within the Vaal region**

Even though it is estimated that the VLH would only be 12 percent of the size of the CDLH, the effect on the Vaal economy is still significant. As in Table 5.4, household income would increase by more than R 1.8 billion in the Vaal region. This constitutes an estimated 20 percent rise in household income levels within the Vaal. With only 8.93 percent (Stats SA, 2003) of the Vaal population earning between R 401 and R 800 per month, this increase in household income could

enable most of the inhabitants of the area to move beyond their respective poverty lines, of which 51.6 percent of the Vaal population are living below.

With the VLH, the number of job opportunities would also increase greatly. Households previously unemployed or the employed-poor households would experience an increase in their household income also decreasing the effects of poverty felt within the Vaal region. This increased household income would also greatly impact the GDP of the Vaal region. Again, this is based on the assumption that all new industries would locate in the Vaal region as a result of the VLH. The effect on household income would be considerably less if it is only local industries that relocate to the VLH.

#### **5.4.2 The effect on employment and poverty within the Vaal region**

As shown in Table 5.4, an estimated 40 887 job opportunities would be created in the Vaal as a result of the establishment of the VLH. This estimate is based on the assumption that all new industries would locate in the Vaal region as a result of the VLH. Local industries are thus ignored. If only local industries relocate to the VLH the effect would be an expansion in their productive capacity and the resultant effect on employment would be far less than that indicated in Table 5.4.

Currently, 53.6 percent (Stats SA, 2003) of the Vaal population is unemployed. Of the respondents of the industry questionnaire, 91 percent (Viljoen, 2006a) agreed or agreed strongly that the VICD would create jobs in the Vaal region. Also, of the 49 percent of respondents that indicated they would make use of the VICD, 33 percent of respondents indicated that their business would be able to create more employment opportunities in the Vaal (Viljoen, 2006a). Also, a high incidence of employment occurs in the manufacturing (22.2 percent), trade (16.7 percent) and the services and other sectors (18.9 percent) (Stats SA, 2003). The dominant economic activities within the Vaal (as indicated by respondents) are secondary and tertiary activities, of which manufacturing and trade, services activities respectively, form part. Any employment opportunities that respondents

could make available to the inhabitants of the region would likely be in these sectors of economic activity.

Due to the fact that there is a strong correlation between unemployment and poverty (Slabbert, 2005:15), by increasing employment in the Vaal, the VLH would also be decreasing poverty within the region. With a dependency ratio of 7:1, meaning over 7 persons rely on the income of one person, for poor households in the Vaal, the establishment of the VLH could decrease this ratio, thereby decreasing poverty and providing upliftment for the poor population of the Vaal region.

## **5.5 SUMMARY AND CONCLUSIONS**

The results of the industry survey show that the majority of products either imported or exported into the Vaal are from or are being delivered to regions within South Africa. 73.7 percent of goods within the Vaal has South Africa as their country of origin, while 70.1 percent of goods have South Africa as their point of destination. The total percentage of goods with international origin and destination points is 26.3 and 29.2 percent respectively. Africa and Europe, with 8.8 and 7.5 percent respectively, are the destinations that procure the highest percentage of goods from the Vaal region. Europe is the greatest source of inputs into the production of goods within the Vaal with a volume of 11.2 percent.

Of the regions in South Africa from which goods are procured, 27 percent originates from Johannesburg/Pretoria while 30 percent of goods produced in the Vaal are distributed to the same region. Port Elizabeth has the lowest (0.3 percent) percentage share in volume of goods that are procured from the Vaal region. Of the 73.7 percent of goods that originate in South Africa, almost half (32.4 percent) originates from the Vaal region itself.

Over half of the goods transported by business within the Vaal are done so by means of road (53 percent for delivery and 56 percent for procurement). Rail is the second most used mode of transportation for goods within the Vaal with 34

percent being delivered via rail and 24 percent being procured using rail. An average of 42 percent of the volume of goods procured from the Vaal region are shipped to their destination using containers, while an average of 47 percent of the volume of goods procured by undertakings within the Vaal region arrive in containers.

Of the economic activities in the Vaal more than half (51.2 percent) are secondary in nature. Primary sector activities only account for 3.6 percent of all respondents in the Vaal. Of all the respondents, 68 percent indicated that they are a small business. Large enterprises amount to 9.3 percent of the total respondents and 22.7 indicating that they are a medium-sized enterprise.

According to the industry survey, 49 percent of respondents indicated that they would make use of the proposed Vaal Inland Container Depot (VICD), with 77 percent fully supporting the establishment of the VICD. Of all respondents 49 percent indicated that the VICD would create cost savings for their business. With the matter of job creation, 91 percent of respondents agreed that the VICD would create employment opportunities for the inhabitants of the region. However, of the total number of respondents, half believed that the VICD would not enable their business to undergo any expansion.

With the freight forwarder survey, 60 percent of respondents indicated that they are a medium enterprise. None of the respondents interviewed were of the small business category. Almost all (90 percent) respondents agreed that there were constraints in the industry with regard to freight handling at City Deep, with many citing administrative backlog, long waiting periods and equipment failures as among the main causes. Respondents of the freight forwarder survey all indicated that they would make use of the VICD and would be willing to channel an average of 35.6 percent of their cargo through its facilities. All respondents indicated that they would make use of the VICD if there were fewer administrative constraints and a lower fee structure in place. Respectively, 44.4 and 43.1 percent of respondents' cargo would be forwarded through the VICD.



If it is assumed that the VLH would be 12 percent the size of the CDLH then the resultant effect on the Vaal economy would be significant. Over R 1.8 billion in household income would be generated by the VLH causing a 20 percent increase in household income for individuals within the Vaal. Also, the VLH would create over 40 000 employment opportunities for the Vaal region and because poverty has a strong unemployment dimension, with increased employment in the region, poverty is decreased.

The ultimate users of the VICD infrastructure, the industries within the Vaal and the freight forwarders that would be handling the cargo of these industries, all fully support the establishment of the proposed VICD. In this way the VICD would be able to facilitate the intermodal nature of transport infrastructure within the Vaal area and in doing so the VICD would be achieving the goals of infrastructure set out in legislation governing such infrastructure. Also, new industries would be willing to locate in the area as a result of the VICD, especially with its proximity to major national road infrastructure such as the N1, N3 and R53 freeways, and that it provides access to the large metropolitan areas such as the Witwatersrand and the East Rand as well as the proximity to the already established steel and coal industries within the area.

Based on the effect of the VLH on both household income and employment (and as a result, poverty), the establishment of the proposed project would have a profound impact on the Vaal region. By increasing employment, the effects of poverty can be alleviated resulting in the upliftment of the poor population of the Vaal region.

## **CHAPTER 6: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

### **6.1 SUMMARY**

As developing economies become increasingly integrated with the global economy, their governments must make such integration work for their development objectives. In doing so, there would be a critical role for public goods that cross borders in bringing benefits that would not materialise by domestic public goods alone. There has been an increasing realisation that regional integration cannot take place without regional transport and infrastructure. Governments should have their own development policies and investment priorities that suit their circumstances. However, it is often the physical infrastructure development, particularly in the transport sector, that is high on the priority list. As transport infrastructure does not end at local boundaries for their users it becomes necessary to develop cross-border infrastructure and associated institutions, as well as to maximise the economic benefits of domestic infrastructure

The study area, the Vaal, is formed by the Emfuleni, Midvaal and Metsimaholo municipalities, which are situated in the southern part of Gauteng and the northern part of the Free State respectively. These areas form a cohesive and intensively integrated economic unit that cannot be separated by politically demarcated boundaries. People living in these areas are, to a great extent, shopping, working or searching for jobs in one or more of the municipal areas and as a result there is a high incidence of commuting between these areas. Low income areas are almost totally dependent on the economic activities taking place in the high to medium income areas.

The total population of the Vaal area is estimated at 839 039, with Emfuleni having the largest portion of the population at 78.5 percent. The African population is estimated at 685 495, which forms 81.7 percent of the total population of the Vaal. With the highest concentration of the population over the job-seeking ages and the

current unemployment rate for the Vaal area at 53.6 percent many youths will probably not find gainful employment within the Vaal region.

Of the existing employment opportunities, a high incidence of employment occurs in the manufacturing (22.2 percent), trade (16.7 percent) and the services and other sectors (18.9 percent). The lowest employment figures are for the mining (0.8 percent), electricity/gas/water (1.5 percent) and tourism and entertainment (1.4 percent) sectors.

The largest contributor to the Vaal GGP is the manufacturing sector, contributing 38.7 percent, and is responsible for 34 122 employment opportunities. The services sector is growing at a steadily increasing rate. The transport sector has experienced the highest percentage growth per annum of all the economic sectors of the Vaal, with 8.6 percent. Its relative contribution to the GGP of the Vaal area, however, is low (7.6 percent in 1996 and 9.0 percent in 2003).

The various pieces of legislation governing South Africa's transport system such as the White Paper on National Commercial Ports Policy and the White Paper on National Transport Policy, all have certain objectives in common. The most prominent objective is that all policies must provide for inter-modal transportation and its seamless facilitation. Thus all modes of transport within the economy must be geared towards a framework of co-operation in order to take advantage of any economies of scale the country or various regions have.

Despite the legislation that is aimed at the smooth running of the national transport and freight system, there are still numerous inequalities that exist when looking at the different regions within South Africa, as well as the lack of adequate infrastructure that would enable South African products to compete in the global market. For this reason, several strategies were developed in order to establish the current levels of service provision within the country, as well as what could be done to enhance and develop these further. These are the Moving South Africa (MSA) Strategy and the National Freight Logistics Strategy (NFLS). The challenges or inequalities, identified by the NFLS, present significant

obstacles to ensure that the goals of transport legislation are met. The MSA strategy proposed several key strategies to bring about reform in the transport system.

Freight movements within the country are predominantly road based, which provides links between sea ports, rail networks and the Gauteng industrial hub. However, the quality of infrastructure in the freight logistics sector is insufficient to sustain a world class logistics system. The operations on that infrastructure is further not targeted at fulfilling demand, but rather at tailoring demand around the supply structures and constraints.

The location of the firm is often the primary goal of real estate and the key to the success of the investor. Advantages to businesses in a region derive primarily from that region's ability to provide some factors at a better value than the competing regions. The von Thünen land use model and the Weber theory of industrial location are both classical theories of firm location that highlight the role of proximity to raw materials and the market place as the most important consideration of firm location. Transport costs, in this regard, are the governing determinant of business activity and the closer the plant is to the source of the raw material, the greater the benefit to the business undertaking concerned. The ideal location of the firm, according to the classical location theories, is one which is close to the site of raw materials and to the final market of the product. Therefore, proximity to transport networks that facilitate the flow from source to processing plant to final market is of the utmost importance.

Modern theories of industrial location have led to the identification of numerous factors relating to industrial needs and community attributes that can serve as guides to evaluating the potential for the type of industrial development feasible for any given location. The most significant development in modern location theory is the new economic geography (NEG), which explains the cumulative causation process leading to agglomeration. This can be applied to the Vaal

Inland Container Depot (VICD) and the resultant downstream industries that would be created from its establishment.

The input-output model depicts economic linkages that exist within and between different components of an economy. This approach identifies monetary flows (expenditures and receipts) between various units, and focuses on the interdependence of different sectors of economic activities. The model discussed in this study was implemented to measure the impact of positive (e.g. the establishment of new industries) changes in the Vaal economy on employment and household income.

The results of the industry survey show that the majority of products either imported or exported into the Vaal are from or are being delivered to regions within South Africa. 73.7 percent of goods within the Vaal has South Africa as their country of origin, while 70.1 percent of goods have South Africa as their point of destination. The total percentage of goods with international origin and destination points is 26.3 and 29.2 percent respectively. Africa and Europe, with 8.8 and 7.5 percent respectively, are the destinations that procure the highest percentage of goods from the Vaal region. Europe is the greatest source of inputs into the production of goods within the Vaal with a volume of 11.2 percent.

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shipped to their destination using containers, while an average of 47 percent of the volume of goods procured by undertakings within the Vaal region arrive in containers.

Of the economic activities in the Vaal more than half (51.2 percent) are secondary in nature. Primary sector activities only account for 3.6 percent of all respondents in the Vaal. Of all the respondents, 68 percent indicated that they are a small business. Large enterprises amount to 9.3 percent of the total respondents and 22.7 indicating that they are a medium-sized enterprise.

According to the industry survey, 49 percent of respondents indicated that they would make use of the proposed Vaal Inland Container Depot (VICD), with 77 percent fully supporting the establishment of the VICD. Of all respondents 49 percent indicated that the VICD would create cost savings for their business. With the matter of job creation, 91 percent of respondents agreed that the VICD would create employment opportunities for the inhabitants of the region. However, of the total number of respondents, half believed that the VICD would not enable their business to undergo any expansion.

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If it is assumed that the VLH would be 12 percent the size of the CDLH then the resultant effect on the Vaal economy would be significant. Over R 1.8 billion in household income would be generated by the VLH causing a 20 percent increase

in household income for individuals within the Vaal. Also, the VLH would create over 40 000 employment opportunities for the Vaal region and because poverty has a strong unemployment dimension, with increased employment in the region, poverty is decreased. The socio-economic impact of the VLH would thus be significant if it is only new industries that are established as a result. However, if only local industries relocate to the VLH, the impact on the economy would be far less than the above.

## **6.2 CONCLUSION**

If the key sectors of the economy, manufacturing and tourism, could be stimulated sufficiently, it would result in a considerable increase in employment and household income. With export and import markets already in place within the region these enterprises can experience greater levels of competition and expanded market opportunities for their products with the establishment of the proposed VICD.

The increase in productive capacity that the VICD could bring about for manufacturing concerns would lead to an increase in output which would necessitate increased employment in this sector. Also with the expected increased business confidence within the Vaal region as a result of the proposed project, investment opportunities would be created. This in turn would create growth for the industry as well as the labour market within the Vaal. These sectors have the largest potential to increase the exports of local products and to attract new business into the Vaal region. This will automatically stimulate the other sectors that are currently not experiencing the same growth levels and thus economic growth in the entire Vaal region could occur.

The transport sector has experienced the highest percentage growth per annum of all the economic sectors of the Vaal, with 8.6 percent. Even though its relative contribution to the GGP of the Vaal area is low, with the proposed VICD as part of the VLH, it could serve as a catalyst to stimulating growth in the economy's key sectors, especially the manufacturing sector. Road-based freight movement provides links between sea ports, rail networks and the Gauteng industrial hub.

However, the quality of infrastructure in the freight logistics sector is insufficient to sustain a world class logistics system at this stage. The VICD would be linked by well-developed road and rail infrastructures which are, in turn, are interlinked with national road infrastructure such as the N1, N3 and R53 freeways, and provide very good access to the large metropolitan areas such as the Witwatersrand and the East Rand.

For this reason the proposed Vaal Inland Container Depot (VICD) would be able to ensure the smooth running of the freight logistics system in the Gauteng province by providing another outlet for the distribution of cargo along the high-density freight corridor. With City Deep labouring under administrative and capacity constraints, the VICD would provide a much needed opportunity to take advantage of the economies of scale brought about by the concentration of manufacturing activities in the Vaal region as well as contributing to the Gauteng industrial hub.

With transport costs being the most important consideration in industrial location theory, the VICD would be a prime example of where the source of the raw material, the processing plant and the market are in close proximity to one another. With the Vaal region already having firmly established coal and steel industries the VICD would be able to take advantage of flourishing markets and facilitate the flow of goods from these industries to their final users. With the increased demand for goods produced by industries within the Vaal, the need for excess labour would increase greatly.

The ultimate users of the VICD infrastructure, the industries within the Vaal and the freight forwarders that would be handling the cargo of these industries, all fully support the establishment of the proposed VICD. In this way the VICD would be able to facilitate the intermodal nature of transport infrastructure within the Vaal area and in doing so the VICD would be achieving the goals of infrastructure set out in legislation governing such infrastructure. Also, new industries would be willing to locate in the area as a result of its location to



excellent road infrastructure and available resources within the area. The VICD can thus be seen as a catalyst to the development of new industries as well as the expansion of existing enterprises.

With the VICD being a catalyst for growth and development, its effects must be measured as an entire logistical hub, as downstream industries locate or relocate to the VICD. With a proposed Vaal Logistical Hub (VLH), even 12 percent the size of the City Deep Logistical Hub (CDLH), the economic impact is enormous. With over R 1.8 billion in household income being generated and over 40 000 employment opportunities being created as a result of its establishment, the most important socio-economic aspect, i.e. poverty, in the Vaal can be reduced and its effects minimised.

### **6.3 RECOMMENDATIONS**

In order to improve all the socio-economic aspects that the VICD could offer, the following should be implemented:

- The VICD should be established as part of a logistical hub. This would ensure the development of necessary downstream industries for the Vaal and would provide the catalyst necessary for growth and development.
- Incentives for industries that employ the inhabitants (across all levels of skill) of the Vaal region. If regional labour resources are given preference, the jobs that would be created by the VLH could decrease unemployment levels and increase household income within the Vaal region.
- Skills development programmes should be in place so that all skill levels required for the proposed project have an incentive to develop their existing skills and to gain new skills.
- Programmes aimed at promoting the key growth sectors of the Vaal economy, i.e. manufacturing and tourism, could be developed in order to attract investment spending to these sectors and their activities.

- Trade incentives for enterprises using the facilities that the VICD would offer should also be in place so that increased trade flows can be facilitated;

If these incentives and programmes could be in place, the proposed Vaal Logistical Hub (of which the Vaal Inland Container Depot is an important component), could benefit the Vaal inhabitants and create growth and facilitate development for the entire region, thereby also eliminating or decreasing poverty and providing lasting opportunities for the Vaal.

## BIBLIOGRAPHY

ANON. 2000. Alfred Weber's theory of industrial location.

<http://www.sjsu.edu/faculty/Watkins/weber.htm> Date of access: 19 July 2006.

ARMSTRONG, H & TAYLOR, J. 2000. Regional economics and policy. 3<sup>rd</sup> ed. Oxford : Blackwell.

BARLOWE, R. 1986. Land resource economics. N.J : Prentice-Hall.

BLAKELY, E.J. 1994. Planning local economic development: theory and practice. 2<sup>nd</sup> ed. London : Sage.

BLUE IQ. 2002. Blue IQ: the plan for a smart province – Gauteng.

[http://www.blueiq.co.za/the\\_plan\\_for\\_a\\_smart\\_province.html](http://www.blueiq.co.za/the_plan_for_a_smart_province.html) Date of access: 25 May. 2006.

BOLLAN, R.D. 1999. Factors associated with local economic growth. *Rural and small Canada analysis bulletin*, 1(6), April.

BRÅTHEN, S. 1998. Transportation infrastructure and industrial development: pilot case studies. Høgskolen Molde : Molde.

CARRIER, R. & SHRIVER, W.R. 1968. Location theory: an empirical model and selected findings. *Land economics*, 44(4):450-460.

CAROD, J.M.A., 2004. Determinants of industrial location: an application for Catalan municipalities. Spain : Blackwell.

CASADO-IZAGA, F.J. 1999. Location decisions: the role of uncertainty about consumer tastes. *Journal of economics*, 71(1):31-46.

CENTRAL STATISTICAL SERVICES. 1978. Input-Output Tables 1978. Report no. 09-16-05. Pretoria : Government Printer.

CENTRAL STATISTICAL SERVICES. 1993. South African Standard Classification of all Economic Activities. Pretoria : Government Printer.

CHATTERJEE, S. 2003. Agglomeration economies: the spark that ignites a city? <http://www.phil.frb.org/businessreview/q4.pdf> Date of access: 19 July 2006.

COHEN, J.P. & MORRISON-PAUL, C.J. 2001. Spatial and supply/demand agglomeration economies: an evaluation of state and industry linkages in the U.S food system. CA : UCLA

COLANDER, D.C. & GAMBER, E.N. 2002. Macroeconomics. Prentice Hall : New Jersey.

CSISS. 2004. Introduction to human geography: location of industry. <http://www.csiss.org/classics/archive/lect15.htm> Date of access: 19 July 2006.

CSS see Central Statistical Services.

DALA (DEPARTMENT OF LAND AFFAIRS AND AGRICULTURE) see SOUTH AFRICA. Department of Land Affairs and Agriculture.

DC (DEPARTMENT OF COMMERCE) see INDIA. Department of Commerce.

DEMARICATION BOARD. 2003. Municipal demarcations. <http://www.demarcation.co.za>. Date of access: 18 Sep. 2006.

DIPPENAAR, A.A. 2001. Industrial development zones as a policy instrument in South Africa. Potchefstroom : PU for CHE. (Thesis – M.Com.).

DOERINGER, P.B., TERKLA, D.G. & TOPAKIAN, G.C. 1987. Invisible factors in local economic development. New York : Oxford.

DoT (DEPARTMENT OF TRANSPORT) see SOUTH AFRICA. Department of Transport.

DoL (DEPARTMENT OF LAND AFFAIRS AND AGRICULTURE) *see* SOUTH AFRICA. Department of Land Affairs and Agriculture.

DTI (DEPARTMENT OF TRADE AND INDUSTRY) *see* SOUTH AFRICA. Department of Trade and Industry.

DURANTON, G. 2005. Spatial economics.

<http://www.individual.utoronto.ca/gilles/Papers/Palgrave.pdf> Date of access: 19 July 2006.

ECKEY, H-F. & KOSFELD, R. 2004. New economic geography: critical reflections, regional policy implications and further development. Kassel : University of Kassel.

ELLINGER, R. 1977. Industrial location behaviour and spatial evolution. *The journal of industrial economics*, 25(4):295-312, June.

FEARON, D. 2001. Alfred Weber: theory of the location of industries, 1909. <http://www.csiss.org/classics/content/51> Date of access: 19 July 2006.

FUCHS, O. 2001. When government means business: innovative institutional vehicles for the delivery of projects and infrastructure. (*In* Conference proceedings: Property and construction: the art of contracting with government in the new South Africa. Saxonwald : Henry Stewart Conference Studies).

FULTON, M. 1965. Plant location. *Harvard business review*: 40-50.

FUJIMURA, M. 2004. Cross-border infrastructure, regional integration and development. ADB Institute.

FUJITA, M., KRUGMAN, P. & VENABLES, A. 1999. The spatial economy: cities, regions and international trade. Mass. : MIT.

GE, W. 1999. The dynamics of export processing zones. (Paper read at the UN Conference on Trade and Development held in December 1999).

- HARTZENBERG, T. 2001. South African regional industrial policy: from border industries to spatial development initiatives. Journal of International Development, 13(6):767-777, Aug.
- HOOVER, E.M., GIARRATANI, F. An introduction to regional economics. 3<sup>rd</sup> ed. New York : Knopf.
- HUNT, D. 1989. Economic theories of development: an analysis of competing paradigms. Hertfordshire : Harvester Wheatsheaf.
- INDIA. Department of Commerce. 2005. Guidelines for setting up inland container depot (ICD) and container freight station (CFS) in India. [http://commerce.nic.in/infr\\_guidedet.html](http://commerce.nic.in/infr_guidedet.html) Date of access: 24 Jan. 2006.
- JONES, L.L & WOODS, M.D. 2002. Economic location theory and practice. <http://www.agecon2.tamu.edu> Date of access: 30 July 2006.
- JOURDAN, P. 1998. Spatial development initiatives (SDIs) – the official view. Development Southern Africa, 15(5):717-725, Summer.
- KARAKAYA, F. & CANEL, C. 1998. Underlying dimensions of small business location decisions. *Industrial management and data systems*, 98(7):321-329.
- KHUN, G. & JANSEN, R. 1997. Input-output analysis: Sectoral multipliers for South Africa in 1993. IDC Research Paper series.
- KLEYNHANS, E.P.J. 2003. The competitive platforms for industrial development in South Africa. Potchefstroom : PU for CHE. (Thesis – Ph.D.).
- KUMAR, N. 2001. Infrastructure availability, foreign direct investment inflows and their export-orientation: a cross country exploration. RISDC : New Delhi.
- LIU, A.Y., LI, S. & GAO, Y. 1999. Location, location, location. *The China business review*: 20-25, March.

- MAHARAJ, P. 2001. Welcoming address and background on Blue IQ. <http://www.bluiq.co.za.htm> Date of access: 24 Jan. 2006.
- MASSEY, D. 1973. A critical evaluation of industrial location theory. (*In* Hamilton, F.E.I. & Linge, G.J.R., eds. Spatial analysis and location-allocation models. New York : Van Nostrand Reinhold.)
- MBENDI. 1998. Transvaal Association of Freight Forwarders. [http://www.mbendi.co.za/imports/sa/freightfwd\\_saaff\\_tv1.htm](http://www.mbendi.co.za/imports/sa/freightfwd_saaff_tv1.htm) Date of access: 30 Oct. 2006.
- MILLER, R.E. 1998. Regional an interregional input-output analysis. (*In*: Isard, W., Azis, I.J., Drenam, M.P., Miller, R.E., Saltzman, S. & Thorbecke, E. 1998. Methods of Interregional and regional analysis). Aldershot : Ashgate.
- MOHR, P. 2000. Economic indicators. Revised ed. Pretoria : Unisa.
- MOHRING, H. 1976. Transportation economics. Cambridge, Mass. : Ballinger.
- MUELLER, E. & MORGAN, J.N. 2002. Location decisions of manufacturers. MI : University of Michigan.
- NAS, T.V. 1996. Cost-benefit analysis: theory and application. London : Sage.
- NEL, E. 1994. Export processing zones: international experience and applicability in South Africa. Development Southern Africa, 11(1):99-111.
- NEL, H. 2001. Technical coefficients, Leontief Inverse Matrix and Sectoral Multipliers for the Vaal. Unpublished research document. Vaal Research Group. Vanderbijlpark.
- NEWMAN, N. 1998. SDI and IDZ challenges facing South Africa. South African Labour Bulletin, 22(4):42-45, Aug.

PDC. 2002. Location factors.

<http://www.pdc.us/programs/ed/strategy/pdf/appendix-2-3.pdf> Date of access:  
17 July 2006.

PIETLOCK, B.A. 1994. Developing location factors using a factoring model.

<http://www.icoste.org/koreva94.htm> Date of access: 19 July 2006.

PREST, A.R. 1969. Transport economics in developing countries. London :  
Weidenfield & Nicolson.

QUINET, E. & VICKERMAN, R. 2004. Principles of transport economics.  
Cheltenham : Edward Elgar.

RICHARDSON, H.W. 1969. Regional economics: location theory, urban  
structure and regional change. London : Weidenfield & Nicolson.

RICHARDSON, H.W. 1972. Input-Output and Regional Economics. London:  
Weidenfeld & Nicolson.

ROGERSON, C.M. 2004. From spatial development initiatives to Blue IQ: sub-  
national economic planning in Gauteng. (*In Nel, E. & Rogerson, C.M., eds.*  
Local economic development in the developing world: the experience of  
southern Africa. N.J. : Transaction. p.183-209.)

ROSENTHAL, S.S. & STRANGE, W.C. 2003. Evidence on the nature and  
sources of agglomeration economies. *Handbook of regional and urban  
economics*, Aug.

SEERS, D. 1979. The meaning of development. (*In Lehmann, D., ed.*  
Development theory. London : Cass. p. 9-32.)

SIMONIS, D. 2002. The new economic geography: a survey of the literature.  
Brussels : FPB.



SLABBERT, T.J.C. & SLABBERT, G. 1983. Port Elizabeth / Uitenhage Metropolitan Region: A complete Input-Output Table. Research Report no. 25. Institute for Planning Research. Port Elizabeth

SLABBERT, T.J.C. & SLABBERT, G. 2002a. A local economic development strategy. VRG : Vanderbijlpark.

SLABBERT, T.J.C. & SLABBERT, G. 2002b. Urban economic review and projection of local economic development. VRG : Vanderbijlpark.

SLABBERT, T.J.C. 2001. Prospects for the regeneration of the Vaal Triangle economy. VRG : Vanderbijlpark.

SLABBERT, T.J.C. 2004. A micro-economic analysis of unemployment, poverty and other socio-economic & environmental issues in the Vaal. Vanderbijlpark : VRG.

SLABBERT, T.J.C. 2005. Emfuleni local municipality: review of economic and demographic trends, economic sustainability and LED strategies. Vanderbijlpark : VRG.

SMITH, D.M. 1976. Modelling industrial location: towards a broader view of the space economy. (*In* Hamilton, F.E.I. & Linge, G.J.R., eds. Spatial analysis and location-allocation models. New York : Van Nostrand Reinhold.)

SOUTH AFRICA. Department of Land Affairs and Agriculture. 2001. White paper on spatial planning and land use management.  
<http://www.info.gov.za/whitepapers/2001/spatialplanning.htm>. Date of access: 19 March. 2006.

SOUTH AFRICA. Department of Trade and Industry. 1999. South Africa's industrial development zone programme. Pretoria : Government printer.

SOUTH AFRICA. Department of Trade and Industry. 2004. Industrial development zones. [Web:] <http://www.dti.gov.za/offerings.html> [Date of access: 15 May. 2005].

SOUTH AFRICA. Department of Transport. 1996. White paper on national transport policy.

[http://www.polity.org.za/html/govdocs/white\\_papers/transwhite.html](http://www.polity.org.za/html/govdocs/white_papers/transwhite.html) Date of access: 26 May 2006.

SOUTH AFRICA. Department of Transport. 1998. Moving South Africa. Pretoria : Government Printer.

SOUTH AFRICA. Department of Transport. 2001. Draft white paper on national commercial ports policy. [http://www.transport.gov.za/library/docs/white-paper/ports\\_wp.html](http://www.transport.gov.za/library/docs/white-paper/ports_wp.html) Date of access: 26 May 2006.

SOUTH AFRICA. Department of Transport. 2005. National freight logistics strategy. Pretoria : Government Printer.

STATISTICS SOUTH AFRICA. 2003. Census 2001 statistics. <http://www.statssa.gov.za>. Date of access: 18 Sep. 2006.

STATS SA *see* STATISTICS SOUTH AFRICA.

TODARO, M.P. & SMITH, S.C. 2003. Economic development. 8<sup>th</sup> ed. Pearson : England.

TOMBARI, H.A. 1979. Economic and non-economic factors affecting plant location decisions. *American journal of small business*, 3(4):23-30.

UNCTAD. 1991. Handbook on the management and operation of dry ports. [http://www.unctad.org/ports/handbook\\_management](http://www.unctad.org/ports/handbook_management) Date of access: 24 Jan. 2006.

URBAN ECON. 1998. Socio-economic impact assessment of disinvestment options

for Iscor Flat Products: Vanderbijlpark Works. Report for Iscor Steel. Pretoria.

VAALMET. 1994. Economic Land Use, Transport and Passenger Transportation Plans. Volume 1. Economic Development Plan. Vereeniging

VAN VUREN, L.C. 2003. Local economic development in the Emfuleni Municipal Area: a critical analysis. Vanderbijlpark : PU for CHE. (Dissertation - M.Com.)

VILJOEN, D-J. 2006a. Industry survey conducted from March 2006 to August 2006. Vaal area.

VILJOEN, D-J. 2006b. Freight forwarder surveyed conducted in October 2006. Vaal area.

VRG. 2000. Prospects for trade and investment in South Africa's largest industrial hub: Vaal Triangle Metropolitan Area. Vanderbijlpark : VRG.

## **Annexure A: Classification of economic activities**

The economic activities referred to in this study are defined below. The main categories of the Standard Industrial Classification of all Economic Activities (SIC) are utilised for this purpose (CSS, 1993).

### **1. AGRICULTURE**

This sector includes the following:

- Agriculture, hunting and related services;
- Growing of crops, market gardening, horticulture;
- Farming of animals; and
- Production of organic fertiliser.

### **2. MINING (Mining and quarrying)**

This sector includes the following:

- Mining of coal and lignite;
- Extraction of crude petroleum and natural gas, service activities incidental to oil and gas extraction, excluding surveying;
- Mining of metal ores, except gold and uranium;
- Other mining and quarrying;
- Stone quarrying, clay and sand-pits; and
- Service activities incidental to mining of minerals.

### **3. MANUFACTURING**

This sector includes the manufacturing of the following:

- Food products, beverages and tobacco products;
- Textiles, clothing and leather goods;
- Wood and cork products (except furniture), straw and painting materials, paper and paper products, publishing, printing and reproduction of recorded media;

- Coke, refined petroleum and nuclear fuel products, chemicals and chemical products, rubber and plastic products;
- Other non-metallic mineral products;
- Basic metals, fabricated metal products, machinery and equipment, office/ accounting and computing machinery;
- Electrical machinery and apparatus, not elsewhere classified;
- Radio, television and communication equipment, medical, precision and optical instruments, watches and clocks;
- Transport equipment; and
- Furniture, recycling, manufacturing not elsewhere classified.

#### **4. ELECTRICITY/ GAS AND WATER**

This sector includes the following:

- Electricity, gas, steam and hot water supply; and
- Collection, purification and distribution of water.

#### **5. CONSTRUCTION**

This sector includes the following:

- Site preparation;
- Building complete constructions or parts thereof, civil engineering; and
- Building installation.

#### **6. TRADE (wholesalers and retailers)**

This sector includes the following:

- Wholesale and commission trade, except motor vehicles and motorcycles;
- Retail trade, except motor vehicles and motorcycles, repair of personal household goods; and
- Sales, maintenance and repair of motor vehicles/ motor cycles, retail trade in automotive fuel.

## **7. TRANSPORT**

This sector includes the following:

- Land and via pipeline transport;
- Water;
- Air;
- Supporting and auxiliary activities, travel agencies; and
- Post and telecommunications.

## **8. FINANCING**

This sector includes the following:

- Financial intermediation, except insurance and pension funding;
- Insurance and pension funding, except compulsory social security;
- Activities auxiliary to financial intermediation;
- Real estate activities;
- Rental of machinery and equipment, without operator, personal and household goods;
- Computer and related activities;
- Research and development; and
- Other business activities.

## **9. SERVICES**

This sector includes the following:

- Public administration and defence activities;
- Education;
- Health and social work;
- Other community, social and personal service activities;
- Membership organisations, not elsewhere classified; and
- Other service activities.

## **10. TOURISM AND ENTERTAINMENT**

This sector includes the following:

- Hotels and restaurants;
- Recreational, cultural and sporting activities; and
- Parks and other organisations not included elsewhere.

## Annexure B: Industry Questionnaire

### PROPOSED VAAL LOGISTICAL HUB

- VAAL INTERNATIONAL (CARGO) AIRPORT
- VAAL INDUSTRIAL DEVELOPMENT ZONE
- VAAL INLAND HARBOUR/CONTAINER DEPOT

### A GENERAL INFORMATION

- 1 Name of business : \_\_\_\_\_ (Example: African (Pty) Ltd)
- Physical address : \_\_\_\_\_ (Example: 37 Asbestos Street, Duncanville)
- Contact person : \_\_\_\_\_
- Telephone number: : \_\_\_\_\_
- Fax number : \_\_\_\_\_
- E-mail address : \_\_\_\_\_
- 2 Type of business : \_\_\_\_\_
- 3 Size of business : Number of workers  Value of turnover pa.

### B DISTRIBUTION/PROCUREMENT INFORMATION

- 1 To which areas does your business sell/distribute its products?

	RSA*	North America	South America	Africa	Europe	Far East	Middle East	Asia	Australasia
Percentage (Add to 100%)									

\*Please indicate for RSA

Percentage (Add to 100%)

Vaal	Cape Town	Durban	P.E	East London	Joburg/Pretoria	Other (specify)

- 2 From where does your business procure products?

	RSA*	North America	South America	Africa	Europe	Far East	Middle East	Asia	Australasia
Percentage (Add to 100%)									

\*Please indicate for RSA

Percentage (Add to 100%)

Vaal	Cape Town	Durban	P.E	East London	Joburg/Pretoria	Other (specify)

- 3 Please indicate the mode of transport for procurement, with reference to volume. (% add to 100%)

ROAD		RAIL		AIR	
Container	Other (specify)	Container	Other (specify)	Container	Other (specify)
%		%		%	



- 4 Please indicate the mode of transport for distribution, with reference to volume. (% add to 100%)

ROAD		%	RAIL		%	AIR		%
	Container	Other (specify)		Container	Other (specify)		Container	Other (specify)
%			%			%		

## AIR TRANSPORT

- 5 If air transport is used, who delivers/picks up the container(s)/goods at the airport?

Your business	Contractor	Freight forwarder
---------------	------------	-------------------

- 6 Where?

JHB	Rand Airport	Lanseria	Other (specify)
-----	--------------	----------	-----------------

- 7 How many times per month does your business/the freight forwarder pick up/deliver goods at the airport?

- 8 If a contractor/freight forwarder is used, at what annual cost for deliveries?

- 9 Please indicate the type of truck(s) used to pick up/deliver to the airport.

Petrol (cc)	Diesel (cc)

- 10 Please indicate the average salary (R per month) of the driver/co-driver that drives the truck.

- 11 If your business delivers/picks up the goods from an airport, please indicate the average time spent per trip.

- 12 Do you experience any delays at airport(s)?

JHB	Rand Airport	Lanseria	Other (specify)

Indicate average delay per consignment (hours/days).

- 13 Please indicate the longest delay you have experienced (hours/days).  
If possible, please indicate the reasons for the delays.

- 14 What is the additional annual inventory cost you have to bear because of delays?

## ROAD CONTAINER TRANSPORT

- 15 If road transport is used, who delivers/picks up the containers at the airport/harbour?

	Your business	Contractor	Freight forwarder	Supplier
%				

16 Where? (Percentage add to 100%)

	Supplier	City Deep	Station	Harbour	Airport	Other (specify)
%						

17 How many times per month does your business/the freight forwarder pick up/deliver containers?

Supplier	City Deep	Station	Harbour	Airport	Other (specify)

18 If a contractor/freight forwarder is used, at what annual cost for deliveries?

19 Please indicate the type of truck(s) used to pick up/deliver containers.

Petrol (cc)	Diesel (cc)

20 Please indicate the average salary (R per month) of the driver/co-driver that drives the truck.

21 If your business delivers/picks up the containers, please indicate the average time spent per trip.

22 Do you experience any delays?

Indicate average delay per consignment (hours/days).

Supplier	City Deep	Station	Harbour	Airport	Other (specify)

23 Please indicate the longest delay you have experienced (hours/days).   
If possible, please indicate the reasons for the delays. \_\_\_\_\_

24 What is the additional annual inventory cost you have to bear because of delays?

## RAIL CONTAINER TRANSPORT

25 If rail transport is used, who delivers/picks up the containers?

	Your business	Contractor	Freight forwarder	Supplier
%				

26 Where?

	Your premises	Station	Other (specify)
%			

27 Do you experience any delays?

Indicate average delay per consignment (hours).

Station	City Deep	Other

28 Please indicate the longest delay you have experienced (hours).

29 What is the additional annual inventory cost you have to bear because of delays?





**C STATEMENTS/OPINIONS**

**Vaal international (cargo) airport**

**1 Questions/statements related to the establishment of an international (cargo) airport in the Vaal Logistical Hub. Please indicate with a cross (X) on the following scale from 1-7, where 1 = Agree strongly and 7 = Disagree strongly)**

**1.1 My business will make use of an international cargo airport in the Vaal.**

Agree strongly							Disagree strongly
1	2	3	4	5	6	7	

**1.2 My business fully supports the establishment of an international cargo airport in the Vaal.**

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**1.3 An international cargo airport in the Vaal will solve the problem of delays for my business.**

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**1.4 An international cargo airport in the Vaal will enable my business to carry fewer inventories.**

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**1.5 An international cargo airport in the Vaal will enable my business to make use of international best practice (example just-in-time procurement).**

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**1.6 An international cargo airport in the Vaal will lead to cost reductions for my business.**

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**1.7 An international cargo airport in the Vaal will lead to higher business confidence in the area.**

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**1.8 An international cargo airport in the Vaal will create jobs in the Vaal.**

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**1.9 An international cargo airport in the Vaal will lead to a higher rate of industrial development in the area.**

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**1.10 My business will be exposed to more export opportunities with an international cargo airport in the Vaal.**

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**1.11 My business will be exposed to more imported products with an international cargo airport in the Vaal.**

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1.12 My business will create more jobs as a result of an international cargo airport in the Vaal.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1.13 My business will expand because of an international cargo airport in the Vaal.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1.14 The international cargo airport should be combined with an inland harbour/container depot and an industrial development zone (IDZ).

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1.15 Problems (congestion) at other airports (JHB, Lanseria, etc.) are an obstacle to my business.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1.16 An international cargo airport in the Vaal will increase the intensity of the noise levels in the Vaal.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1.17 My business will use the international cargo airport to export/import primarily from/to African countries.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1.18 My business will use the international cargo airport to distribute/procure primarily to/from other cities/areas in South Africa.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1.19 My business will use the international cargo airport to export/import primarily to/from international countries, other than African countries.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1.20 The proposed international cargo airport should also make provision for passenger services to a certain degree.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

## **Vaal inland harbour/container depot**

**2 Questions/statements related to the establishment of an inland harbour/container depot in the Vaal Logistical Hub**

2.1 My business will make use of a container depot in the Vaal.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

2.2 A container depot in the Vaal will lead to cost reductions for my business.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

2.3 A container depot in the Vaal will solve the problem of delays for my business.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**2.4** A container depot in the Vaal will enable my business to carry fewer inventories.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**2.5** A container depot in the Vaal will enable my business to make use of international best practice (example just-in-time procurement).

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**2.6** My business fully supports the establishment of a container depot in the Vaal.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**2.7** A container depot in the Vaal will lead to higher business confidence in the area.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**2.8** A container depot in the Vaal will create jobs in the Vaal.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**2.9** A container depot in the Vaal will lead to a higher rate of industrial development in the area.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**2.10** My business will be exposed to more export opportunities with a container depot in the Vaal.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**2.11** My business will be exposed to more imported products with a container depot in the Vaal.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**2.12** My business will create more jobs as a result of a container depot in the Vaal.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**2.13** My business will expand because of a container depot in the Vaal.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**2.14** It is a good idea to combine the container depot with an international cargo airport and an industrial development zone (IDZ).

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**2.15** My business will use the container depot to export/import primarily to/from African countries.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**2.16** My business will use the container depot to distribute/procure primarily to/from other cities/areas in South Africa.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**2.17** My business will use the container depot to export/import primarily to/from international countries other than African countries.

1	2	3	4	5	6	7
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## Vaal industrial development zone

### 3 Questions/statements related to the establishment of an industrial development zone (IDZ) in the Vaal Logistical Hub

3.1 My business fully supports the establishment of an IDZ in the Vaal.

1	2	3	4	5	6	7
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3.2 My business will participate in the activities of an IDZ in the Vaal.

1	2	3	4	5	6	7
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3.3 An IDZ in the Vaal will create new business opportunities for my business.

1	2	3	4	5	6	7
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3.4 An IDZ will create downstream opportunities/manufacturing for my business.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

3.5 An IDZ is suitable for the export-oriented products of my business.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

3.6 My business will be exposed to more imported products with an IDZ in the Vaal.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

3.7 My business will relocate its business/production activities to/in the IDZ.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

3.8 My business will utilize the facilities and infrastructure of the IDZ.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

3.9 An IDZ will have tax benefits for my business.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

3.10 My business will utilize the government incentive schemes related to an IDZ.

1	2	3	4	5	6	7
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3.11 An IDZ will increase the competitiveness of my business.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

3.12 An IDZ will lead to the diversification of my business' production activities.

1	2	3	4	5	6	7
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3.13 My business will expand because of the establishment of an IDZ in the Vaal.

1	2	3	4	5	6	7
---	---	---	---	---	---	---



**3.14** An IDZ in the Vaal will have a positive economic/financial impact on my business.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**3.15** My business will create new jobs because of an IDZ in the Vaal.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**3.16** An IDZ in the Vaal will eventually offer a direct link to an international cargo airport for my business.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**3.17** An IDZ in the Vaal will eventually offer a direct link to an inland harbour/container depot for my business.

1	2	3	4	5	6	7
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**3.18** An IDZ provides a location for the establishment of strategic investments to the benefit of the Vaal.

1	2	3	4	5	6	7
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**3.19** An IDZ will attract new businesses into the Vaal.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**3.20** An IDZ in the Vaal will lead to higher business confidence in the area.

1	2	3	4	5	6	7
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**3.21** An IDZ enables the exploitation of resource-intensive industries in the Vaal.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**3.22** An IDZ will lead to a diversification of production activities in the Vaal.

1	2	3	4	5	6	7
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**3.23** The establishment of an IDZ in the Vaal will create new jobs for the Vaal region.

1	2	3	4	5	6	7
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**3.24** An IDZ will increase the Vaal's total output/production and eventually the region's gross geographical product (GGP).

1	2	3	4	5	6	7
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**3.25** An IDZ will contribute to a reduction of the high poverty level/rate of the Vaal.

1	2	3	4	5	6	7
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**3.26** An IDZ will stimulate industrial development in the Vaal.

1	2	3	4	5	6	7
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**3.27** The establishment of an IDZ in the Vaal is an ideal LED (local economic development) strategy for the region.

1	2	3	4	5	6	7
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**3.28** It is a good idea to combine the IDZ with an industrial cargo airport and an inland harbour/container depot.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**3.29** My business fully supports the establishment of a logistical hub in the Vaal – international (cargo) airport, inland harbour/container depot and an IDZ.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**3.30** A logistical hub is the ideal location for conducting business on a global scale, without ever having to leave your own backyard.

1	2	3	4	5	6	7
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## Annexure C: Freight forwarder questionnaire

Name of company: \_\_\_\_\_  
Position of respondent: \_\_\_\_\_  
Address of company: \_\_\_\_\_  
Telephone number: \_\_\_\_\_  
E-mail address: \_\_\_\_\_

### GENERAL

1. What type of products did your company primarily forward in the last year?

Product \_\_\_\_\_ (Percentage) \_\_\_\_\_  
\_\_\_\_\_ (Percentage) \_\_\_\_\_

2. How would you describe the size of your business if looked at kilograms forwarded by road/rail in the last year?

Big

Medium

Small

3. Approximately how many kilograms (by road) on average do you forward per month?

Specify: \_\_\_\_\_

### CURRENT PROBLEMS IN INDUSTRY

4. Do you experience any problems at City Deep?

Yes  No

Specify: \_\_\_\_\_

5. Do you think that congestion at City Deep is related to:

Administration constraints

Capacity constraints

Other

Specify: \_\_\_\_\_

6. Do you expect the problems to increase at City Deep?

Yes  No

## STATED PREFERENCE QUESTIONS

7. Assume that an alternative container terminal linked to an airport with international status is developed in the Vaal area; will you be prepared to make use of it?

 Yes No

8. If yes indicated in question 8, what percentage of your business will you be prepared to channel through the Vaal Inland Container Depot?

 %

9. Assuming that constraints exist at City Deep related to administration/customs etc. and an container terminal in the Vaal is managed with less administrative constraints; will you be prepared to make use of the terminal?

 Yes No

10. If yes in question 10, what percentage of your business are you prepared to channel through the Vaal Inland Container Depot?

 %

11. If the Vaal Inland Container Depot renders the same services as City Deep but at a lower fee structure (taking into account the transport cost to the Vaal), will you be prepared to make use of the alternative Vaal Inland Container Depot?

 Yes No

12. If yes in question 12, what percentage of your business are you prepared to channel through the Vaal Inland Container Depot?

 %

13. If it is assumed that the Vaal area does not have enough origin-destination demand, would you still make use of the container terminal to forward goods out of other areas?

 Yes No

14. If yes in question 14, what percentage of your business are you prepared to channel through the Vaal Inland Container Depot?

 %