Analysis of freight movement activities in the Sedibeng region

SM Manqa


orcid.org/0000-0001-8682-6230

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Supervisor: Prof DF Meyer
Co-Supervisor: Prof WCJ Grobler

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Student number: 10902562

DECLARATION

I Sarhili Meshack Manqa, declare that “Analysis of freight movement activities related to economic growth in the Sedibeng region” is my own work, and that it has not being sponsored or submitted previously for assessment or completion for any postgraduate qualification.

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S.M. MANQA

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ABSTRACT

Title: Analysis of freight movement activities related to economic growth in the Sedibeng region.

Keywords: Freight movement, urban freight, logistics, transport and economic development, Gauteng, Sedibeng Municipal Area.

There is a need for understanding the movement of freight and its characteristics, because of its importance in promoting efficiency and economic growth. Therefore, freight involves the movement of goods, across infrastructure elements using vehicles, to where people needs them most. Freight movement activities are normally performed by private companies using public infrastructure and governed by regulations that are implemented by public authorities. The study seeks to examine and get insight into freight movement activities, as related to economic growth by the private companies as well as how the public authorities respond in providing necessary public transporting infrastructure, plans and regulations.

The National Freight Logistic Strategy defines freight system in South Africa as fraught with inefficiencies at the system and firm levels. There are infrastructure 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 skill base is deficient and regulatory frameworks are incapable of resolving problems in the industry (Gauteng Fright, 2017:4). The Sedibeng Integrated Transport Plan (ITP) has identified a gap in the need to assess the state of the freight and logistics in the region (Sedibeng District Municipality, 2008:170).

The largest contributor to the Gross Value Added by Region (GVA-R) is manufacturing, followed by finance, community services, trade, transport, electricity, construction, mining and agriculture. The total contribution of transport increased from R2.946 billion in 2005 to R3.567 billion in 2015, which amounts to an increase of 2.11% per annum over the last ten years. In Gauteng, contribution increased from R70.623 billion to R98.520 billion over the same period and amounts to an increase of 3.95% per annum, which is above the Sedibeng region. The total employment in transport for the Sedibeng Region increased from 6 558 in 2005 to 11 005 in 2015, which amounts to an increase of 6.78% per annum. Manufacturing, the largest

sector in terms of number of employment in the Sedibeng Region, increased from 38 227 in 2005 to 42 405 in 2015, which amounts to 1.09% per annum, over the last ten years. In comparison to the Gauteng Province, which increase its employment in the transport sector from 155,291 in 2005 to 259,726 in 2015, which amounts to 6.73% per annum over the last ten years.

The study took a route of pragmatic paradigm, a clear mixed method approach, using qualitative and quantitative questionnaire for respondents. The respondents consisted of 20 top transport-related businesses within the Sedibeng District Municipal region and 8 relevant departments from Gauteng province, Sedibeng district and local municipalities. The departments targeted were Transport, Economic Development, Traffic and Roads, according to their level of authority as related to the function. There were five sets of questionnaires. The first directed to road authorities, second to economic departments, third to traffic departments, fourth to transport departments and fifth to private sector businesses.

The survey results showed that there are significant freight movement activities that come in and out of the region. The areas that showed strong trade with the region were the City of Johannesburg, the City of Tshwane and the City of Ekurhuleni. What were also found were significant trading movement activities within the region and noticeable trading with Africa and rest of the world. There was also absence of relationship on freight movement activities between private and public sector.

The European Commission affirmed that transport and logistics represent a substantial share of business and of household expenditure. Transport and logistics account to around 9-10% of GDP, 10-15% of production costs of individual companies and 12% of house-holds total final consumption. The People's Republic of China in 2014, has invested about 8.5% national Gross Domestic Product (GDP) to infrastructure with railway increased by 54% in 2015 and planning to increase container terminal by 132% by the year 2020.The African Development Group invested in major project of 240km of roads in the Southern Ethiopia which targets to grow the economy by unlocking the agricultural prospects of the region. There is direct and indirect relationship between transport and economic growth. The developed and developing countries in their studies to grow regional economies came to the same conclusion.

The study concluded that the road infrastructure must be given attention and strong cooperation between the private and public sector should be forged for planning the positive contribution of freight movement activities to regional economic development. The study found a strong indication that freight movement activities have a direct relationship with the economic growth in the region.

The production and consumption of goods or services contributes towards the economic growth of the region or country. Therefore, the efficient movement of freight adds value to goods or services and contributes to costs of such goods or services. The local economic strategies and studies should also take into account the contribution of transport in regional economy. The development of Regional Freight Transport Strategy is essential in planning for integration of transport, regional economy, regulation, transport infrastructure and institutional arrangement to enhance contribution of transport to economic growth.

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LIST OF ABBREVIATIONS

BRICS	Brazil, Russia, India, China and South Africa)
CBD	Central Business District
CSIR	Council for Scientific and Industrial Research
CoJ	City Of Johannesburg
CoE	City Of Ekurhuleni
CoT	City Of Tshwane
DOT	Department Of Transportation
EAP	Economically Active Population
FCCs	Freight Consolidation Centres
GDP	Gross Domestic Product
GDP-R	Gross Domestic Product by Region
GVA	Gross Value Added
GVA-R	Gross Value Added By Region
GVZ's	Güterverkehrszentrums (Cargo Traffic Centres)
HDI	Human Development Index
ITP	Integrated Transport Plan
LED	Local Economic Development
LM	Local Municipality
MSA	Moving South Africa
NFLS	National Freight Logistics Strategy
NLTSF	National Land Transport Strategic Framework
PLTF	Provincial Land Transport Framework
PNLT	National Plan for Logistics and Transport
RTQS	Road Traffic Quality System
SDM	Sedibeng District Municipality
TDM	Travel Demand Management
UDC's	Urban Distribution Centres
UFT	Urban Freight Transport
UK	United Kingdom
USA	United States of America

CHAPTER 1: INTRODUCTION AND BACKGROUND TO THE STUDY

1.1 INTRODUCTION

The efficient movement of freight is critical in promoting local, regional and national economic development (Federal Highway Administration, 2011:1). The vehicles that carries freight moves across transport infrastructure. Therefore, freight involves the movement of goods, across infrastructure elements using vehicles, to where people need them and can be categorized by product, market, mode and location (Australian Government, 2011:8).

The Federal Government of Germany (2009:8) defines freight "as moving goods to where people need them. In doing so, they create the material conditions for people to develop and for social exchange, which manifests itself in the trade of goods and products. Freight operators provide the goods required by the urban economy at the right place and the right time and in most cases they succeed, but not always in a sustainable manner". The World Bank (2009:4) further indicate that policies developed by most governments focus on the national or provincial roads which carry goods among provinces and countries. The policies were primarily developed to regulate and manage freight. It further asserts that this was done in spite of the fact that most movement of freight in urban areas needs to focus on effective and efficient urban freight movement to reduce externalities, such as congestion and pollution.

Lindholm (2013:1) asserted that many research projects that have been conducted have pointed out freight transport is essential for urban economy and its development. It contributes to daily needs of people and business. However it has also negative impact like traffic congestion, noise and emissions that requires intervention by governments, communities, businesses, towns and cities. The urban freight in Europe generates 85% of the gross domestic product (GDP) and functioning of urban economy and growth depends on its efficiency.

The World Bank (2009:2) raised inefficient movement of freight in urban areas, increasing numbers of trucks and vans, international flow of goods, and road transport as preferred mode of transport as critical issues shared by all cities and freight stakeholders.

The negative impact of freight transport to urban mobility received attention in the mid-1990s by researchers and policymakers. This resulted in many cities in Europe developing plans to mitigate the negatives and provided appropriate solutions (Allen *et al.*, 2007:4).

In a National Freight Logistic Strategy, the freight system is defined in South Africa "as fraught with inefficiencies at the system and firm levels. The institutional structure of the freight sector is inappropriate, and there is a lack of integrated planning. Information gaps and asymmetries abound, the skill base is deficient and regulatory frameworks are incapable of resolving problems in the industry" (Department of Transport, 2004:4). There has been a general acknowledgment throughout the world that freight contributes to the economy, and more attention shall be paid to it (Brickenhoff *et al.*, 2009:24).

According to Best Urban Freight Solutions (BESTUFS) (2012:5), urban freight transport is important for various reasons, including:

- The role urban freight plays on industrial, trading and servicing activities which have a direct bearing on economy in terms of freight transport and logistic cost.
- Urban freight is an essential contributor on its own to the everyday activities of the cities.
- The competitiveness of industries are enhanced by the efficient freight transport.
- While the urban freight is significant, it also has the negative social and environmental effects.

"From an economics perspective, freight transport demand constitutes a derived demand, meaning that its existence is derived from the need to move goods between different points in space" (Shahia *et al.*, 1994:4). The efficient movement of goods plays a vital role in logistics. The logistics are related to strategic management and warehousing of materials, components and finished products. The movement of materials, components and finished products from the suppliers, between the enterprise, as well as customers of the enterprise also constitutes logistic (Shahia *et al.*, 1994:4). The process that ultimately results in goods received by customers

according to their requirements is also part of logistics. The process would have entailed planning, implementing and controlling efficient flow and storage of goods or services from the point of origin.

According to Schoemaker *et al.* (2006:2) quantitative information on urban freight transport is not commonly available and the size of urban freight transport is unspecified on many levels. The availability of data is usually on specific areas. De Villiers (2014:1) noted that in South African is focus is on addressing the freight problems in the main corridors and urban areas.

The transportation of freight is vital for expansion of trade and economic growth. Freight logistic will play an essential role in reducing costs of moving goods and enhancing South Africa's international competitiveness with its trading partners. (Department of Transport, 2004:7).

In evaluating the state of logistics in South Africa, Viljoen (2014:5) concluded by asserting that South African supply chains have moved to where costs, inventories and lead times have been minimised to integrated supply chain functions. In sharing macroeconomic freight challenges in South Africa, Havenga *et al.* (2016:6) cited logistics as a strategic resource for the economy and the key to offering global competitive edge.

The efficiency of inland transport in serving an increasing and often disputed hinterland is critical to economic development of South Africa (Department of Transport, 2004:1). It has become apparent that the majority of freight is internal, contrary to the perceived importance of corridor movements that maintain exports and imports through a country's ports. It is, therefore, important for the system to be able to bring marginalised and/or rural producers of goods and services into primary freight transport systems, and also able to respond to the ever increasing freight on the various networks of transport system outside main corridors (Department of Transport, 2004:1).

Most countries in the world do not consider urban freight as priority and this is in spite of challenges it pose to many cities (Schoemaker *et al.*, 2006:2). The national governments consider urban freight transport to be a local problem which needs intervention from local government. The large cities are the ones who are building

their capacity to evaluate the highly complex urban freight situation (Schoemaker *et al.*, 2006:3). There is little known on the contribution of freight transport to the economy and its environmental problems in society (Schoemaker *et al.*, 2006:2). According to Byrne (2007:36), the research into policy-making for freight transport should be tackled, and research development encouraged.

1.2 PROBLEM STATEMENT

The freight movement activities and impact on the local economy and infrastructure are unknown in the Sedibeng region and no authority has undertaken any such assessments in recent times. The problem of the deterioration of road infrastructure used by freight transport is a clear indication of the need to analyse freight movement activities, and to seek a solution on how such activities can enhance economic growth and reduce negative impacts that have been caused.

According to the Department of Transport (2011:1), the heavy freight hauliers are increasingly using the the secondary and tertiary road networks and thereby putting them under sever pressure. Sedibeng District Municipality (SDM) is situated in the southern part of Gauteng and is removed from the hub of economic activity in the central areas of the Province. The Sedibeng District Municipality's Integrated Transport Plan (ITP) has recognised the problem of freight transportation issues not expressed in the regional transportation planning process. The ITP has identified the problem as a challenge and suggested the need to assess the state of the freight and logistics in the region (Sedibeng District Municipality, 2008:170).

The Sedibeng District Municipal region was selected as the focus of the study for four reasons. Firstly, it has active industrial and commercial nodes, with good linkages into central areas of the Gauteng province. Secondly, the lack of freight transport issues and their coordination in the district's Integrated Transport Plan (ITP, 2016).Thirdly, the lack of capacity, policy, deterioration of road infrastructure and strategies due to the inability of the district to deal with freight issues. Lastly, the increased traffic congestion as the results of more trucks on the road and also deterioration of rail network.

The expansion of trade and economic growth in the region had a major impact on key roads in the region. The deterioration of the road infrastructure was as a result of the increase in heavy vehicles on the road network, which was largely not designed to carry such loads, and lack of rail as an alternative to road. Although the Sedibeng DM has an ITP, it does not address challenges on freight management in the region. The municipality, according to ITP, is required to make further assessments or research on freight issues in the region. There is also a continual increase of heavy vehicles entering the CBDs, which thus contribute to traffic congestion (Manager: Transport, 2015).

The analysis of freight movement activities related to the economic growth in the region is essential for better understanding of the contribution of transport to the regional economy. The study on freight movement activities is necessary so that it can reveal volume, nature of goods transported, their destination, and how both private and government departments handle freight activities. The movement of freight is critical for the regional economy.

1.3 PROFILE OF THE SEDIBENG DISTRICT MUNICIPALITY

Sedibeng District Municipality (SDM) is a category C municipality and has three category B municipalities namely the Emfuleni Local Municipality, the Lesedi Local Municipality and the Midvaal Local Municipality. The SDM located in the southern part of Gauteng province along the banks of the Vaal River and Vaal Dam. Emfuleni Local Municipality has Vereeniging, Sebokeng, Boipatong, Bophelong, Sharpeville, Vanderbijlpark as main areas constituting the municipality. While Midvaal Local Municipality has Meyerton, Henly-on Klip and Sicelo as main areas with Lesedi Local Municipality, Heidelberg, Ratanda and Devon (Sedibeng District Municipality, 2013:18).

The total population of Sedibeng increased from 796 754 (Statistic SA, 2001) to 916 484 (Statistic SA, 2011) which amount to annual increment of 1.5% in the last ten years.The population of Sedibeng Municipal Area has increased slightly, by 1.5%, compared to the provincial increase of 2.7% (Statistic SA, 2012). The five major contributors for economic activity in the region are manufacturing, general (government, social and personal services), wholesale and retail, finance and business and lastly, transport (Sedibeng District Municipality, 2013:22).They are

major employers and significant contributors to Gross Value Added (GVA). The economic growth for the Sedibeng region in 2015 was negative at 1.1% compared to the South African economy which is estimated to have grown by 1.2 % in 2015, compared to 1.5 % in 2014. The Gauteng province's economy is also estimated to have grown by 1.2 % in 2015 (Sedibeng District Municipality SDM, 2017: 35). The above indicates that the economy of the region shrank, while the National and Provincial economies showed some growth.

1.4 OBJECTIVES OF THE STUDY

1.4.1 Primary objective

The primary objective of the study is to analyse freight movement activities related to economic growth in the Sedibeng Region.

1.4.2 Theoretical objectives

In order to achieve the primary objective, the following theoretical objectives are formulated for the study.

- Conduct a literature review on the theory of freight and logistic movement activities.
- Conduct an assessment of the literature on freight transport to local economic growth.
- Ascertain a review of freight transport case studies in developing and developed countries.
- Define and analyse the roles and functions of government regarding freight and logistic transport.
- Research freight movement activities in the Sedibeng Region from existing literature.

1.4.3 Empirical objectives

- Analyse the freight movement activities in the Sedibeng region.
- Ascertain the nature of goods transported from the region and their destination.
- Ascertain institutional arrangements about transportation of goods in the region.

- Formulation of recommendations regarding best practice methods and approaches regarding freight and logistics in the region.

1.5 VALUE OF THE RESEARCH

The movement of goods plays a pivotal role in the economy of any country. Attempts have been made to pay particular attention to freight movement at the national level, as it directly impacts on economic growth and infrastructure. There has been lesser or no attempt made at local level, yet the infrastructure is continually deteriorating, and traffic congestion is on the increase as the result of freight movement. The study gives insight into freight movement activities and institutional arrangement by both private and public sector in dealing with all freight related activities and impacts on economic growth.

1.6 RESEARCH DESIGN AND METHODOLOGY

The study aims to review a wide range of viewpoints and evaluated prevailing principles, guidelines, strategies and projects about freight. The Sedibeng DM ITP lacks information on freight issues and it further suggests that the municipality should explore further studies on freight. Therefore, the research methods comprehensively analyse freight movement activities related to economic growth in the Sedibeng Region. The research included a literature review and empirical research methods used.

1.6.1 Literature review

A comprehensive analysis of the information that exists in the study field has been conducted including concepts, definitions and case studies. Diverse literature sources were consulted including books, journals, theses, articles, internet sources, relevant policies, plans and legislations concerning freight transport. The review served as a theoretical foundation for the research. It also consisted of an evaluation of comparative studies, both local and international, to determine best practice examples.

Case studies on freight transport were analysed and evaluated to determine the best practice guidelines. Local case studies and those from BRICS (Brazil, Russia, India, China and South Africa) countries, developed (Europe and America) and other developing countries were included. Case studies also focussed on the incorporation

of freight transport in transport planning. Case studies focussing on the industrial and commercial sector experiences were also selected.

1.6.2 Empirical study

The empirical part of the study included the following empirical dimensions:

1.6.2.1 Target population

The target population for the study included major companies that contributed to the generation of freight movement activities in the region. As well as, provincial and local governments' departments dealing with freight activities.

1.6.2.2 Sampling frame and method

Ahmed (2009:14) defines sampling as the process of choosing a subset of observations from an entire population of interest. This is done so that characteristics from the subset (sample) can be used to draw a conclusion or generate deduction about the entire population. The sampling frame consisted of the top 20 companies that generate freight movement in the region. Convenience sampling was used to choose among these companies that are generators of freight in the region. Also targeted was a government department that directly or indirectly interacts with freight activities, namely road, transport, economic and traffic departments.

The sampling method that was used in this study is convenience sampling. Convenience sampling is often used when statistical data, gathered from the specific group, is desired and easily accessible (Wahad, 2014:1). The specific groups targeted for the study were companies that generate freight movement activities in the Sedibeng Municipal Area. According to Sedibeng Municipal sources (Sedibeng District Municipality, 2012), research indicated that these companies represent up to 80% of freight movements in the region. They dominate manufacturing, mining, agriculture, trade, constructions and electrical sectors of the regional economy.

1.6.2.3 Sample size

The sample size consisted of the top 20 companies which are considered to be a sufficient sample of freight traffic in the region. The large companies were those companies within all the sectors of the regional economy and contributing to freight movement. The study correlates with previous studies about the same subject on

understanding freight activities in urban areas and ascertaining its sustainability. (Allen *et al*, 2000:2).

The top 20 companies that generate approximately 80% of the freight in the region and which are included in the study are ABI, AfriSam, Arcellor Mittal Vanderbijlpark, Bophelong Bricks, Cape Gate, CBI Electric-African cables, Clotan Steel Pty Ltd, Delta Bricks, Glen Douglas Dolomite, Karan Beef, MaleselaTaihan Electric Cable, Nampak, PC van Rensburg Transport, Lime Distributors (Pty) Ltd, DCD Heavy Engineering, PBD Boeredienste, Air products South Africa, Pro Roof Steel Merchants, Vision Transport and KWS Carriers. There were choosen among many companies because of the amount of cargo they carry and frequent number of carge trips generated.

1.6.2.4 Measuring instrument and data collection method

The collection of the primary data became the main focus of the measuring instrument that was used in the study. The self-administered questionnaires were used to collect primary data on freight-related matters in local economic development strategies or any other strategies and public sector institutions. Annexure A for an example gave a representation of a questionnaire directed to road authorities in the provincial and local government and consisted of the following:

- Designation of roads for freight movement.
- Relationship with freight operators.
- Roads' network capacity to handle freight volume.
- Impact of freight vehicles to the road network.
- Road master plan that dedicates certain roads to freight vehicles.
- Challenges of freight operations on road infrastructure and possible solution.

Annexure B for an example gave a representation of a questionnaire directed to Economic departments in the provincial and local government and consisted of the following:

- Consideration of freight--related matters in local economic development strategies.
- Relationship with freight operators.
- Data or measures movement of goods in and out of the region and economic impact.

- Quantification of the transport logistic costs.
- Challenges of transport logistics and possible solution.

Annexure C for an example gave a representation of a questionnaire directed to Law enforcement in the provincial and local government and consisted of the following:

- Division or person is responsible for freight-related matters.
- Relationship with freight operators.
- Overloading facilities.
- Freight vehicles restrictions
- Freight contribution to traffic congestion.
- Freight contribution to road accidents.
- Challenges of freight operations and possible solution.

Annexure D for an example gave a representation of a questionnaire directed to Transport departments in the provincial and local government and consisted of the following:

- Division or person is responsible for freight-related matters.
- Relationship with freight operators.
- Freight databank.
- Integrated Transport Plan (ITP) that incorporated freight issues.
- Freight facilities.
- Freight Plan that includes movement of dangerous goods.
- Challenges of freight operations and possible solutions.

Annexure E for an example gave a representation of a questionnaire directed to industrial and commercial companies in the region and consists of the following**:**

- General Information: Name of business, physical address, contact person, telephone, E-mail address, type of business, size of business, duration of business, division or person responsible for freight, vehicles to transport goods.
- Distribution/Procurement Information: Goods distributed/transport, goods procured/received, areas business sells/distributes its products, areas business procures its products, mode of transport used,

- Statements/Opinions: Relationship with the government, challenges of freight operations and possible solution.

1.7 ETHICAL CONSIDERATIONS

According to Mouton (2003:238), ethics of science concerns what is right and what is wrong in the conduct of the research. The following ethical principles and guidelines will be maintained and adhered to:

- Objectivity and integrity in research.
- The fabrication or falsification of data will be avoided.
- Recording own data during research.
- The right to privacy (including the right to refuse to participate in the research).
- The right to anonymity and confidentiality.
- An obligation to the free and open dissemination of research results.

All the relevant guidelines and procedures required by the North-West University were adhered.

1.8 CHAPTER CLASSIFICATION

Chapter 1: Introduction

The chapter provides a brief overview of the research to be conducted. The chapter includes the orientation and background of the study, problem statement, objectives of the study, as well as the research design and methodology of the research.

Chapter 2: Sedibeng profile

In this chapter, an overview is provided on available information that helps us to analyse, interpret and understand the Sedibeng region. The analysis will be contextualised within the freight and logistics transport sector.

Chapter 3: Literature review

This chapter forms part of the literature review and focuses on theory of freight transport. It will also analyse and evaluate freight transport. The analysis will be used in defining appropriate methods to be employed for the regional study. Comparative studies from other countries will also be sought from Brazil, Russia, India, China and South Africa (BRICS) and developed countries. It will also look at strategic plans

developed by various levels of government, to tackle the inefficiencies in freight transport.

Chapter 4: Freight Transport Policy Analysis in South Africa

Chapter 4 is aimed at providing an overview of policies, legislations and strategies that have been developed in South Africa since 1994 which have an impact on freight movements. It does not attempt to analyse all policies, but merely attempts to provide a brief overview of the existing framework of the most relevant and important policies and strategies impacting on freight movement at a National and Provincial level. Local Government freight considerations are contained in their Integrated Transport Plans (ITPs).

Chapter 5: Research methodology, results and findings

The chapter deals with the research methodology applied in this study, as well as the design of the questions for the empirical research that will be formulated and distributed to a selected group of traders, institutions and stakeholders. The chapter will also focus on the interpretation of the empirical research results by means of quantitative and qualitative analysis.

Chapter 6: Conclusion and recommendations

The chapter is a concluding overview, attempting to present the regional proposed scenario in relation to the bigger national picture. The findings portrayed in this chapter will be discussed in relation to the research objectives, the shortcomings of the study and the recommendations for further research, if needs be. It also brings to the fore key considerations and makes recommendations that focus on addressing the identified obstacles, provides a summary of the research on freight activities and conclusions on the problems of freight transport in the region and required intervention.

In the next chapter an overview is provided on available information that helps us to analyse, interpret and understand the Sedibeng region. The analysis will be contextualised within the transport sector contribution to the economy of the region.

CHAPTER 2: SOCIO-ECONOMIC PROFILE OF THE AREA

2.1 INTRODUCTION

This chapter provides an overview on available information in order to analyse, interpret and understand the Sedibeng District Municipality as a region, which is the focus area of the study. The Sedibeng District Municipal region is described in terms of geographical location, land cover, road network, rail, population, economy and labour.

2.2 DESCRIPTION OF THE AREA

The geographic size of Sedibeng District Municipality (SDM) is 4,630 km square. Sedibeng District Municipality (SDM) is a category C municipality and has three category B municipalities namely the Emfuleni Local Municipality, the Lesedi Local Municipality and the Midvaal Local Municipality. The SDM located in the southern part of Gauteng province along the banks of the Vaal River and Vaal Dam. Emfuleni Local Municipality has Vereeniging, Sebokeng, Boipatong, Bophelong, Sharpeville, Vanderbijlpark as main areas constituting the municipality. While Midvaal Local Municipality has Meyerton, Henly-on Klip and Sicelo as main areas with Lesedi Local Municipality, Heidelberg, Ratanda and Devon (Sedibeng District Municipality, 2013:18).

Figure 2.1 denotes the Sedibeng District municipal boundary, location of three local municipalities and adjacent municipalities out SDM boundaries (Sedibeng District Municipality, 2016:23).

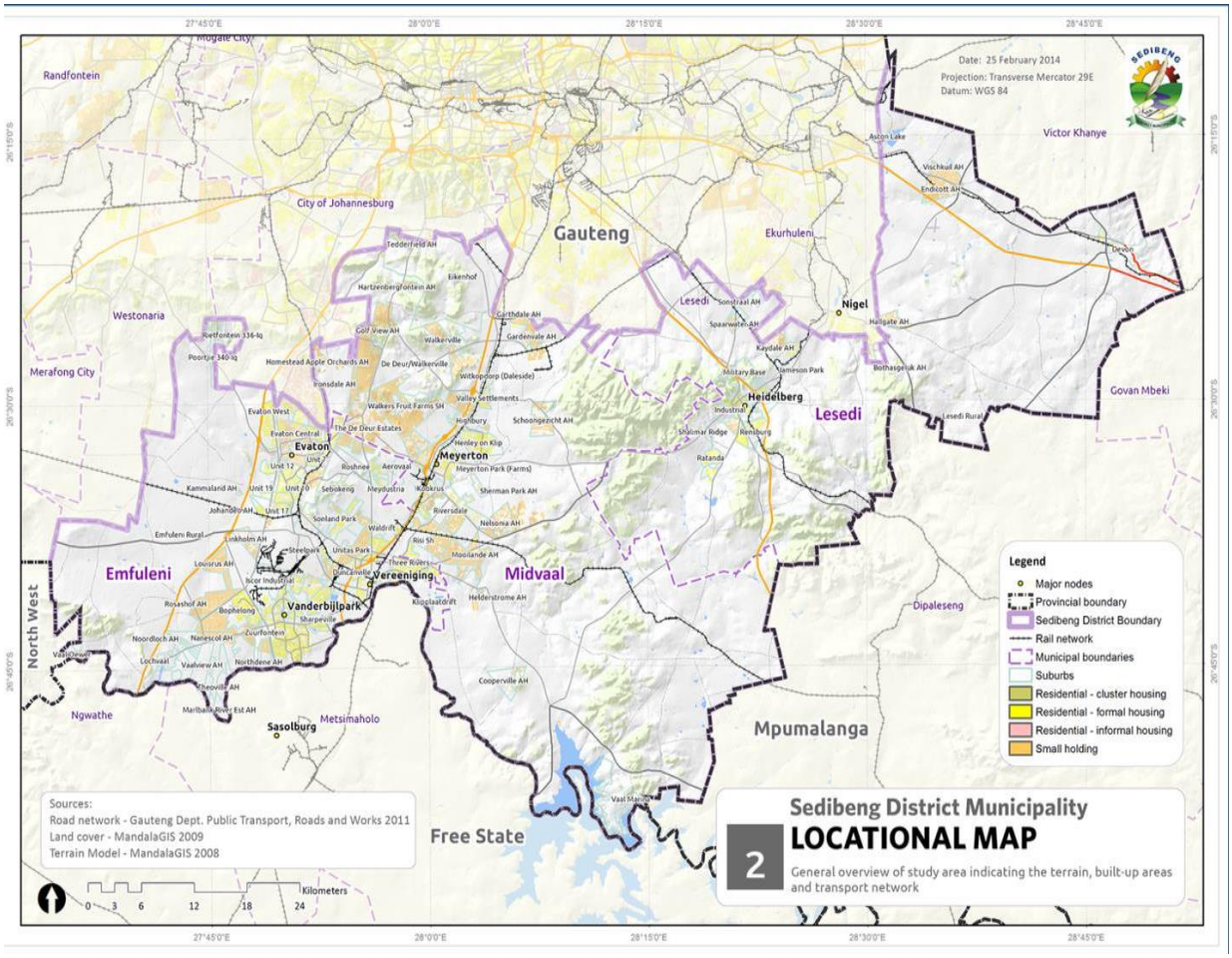


Figure 2.1 Sedibeng District Municipal boundary. Source: SDM IDP, (2016)

2.2.1 Emfuleni area

The Emfuleni area is functionally associated to Gauteng and the Free State provinces. Some sections of Sasolburg and Vaalpark situated in the Metsimaholo Municipal area in the Free State are economically interconnected to Emfuleni. The Gauteng Spatial Development Framework has identified Vereeniging and Vanderbijlpark as urban development nodes connected to a well developed rail and road network infrastructure. The essential major national and provincial roads and rail traversing Emfuleni N1, K178, K53, K59, R59, and rail line connecting Vereening to Johannesburg (Sedibeng District Municipality, 2016:23).The Vanderbijlpark and Vereeniging as urban development nodes have commercial, industrial, residential and education with agricultural, tourism facilities focussed on the west part and along banks of the Vaal River and Vaal Dam.

2.2.2 Midvaal area

Midvaal Local Municipality is located between Emfuleni in the west and Lesedi in the east. The municipal area covers the banks of the Vaal River and the Vaal Dam in the south and essential major national and provincial roads traversing Midvaal are R59, N1, N3, R82, M61, R42, R551, R550 and R54. The R59 corridor connects Johannesburg, Ekurhuleni, Meyerton and Vereeniging and it is in proximity of Johannesburg to Midvaal, and also linked by the R82, M61 and N1 (Sedibeng District Municipality, 2016:23).

Sedibeng District Municipality (2016:23) identifies Midvaal area as rural/agricultural with Suikerbosrand Nature Reserve, Vaal River and the Vaal Dam valuable natural features, conservation and environmentally fragile areas. The main urban nodes are occurring along these routes include:

- R59: Waterval , Randvaal, Henley-on-Klip and Meyerton.
- R82: Tedderfield, Walkerville, Savannah City and De Deur.

2.2.3 Lesedi area

The Lesedi Local Municipality has a land area of 1 042 km square. The major national and provincial roads traversing through the municipality are N3, N17, R42, R29, R549, R550, R23, R51, R548 and R103. Sedibeng District Municipality (2016:24) identifies Lesedi Municipal area as rural/agriculture in nature with major urban nodes as Heidelberg/Ratanda and Devon/ Impumelelo.

2.3 ROAD TRANSPORT NETWORK

There are three modes of transport in Sedibeng District Municipality namely road, rail and air. The region largely depends on road transport network to meet its daily travelling needs. There is less use of rail and air as modes of transport. The bus and mini taxi industries are main modes of public transport with minibus taxi industry dominant mode of transport in the region.

2.3.1 National roads

Sedibeng District Municipality (2016:23) identifies national free-way roads in the district as N1, N3 and N17 respectively connecting the region to Western Cape, Free State, KwaZulu/Natal and Mpumalanga provinces.

2.3.2 Major development corridors

The two main industrial and commercial corridors as identified by Gauteng Spatial Development Framework, that are N3 south corridor and R59 corridor both connect with City of Johannesburg and City of Ekurhuleni.

2.4 AIR TRANSPORTATION

There are four airfields in the region and are largely used by private people for training pilots, for recreational activities, business purpose and as passenger mode of transport for small aircrafts. The two airfields are located in Midvaal, one in Lesedi and the other in Emfuleni area.

2.5 RAIL TRANSPORTATION

There are three well developed rail lines in the region. Emfuleni and Midvaal shares the rail line which connects the areas to Ekurhuleni, Emfuleni rail line connects to Johannesburg while Lesedi rail line links to Ekurhuleni (Sedibeng District Municipality, 2016:26).

Passenger Rail Agency of South Africa (PRASA) is embarking on the program to modernise stations and 135 were identified. The stations prioritised have a high volume of passengers and a potential to generate revenue. PRASA further asserts that any improvement in these stations will benefit commuters, improve the overall customer experience and add value to the service. The station modernisation program has been allocated R2.2 billion over the 2015 MTEF cycle, with R723 million allocated for 2015/16, R764 million for 2016/17 and R740 million for 2017/2018. From the current 135 stations identified as a priority, 28 stations are in various stages of development, inclusive of the fourth party (co-founded) projects, these projects being Leralla, Germiston, Roodeport and Vereeniging. It will also modernise its fleet and existing signaling interlock (PRASA, 2017).

2.6 POPULATION OF SEDIBENG

2.6.1 Total population

Table 2.1 shows the population of Sedibeng district and its local municipalities that are Emfuleni, Midvaal and Lesedi. The average annual growth rate between 2005 and 2015 is also indicated.

Table 2.1: Population of Sedibeng

Municipality	Year				Average Annual Growth Rate (2005-2015)
	2005	2008	2013	2015	
Emfuleni Local	653,768	688,000	732,000	733,177	1.2%
Midvaal Local	71,675	84,900	101,000	104,858	4.6%
Lesedi Local	73,603	90,600	110,000	108,784	4.8%
Sedibeng District	**799 046**	**863,803**	**942,470**	**946,819**	**1.8%**

Source: Global insight (2016)

The Sedibeng District Municipality population increased with the average annual growth rate of 1.84 % from 2005 to 2015. Midvaal and Lesedi Local municipalities have experienced a relatively high growth rate of 4.6% and 4.8 % respectively, while Emfuleni registered 1.2 %.

2.6.2 Population density

The population density shows a number of people occupying land per kilometer square. Table 2.2 shows population density in Gauteng, Sedibeng and local municipalities. It also shows total population density and population density among various groups in the district and province.

Table 2.2: Population density (Number of person per km²): 2005-2015

YEAR	Group	Gauteng	Sedibeng DM	Midvaal LM	Lesedi LM	Emfuleni LM
2005	**African**	419.51	641.72	26.16	41.12	574.44
	White	101.90	117.74	16.04	8.76	92.94
	Coloured	20.39	9.38	0.70	0.72	7.96
	Asian	13.90	7.03	0.20	0.42	6.41
	Total	555.69	775.97	43.10	51.02	681.75
2011	**African**	516.96	179.47	31.86	51.56	635.11
	White	103.36	33.7	20.73	11.67	88.25
	Coloured	23.38	2.72	0.91	0.93	8.62
	Asian	18.80	2.09	0.40	0.77	7.01
	Total	**662.5**	**217.98**	**53.90**	**64.93**	**738.99**
2013	**African**	550.76	186.64	34.53	55.31	655.17
	White	102.66	33.57	21.67	12.20	85.38
	Coloured	24.21	2.82	0.99	1.00	8.8
	Asian	20.39	2.18	0.47	0.86	7.09
	Total	**698.02**	**225.21**	**57.66**	**69.38**	**756.44**
2015	**African**	578.21	757.83	36.90	58.66	662.27
	White	99.68	116.12	22.38	12.61	81.13
	Coloured	24.84	11.07	1.07	1.08	8.92

	Asian	20.72	8.21	0.53	0.94	6.74
	Total	**723.46**	**893.23**	**60.88**	**73.28**	**759.07**

Source: Global Insight (2016)

The following can be deduced on the population density of Sedibeng District municipality:

- From 2005 to 2015, the population density has increased in the Sedibeng Municipal area from 775.97 to 893.23 which amount to an increase of 1.5% per annum over the last ten years, At the same period the Gauteng population density increased from 555.69 to 723.46 amounting to a 2.31% increase per annum, which is more than the Sedibeng Municipal area.
- The Emfuleni Municipal area has the largest population density (759.07 person/km²) compared to the provincial level (723.46 person/km²), followed by Lesedi at 73.28 person per kilometre square and Midvaal at 60.88 person per kilometre square.
- The trend of population density across races shows that the White population group presents a particular case where their population density have decreased from 2005 to 2015 while it has been increasing among other races (African, Coloured and Asian).
- The race distribution of population density in 2015 indicates that the African population has the highest population density (757.83 person/km²) compared to other races in the Sedibeng District.

2.6.3 Number of households

Household is defined as individuals staying together, collectively providing themselves with necessities to live and at least spends four nights (Emfuleni Local Municipality, 2015:15). Table 2.3 shows the number of households in Gauteng and Sedibeng and Sedibeng house size between the period 2005 and 2015.

Table 2.3: Number of Households – Sedibeng and Gauteng 2005-2015

Year	Sedibeng	Gauteng	Sedibeng as % of Province	Sedibeng house hold Size
2005	245,604	3,259,923	7.53	3.25
2008	255,657	3,460,753	7.39	3.38
2013	279 949	3 952 268	7.81	3.37
2015	292 133	4 204 753	6.95	3.24

Source: Global Insight (2016)

The Sedibeng District Municipality households increased from 245,604 in 2005 to 292 133 in 2015, which amounts to 1.89% increase per annum over the last ten years. The Gauteng Province increased from 3,259,923 in 2005 to 4 204 753 in 2015 which amounts to 2.25% increase per annum over the last ten years, which is slightly above Sedibeng. The house hold size in Sedibeng has slightly decreased from 3.25% in 2005 to 3.24% in 2015 which amount to 0.031% over the last ten years. This means that family size has been decreasing over the last ten, the lesser the family size, the more disposable income in the family (Global Insight, 2016)

2.7 INFRASTRUCTURE INDEX

The infrastructure index indicates the level of infrastructure delivery with 1 indicating maximum service delivery and 0 lack of services. The table below shows general house infrastructure index in Gauteng, Sedibeng District and its local municipalities.

Table 2.4: General Household Infrastructure index

AREA	2001	2011	2013	2015
Emfuleni LM	0.79	0.86	0.87	0.86
Midvaal LM	0.73	0.80	0.79	0.77
Lesedi LM	0.72	0.80	0.80	0.79
Sedibeng DM	0.78	0.85	0.85	0.80
Gauteng	0.80	0.83	0.83	0.83

Source: Global insight (2016)

The following can be concluded on the general household infrastructure Index for the Sedibeng District:

- The index has a maximum value of 1 for complete infrastructure delivery and a value of 0 for lack of infrastructure delivery.
- There has been a general improvement in the infrastructure index between 2001 and 2015, for all areas under comparison.
- The number of households with proper infrastructure has been steadily increasing over a number of years.
- Emfuleni municipal area has an infrastructure index that is above both the region and province, followed by Lesedi and Midvaal.

2.8 SOCIAL DEVELOPMENT

The following section provides a summary of social development aspects, such as Gini-Coefficient index, urbanisation, education and literacy.

2.8.1 Gini-coefficient index

Table 2.5 shows human development index for Gauteng, Sedibeng district and its local municipalities. It also indicates Gini-Coefficient index among various groups.

Table 2.5: Gini-Coefficient index: 2005-2015

YEAR	Gauteng	Emfuleni LM	Midvaal LM	Lesedi LM
2005	0.65	0.63	0.64	0.63
2011	0.69	0.65	0.68	0.62
2013	0.7	0.66	0.71	0.65
2015	0.71	0.68	0.73	0.67

Source: Global insight (2016)

The following findings can be observed on Gini-Coefficient Index:

- The Gini-Coefficient is the quantification intended to represent income o wealth distribution of the nation's citizens and is mostly used measure of inequality. Gini index of 0 represents perfect equality and a value of 1 represents perfect inequality.
- From 2005 to 2015, the level of income inequality has increased in all considered areas (Gauteng, Emfuleni, Midvaal and Lesedi) and across all races; the Gini-Coefficient is high ranging between averages of 0.62 in 2005 to 0.69 in 2015. The Gini-Coefficient among the white community has drastically increased from an average of 0.47 in 2015 to 0.88 in 2015. Lesedi Local Municipality has the least Gini-Coefficient.

2.8.2 Urbanisation

Table 2.6 shows urbanisation in Gauteng, Sedibeng district and its local municipalities.

Table 2.6: Urbanisation in Gauteng and Sedibeng district

Year	Gauteng	Sedibeng	Emfuleni	Midvaal	Lesedi
2005	93.4%	74.2%	93.0%	52.2%	77.4%
2010	95.4%	79.3%	97.0%	56.8%	84.1%
2015	96.0%	80.5%	97.1%	58.2%	86.1%

Source: Global insight (2016)

In the last ten years, between the years 2005 and 2015, Sedibeng district municipality has been urbanised from 74.2% in 2005 to 80.5%, but below Gauteng

province urbanisation rate. Figure 2.2 shows urbanisation in Gauteng and Sedibeng with its local municipalities.

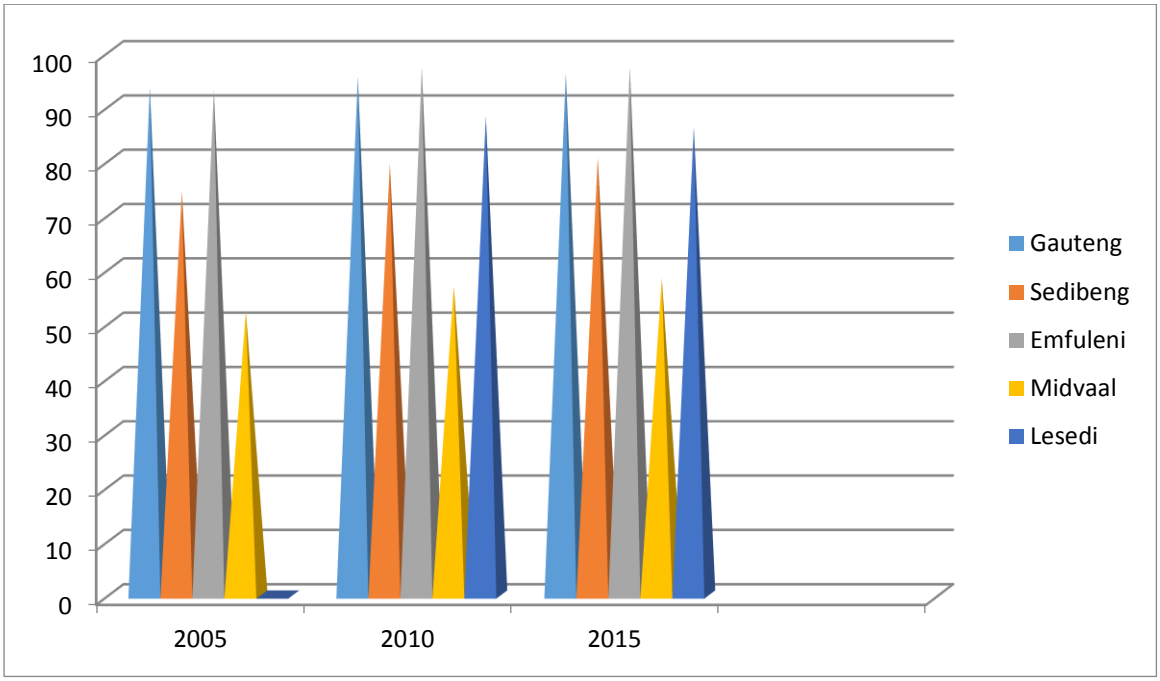


Figure 2.2: Urbanisation of Gauteng and Sedibeng, Source: *Own compilation from Global Insight*

Emfuleni Local Municipality is more urbanised than Midvaal and Lesedi Local Municipalities. It is also above province and region. The least urbanised area is Midvaal Local Municipality.

2.8.3 Education and literacy

The illiteracy indicates the number of people who have low levels of education, for instance functional literacy is regarded as people who have completed grade 7 or higher. Therefore, those who have not completed grade 7 and below are classified in the category of illiteracy.

Table 2.7 shows education development in Gauteng, Sedibeng district and its local municipalities between the period of 2005 and 2015. It indicates numbers of no schooling to postgraduate enrolments over the last ten years, which is between 2005 and 2015.

Table 2.7: Education Development 2005-2015

YEAR	Group	Gauteng	Sedibeng DM	Emfuleni LM	Midvaal LM	Lesedi LM
2005	**No school**	382 723	35 886	26 282	3 810	5 794
	Matric Only	1 303 340	93 153	81 939	4 840	6 374
2011	**No school**	251 795	22 680	15 617	2 735	4 328
	Matric Only	2 000 400	135 942	116 879	8 482	10 581
2015	**No school**	248 611	22 954	15 813	2 981	4 160
	Matric Only	2 326 299	153 242	130 696	10 091	12 455

Source: Global Insight (2016)

The following can be noted on illiteracy rate:

- The Sedibeng district area shares a similar trend with the entire Gauteng province where the number of illiterate people has decreased from 2005 to 2015 across all races. They have decreased from 35 886 to 22 954 that is 3.6% per annum over the last ten years, in comparison to Gauteng decrease of 3.5% over the same period, which is almost the same.
- From 2005 to 2015, the number of people completing matric increased from 93 153 to 153 242 the increase amounts to 6.4% per annum over the last ten years. The number of completions in Gauteng increased from 1,303,340 to 2 326 299; the increase amounts to 4.4% per annum over a period of ten years. The Gauteng province's increase is slightly less than the regional increase.
- Emfuleni Local Municipality shares high numbers of education enrolments in the entire Sedibeng District Area.

2.9 ECONOMIC ANALYSIS

2.9.1 Overview of the Gauteng province economy

Gauteng is the engine of Africa and South Africa's economy and in 2015 contributed 10% and 35% respectively to the Gross Domestic Product. Among all nine provinces Gauteng is the smallest province covering 1.5% of country's land area yet it is South Africa's heartland of industrial, commercial and financial activities contributing 29.5% of the total employment in the country (Sedibeng District Municipality, 2015: 42).

2.9.2 Gross Domestic Product by Region (GDP-R)

The Gross Domestic Product by Region (GDP-R) indicates value of all finished products and services produced in the region's boundaries within specific time period (Sedibeng District Municipality, 2015: 44).

Table 2.8 shows Gross Domestic Product by Region (GDP-R) for Gauteng province and Sedibeng district for the period between 2005 and 2015. It also indicates annual growth for both province and district over the last ten years. The contribution of the Sedibeng district to Gauteng GDP-R is also shown.

Table 2.8: Gross Domestic Product by Region (GDP-R) Constant 2010 prices (R 1000 000)

Year	Gauteng	Gauteng Annual Growth	Sedibeng	Sedibeng Annual Growth	Sedibeng Contribution to Gauteng GDP-R
2005	807 075		45 727		5.67%
2006	854 952	5.90%	49 480	8.20%	5.79%
2007	904 752	5.82%	53 691	8.51%	5.93%
2008	938 801	3.76%	55 583	3.52%	5.92%
2009	924 560	-1.52%	55 368	-0.39%	5.99%
2010	955 433	3.34%	55 800	0.78%	5.84%
2011	989 708	5.59%	59 826	7.21%	6.05%
2012	1 013 686	2.42%	60 421	0.99%	5.96%
2013	1 039 620	2.56%	61 469	1.74%	5.91%
2014	1 059 659	1.93%	62 077	0.99%	5.86%
2015	1 075 557	1.50%	61 505	-0.92%	5.71%

Source: Global Insight (2016)

The GDP-R of Sedibeng increased from R45.7 billion in 2005 to R61.5 billion in 2015, that is an increase of 3.46% per annum over the last ten years. The Gauteng GDP increased from R807.705 billion to R1 075.56 billion, which amounts to an increase of 3.32% per annum over ten years; slightly less than that of Sedibeng Region. The growth of the Sedibeng Region has been slightly above the Gauteng Province.

There has been a decrease of GDP-R in Sedibeng in 2015 from R62.077 billion to R61.505 in 2014 which amount to 0.9%. This was in contrast to provincial growth of 1.5%. In 2015 the Sedibeng District contributed 5.71% to the Gauteng Province GDP. The average contribution of Sedibeng District Municipality to the Gauteng GDP over the last ten years has been an average 5.5% per annum.

2.9.3 Gross Value Added By Region (GVA-R) Broad Economic Sectors

Table 2.9 shows Gross Value Added by Region (GVA-R) in the Gauteng province and Sedibeng district for the period between 2005 and 2015 for all nine Broad Economic Sectors. It also indicates annual growth rate in all nine Broad Economic sectors for both province and district over the last ten years. The contribution of Sedibeng district to Gauteng GVA-R is also shown.

Table 2.9 Gross Value Added by Region (GVA-R) Broad Economic Sectors (9 sectors) Constant 2010 prices (R 1000 000)

Sectors	Year	Gauteng	Gauteng Annual Growth %	Sedibeng	Sedibeng Annual Growth %	Sedibeng Contribution to Gauteng GVA-R %
Agriculture	2005	4 250		526		12.38
	2010	4 088	-0.76	582	2.13	14.24
	2015	4 271	0.86	648	2.27	15.17
Mining	2005	44 486		971		2.18
	2010	34 311	-4.57	1 251	5.77	3.65
	2015	28 551	-3.36	1 270	0.31	4.45
Manufacturing	2005	136 438		15 114		11.08
	2010	144 780	1.22	17 840	3.61	12.32
	2015	153 682	1.23	19 748	2.14	12.85
Electricity	2005	20 064		2 185		10.89
	2010	21 460	6.96	2 878	31.72	13.41
	2015	20 899	-2.61	3 245	12.75	15.53
Construction	2005	20 240		1 040		5.14
	2010	32 560	12.17	1 679	12.29	5.16
	2015	37 302	2.91	1 901	2.64	5.10
Trade	2005	95 756		3 794		3.96
	2010	116 865	4.41	4 890	7.22	4.18
	2015	135 123	3.12	5 494	2.47	4.07
Transport	2005	70 623		2 946		4.17
	2010	84 948	4.06	3 087	0.96	3.63
	2015	98 520	3.21	3 567	3.11	3.62
Finance	2005	167 269		6 803		4.07
	2010	220 813	6.4	8 982	6.41	4.07
	2015	261 037	3.64	9 214	0.52	3.53
Community Services	2005	172 353		7 459		4.33
	2010	208 209	4.16	8 290	2.23	3.98
	2015	240 116	3.06	8 776	1.17	3.65

Source: Global Insight (2016)

The largest contributor to the Gross Value Added by Region (GVA-R) is manufacturing, followed by finance, community services, trade, transport, electricity, construction, mining and agriculture. The contribution of transport increased from R2.946 billion in 2005 to R3,567 billion in 2015 which amount to increase of 2.11%

per annum over the last ten years. In Gauteng, contribution increased from R70.623 billions to R98.520 billion over the same period and amounted to an increase of 3.95% which is above the Sedibeng.

2.9.4 International trade

Table 2.10 shows International trade totals exports for Gauteng, Sedibeng district and its local municipalities over the last ten years between 2005 and 2015.

Table 2.10 International Trade Totals Exports (R 1000 000)

Year	Gauteng	Sedibeng	Emfuleni	Midvaal	Lesedi
2005	209 106	19 947	16 483	2 968	497
2010	441 715	10 540	9 410	892	238
2015	669 858	8 670	6 757	1 392	522

Source: Global Insight (2016)

The International trade exports have decreased over the last ten years in Sedibeng with both Emfuleni and Midvaal contributing to decreasing while Lesedi Local Municipality has shown a slight increase in exports. The Emfuleni local municipality has decreased by 5.9% per annum over the ten years while Midvaal by 5.3% per annum over the same period. Lesedi has increased exports by 0.5% per annum over the last ten years.

Table 2.11 shows annual growth in international trade totals for exports for Gauteng and Sedibeng for a period between 2005 and 2015. It also indicates the Sedibeng contribution to Gauteng total exports.

Table 2.11 Growth in International Trade Totals Exports (R 1000 000)

Year	Gauteng	Gauteng Annual Growth %	Sedibeng	Sedibeng Annual Growth %	Sedibeng Contribution to Gauteng Exports %
2005	209 106		19 947		9.54
2010	441 715	22.24	10 540	-9.43	2.39
2015	669 858	10.33	8 670	-3.55	1.29

Source: Global Insight (2016)

The international trade for Sedibeng decreased from R19.95 billion in 2005 to R8.67 billion in 2015 which amount to a decrease by 5.65% over the period of ten years. On contrary Gauteng experienced an increase from R209.11 billion to R669.86, which amounts to 22.03% increase over the same period. The contribution of Sedibeng to Gauteng exports has decreased from 9.54% in 2005 to 1.29% in 2015.

Table 2.12 shows International trade totals imports for Gauteng, Sedibeng district and its local municipalities over the last ten years between 2005 and 2015.

Table 2.12 International Trade Totals Imports (R 1000 000)

Year	Gauteng	Sedibeng	Emfuleni	Midvaal	Lesedi
2005	206 897	3 258	2,366	412	479
2010	386 962	7 231	5 580	1 161	490
2015	680 903	9 471	6 939	1 335	1 197

Source: Global Insight (2016)

The total imports for Sedibeng district increased from R3.258 billion in 2005 to R9.471 billion in 2015 which amount to 19.07% per annum over the last ten years. Imports in Gauteng province increased from R206.9 billion to R680.9 billion which amounts to 22.9% per annum over the same period which is slightly above Sedibeng.

Table 2.13 shows annual growth in international trade totals for imports for Gauteng and Sedibeng for a period between 2005 and 2015. It also indicates the Sedibeng contribution to Gauteng total imports.

Table 2.13 Growth in International Trade Totals Imports (R1000 000)

Year	Gauteng	Gauteng Annual Growth %	Sedibeng	Sedibeng Annual Growth %	Sedibeng Contribution to Gauteng Imports %
2005	206 897		3 258		1.57
2010	386 962	17.41	7 231	24.39	1.87
2015	680 903	15.19	9 471	6.20	1.39

Source: Global Insight (2016)

The Gauteng has been importing more than the Sedibeng district. In 2010 it amounted to 17.41% compared to the Sedibeng district 1.87 per annum. The amount for Gauteng in 2015 decreased slightly to 15.19% and the Sedibeng district also decreased to 1.39%

Table 2.14 shows international trade balance in Gauteng, Sedibeng district and its local over the last ten years between 2005 and 2015.

Table 2.14 International Totals Trade Balance (R 1000)

Year	Gauteng	Sedibeng	Emfuleni	Midvaal	Lesedi
2005	2 209 794	16 689	14 117	2 555	165
2010	54 753 063	3 309 669	3 830 680	-269 480	-252 641
2015	-11 045 253	-801 737	-182 156	57 026	-676 697

Source: Global Insight (2016)

Over the last ten years the trade balance has been decreasing among all areas. In 2015 the Midvaal Local Municipal area has shown a positive trade balance.

2.9.5 Income and Expenditure Disposable Income

Table 2.15 shows disposable income in Gauteng, Sedibeng district and its local over the last ten years between 2005 and 2015.

Table 2.15 Income and Expenditure Annual total disposable income (R million, constant 2010 prices)

Year	Gauteng	Sedibeng	Emfuleni	Midvaal	Lesedi
2005	479,646	26 561	20,624	3,617	2,320
2010	570,704	31 040	22,254	4,826	3,198
2015	611,330	34 691	24,227	6,504	3,960

Source: Global Insight (2016)

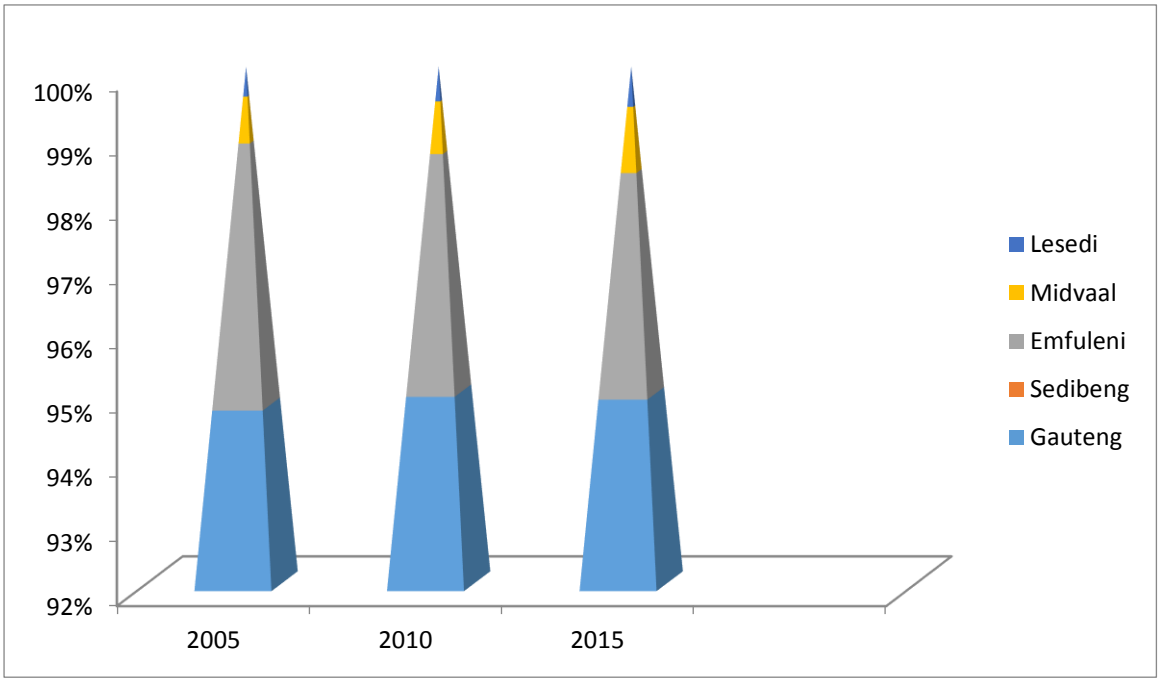


Figure 2.3 Income and Expenditure Annual total disposable income. Source: Own compilation

The Sedibeng annual disposable income increased from R26.56 million in 2005 to R34.69 million in 2015 which amount to increase of 3.6% per annum. While in

Gauteng it increased from R479.65 million to R611.3 million which amounts to 2.75% per annum over the same period.

Table 2.16 shows the annual growth in disposable income for Gauteng province and Sedibeng District between the period of 2005 and 2015. It also shows the contribution of Sedibeng to Gauteng disposable income.

Table 2.16 Growth in income and expenditure Annual total disposable income (R million, constant 2010 prices)

Year	Gauteng	Gauteng Annual Growth %	Sedibeng	Sedibeng Annual Growth %	Sedibeng Contribution to Gauteng %
2005	479,646		26 561		5.54
2010	570,704	3.81	31 040	3.37	5.44
2015	611,330	1.42	34 691	2.35	5.67

Source: Global Insight (2016)

There has been a decreasing annual disposable income for both Gauteng province and Sedibeng District. In Gauteng province the disposable income decreased from 3.81% in 2010 to 1.42 in 2015, while Sedibeng District decreased from 3.37% to 2.35 over the same period. In 2015 the annual growth rate of disposable income for the district was slightly above the province. The Sedibeng contribution to Gauteng disposable has been consistent at average if 5.5% between 2005 and 2015.

2.10 REGIONAL LABOUR PROFILE

Table 2.17 presents key labour indicators for Gauteng and Sedibeng for the years 2013 to 2014.

Table 2.17 – Key Labour Indicators, 2013-2014

Labour Indicators	Gauteng		Sedibeng	
	2013	2014	2013	2014
Unemployment Rate	24.3%	24.6%	36.4%	36.3%
Absorption rate	52.85	51.5%	42.4%	42.5%
Labour force participation rate	72.7%	72.8%	66.6%	66.8%

Source: Sedibeng District Municipality, IDP 2015/6

Gauteng province absorbs yearly, large numbers of people migrate to the province in search of jobs. The 2014 unemployment rate in Sedibeng was higher than Gauteng with region standing at 36.4% while the province at 24.3%. In Sedibeng the unemployment rate decreased by 0.1% from 2013 to 2014 while Gauteng increased

by 0.3% from the same perion. The labour force participation rate increased slightly for both Sedibeng and Gauteng during the years 2013 to 2014.

2.10.1 Employment in Broad Economic Sectors

Table 2.18 shows formal employment in all nine Broad Economic Sectors in Gauteng and Sedibeng. It also indicates the annual growth rate for both Gauteng and Sedibeng over the last ten years between 2005 and 2015.

Table 2.18 Formal Employment in Broad Economic Sectors (9 sectors) Number of formally employed people

Sector	Year	Gauteng	Gauteng Annual Growth %	Sedibeng	Sedibeng Annual Growth %	Sedibeng Contribution to Gauteng %
Agriculture	2005	68,785		4 006		5.82
	2010	45,441	-6.81	2 966	-5.19	6.53
	2015	44,750	-0.29	3 017	0.34	6.74
Mining	2005	96,231		9 573		9.95
	2010	101,665	1.13	20 557	22.95	20.22
	2015	78,074	-4.64	9 701	-10.56	12.42
Manufacturing	2005	506,617		38 227		7.55
	2010	530,674	0.95	43 514	2.77	8.21
	2015	545,226	0.55	42 405	-0.51	7.78
Electricity	2005	23,158		1 857		8.02
	2010	29,852	5.78	2 063	5.55	6.91
	2015	25,702	-2.78	1 734	-3.19	6.75
Construction	2005	161,181		4 262		2.64
	2010	194,989	4.21	10 373	28.68	5.32
	2015	216,280	2.18	11 237	1.67	5.21
Trade	2005	559,323		26 688		4.77
	2010	667,842	3.88	32 916	4.67	4.93
	2015	743,233	2.26	34 279	0.83	4.61
Transport	2005	155,291		6 558		4.22
	2010	202,485	6.08	8 957	7.32	4.42
	2015	259,726	5.65	11 005	4.57	4.24
Finance	2005	755,833		26 148		3.46
	2010	931,224	4.64	33 026	5.26	3.55
	2015	1,094,950	3.52	33 692	0.40	3.11
Community Services	2005	531,175		25 329		4.77
	2010	672,940	5.34	30 335	3.95	4.51
	2015	830,622	4.69	32 076	1.15	3.86
Households	2005	293,755		17 772		6.05
	2010	358,712	4.42	19 754	2.23	5.51
	2015	362,591	0.22	18 134	-1.64	5.00

Source: Global Insight (2016)

Employment in Transport for the Sedibeng Region increased from 6 558 in 2005 to 11 005 in 2015 which amount to increase of 6.78% per annum over the last ten

years. The manufacturing as largest sector in terms of number of employment in Sedibeng Region increased from 38 227 in 2005 to 42 405 in 2015 to amounts to 1.09% over the last ten years. In comparison to Gauteng Province which increase its employment in transport sector from 155,291 in 2005 to 259,726 in 2015 which amounts to 6.73% per annum over the last ten years.

2.10.2 Labour Remuneration in Broad Economic Sectors

Table 2.19 shows labour remuneration in all nine Broad Economic Sectors in Gauteng and Sedibeng. It also indicates the annual growth rate for both Gauteng and Sedibeng over the last ten years between 2005 and 2015.

Table 2.19 Labour Remuneration Broad Economic Sectors - 9 sectors (Current prices, R 1000)

Sector	Year	Gauteng	Gauteng Annual Growth %	Sedibeng	Sedibeng Annual Growth %	Sedibeng Contribution to Gauteng %
Agriculture	2005	705,731		65 085		9.22
	2010	1,118,740	11.70	133 990	21.17	11.98
	2015	1,757,299	11.42	229 395	14.24	13.05
Mining	2005	10,040,884		179 091		1.78
	2010	19,412,816	18.67	507 238	36.65	2,61
	2015	27,303,432	8.13	655 020	5.83	2.41
Manufacturing	2005	54,882,387		5 511 501		10.04
	2010	87,791,223	11.99	11 357 676	21.21	12.94
	2015	130,788,599	9.79	18 110 846	11.75	13.84
Electricity	2005	4,270,322		520 146		12.18
	2010	7,569,356	15.45	1 012 489	18.93	13.38
	2015	12,749,638	13.69	1 901 874	17.57	14.92
Construction	2005	8,838,727		457 248		5.17
	2010	15,991,051	16.18	825 680	16.11	5.16
	2015	23,697,138	9.64	1 209 894	9.31	5.11
Trade	2005	37,144,227		1 590 520		4.28
	2010	51,966,430	7.99	2 300 347	8.9	4.43
	2015	76,917,781	9.60	3 313 460	8.81	4.31
Transport	2005	17,487,586		612 762		3.50
	2010	28,539,948	12.57	986 717	12.20	3.46
	2015	41,886,566	9.42	1 485 544	10.11	3.54
Finance	2005	48,189,310		1 150 458		2.39
	2010	83,943,254	14.82	2 021 189	15.14	2.41
	2015	138,200,627	16.18	3 190 805	11.57	2.31
Community Services	2005	89,585,755		3 904 540		4.36
	2010	165,233,528	16.88	6 613 416	13.88	4.00
	2015	249,382,987	10.19	9 128 673	7.61	3.66

Source: Global Insight (2016)

The labour remuneration for the transport sector in Sedibeng increased from R612.76 million in 2005 to R1 485.54 million in 2015 which amounts to 142.4% over the last ten years. While the largest sector, which is manufacturing, increased from R5.5 billion in 2005 to R18.11 billion in 2015, which amounts to 229.1% over the same period. The transport sector in Gauteng increased from R17.487 billion to R41.886 billion over the same period and amounts to a 139.5% increase.

2.10.3 Unemployment

Table 2.20 shows number of unemployed people in Gauteng, Sedibeng district and its local municipalities.

Table 2.20 Number of unemployed people

Year	Gauteng	Sedibeng	Emfuleni	Midvaal	Lesedi
2005	1 197 702	104 587	91 549	5 490	7 548
2010	1 468 699	120 647	102 529	7 759	10 359
2015	1 762 697	201 713	169 148	14 008	18 557

Source: Global Insight (2016)

Unemployment in the Sedibeng District has increased from 104 587 in 2005 to 201 713 in 2015, which amounts 9.28% per annum over the last ten years. The province increased from 1 197 702 to 1 762 697, which amounts 4.71% increase per annum over the same period. The unemployment in the district has been increasing almost twice above the provincial unemployment rate.

2.11 CONTRIBUTION OF TRANSPORT TO ECONOMIC GROWTH

The largest contributor to the Gross Value Added by Region (GVA-R) is manufacturing, followed by finance, community services, trade, transport, electricity, construction, mining and agriculture. The contribution of transport increased from R2.946 billion in 2005 to R3.567 billion in 2015, which amounts to an increase of 2.11% per annum over the last ten years. In Gauteng, contribution increased from R70.623 billion to R98.520 billion over the same period and amount to an increase of 3.95% which is above the Sedibeng.

Table 2.21 shows the contribution of transport to the Gross Value Added by Region (GVA-R) of the Sedibeng Region and its local municipalities and also indicated is the annual growth over the last ten years.

Table 2.21 Contribution of transport to the Gross Value Added by Region (GVA-R)

Sector	Year	Sedibeng	Emfuleni	Midvaal	Lesedi
Transport	**2005**	2 946 946	2 224 558	363 869	358 519
	Contribution of LMs	100%	75%	13.%	12%
	2010	3 087 712	2 290 637	429 088	367 987
	Contribution of LMs	100%	74%	14%	12%
	Annual growth	0.96%	0.32%	3.58%	0.52%
	2015	3 567 464	2 683 860	478 271	405 333
	Contribution of LMs	100%	75%	13%	12%
	Annual growth	3.1%	3.43%	2.28%	2.02%

Source: Global Insight (2016)

The Emfuleni Local Municipality's transport contribution to the Gross Value Added by Region of Sedibeng has been consistent at more than 70% over the last ten years, followed Midvaal and Lesedi Local Municipalities at more than 10%.The annual growth of transport to the Gross Value Added by Region for both Emfuleni and Lesedi Local Municipalities has been less than 1% for the period between 2005 and 2015, while Midvaal experienced growth of slightly more than 1% over the same period. The annual growth of transport contribution to the Gross Value Added by Region recovered for the period between 2010 and 2015. It increased slightly, by more than 3% for Emfuleni Local Municipality, slightly more than 2% for both Midvaal and Emfuleni Local Municipalities. The growth in local municipalities affects the growth for the entire Sedibeng District Municipality, the higher the growth in local municipalities, in particular Emfuleni, the higher the growth in the district.

Employment in Transport for the Sedibeng Region increased from 6 558 in 2005 to 11 005 in 2015, which amounts to an increase of 6.78% per annum over the last ten years. The manufacturing, as largest sector regarding some employment in Sedibeng Region, increased from 38 227 in 2005 to 42 405 in 2015 which amounts to 1.09% over the last ten years. Employment in the Transport sector increased more than the manufacturing sector over the last ten years. In comparison to Gauteng Province, employment in the transport sector increased from 155,291 in 2005 to 259,726 in 2015, which amounts to 6.73% per annum over the last ten years.

Table 2.22 shows formal employment in the Transport Sector in Sedibeng and its local municipalities. It also indicates the annual growth rate for both Sedibeng and its local municipalities over the last ten years, between 2005 and 2015.

Table 2.22 Formal Employment in Transport Sector and contribution of locals

Sector	Year	Sedibeng	Emfuleni	Midvaal	Lesedi
Transport	**2005**	6 558	5,103	1,005	450
	Contribution of LMs	100%	77.8%	15.3%	6.9%
	2010	8 957	6,730	1,576	651
	Contribution of LMs	100%	75.1%	17.6	7,3%
	Annual growth	5.36%	6.38%	11.36%	8.93%
	2015	11 005	8,087	2,087	831
	Contribution of LMs	100%	73.48%	18.96%	7.55%
	Annual growth	4.57%	4.03%	6.48%	5.53%

Source: Global Insight (2016)

Emfuleni Local Municipality's contribution to the formal employment of the transport sector in Sedibeng has been consistent at more than 70% over the last ten years, followed Midvaal and Lesedi Local Municipalities at more than 15% and 5%, respectively. The annual growth of employment for Emfuleni was 6.38%, Lesedi Local Municipalities at 8.93% for the period between 2005 and 2010, while Midvaal experienced growth of double digits at 11.36% over the same period. The annual growth for the transport employment sector decreased during the period between 2010 and 2015. Emfuleni Local Municipality decreased to 4.03%, while Lesedi decreased to 5.53%, and Midvaal Local Municipality to 6.48%. The growth in local municipalities affects the growth for the entire Sedibeng District Municipality; the lower the growth in local municipalities, in particular Emfuleni, the lower the growth in the district.

The labour remuneration for the transport sector in SDM increased from R612.76 million in 2005 to R1 485.54 million in 2015, which amounts to 14.24 % over the last ten years. While the largest sector, which is manufacturing, increased from R5.5 billion in 2005 to R18.11 billion in 2015, which amounts to 22.9.% over the same period. The transport sector in Gauteng increased from R17.487 billion to R41.886 billion over the same period and amounted to 13.95% increase. The employment in

the transport sector grew by 6.78% per annum over the last ten years, while the remuneration has grown by 14.24% over the same period (SDM, 2016).

Table 2.23 shows Labour Remuneration in Transport Sector in Sedibeng and its local municipalities. It also indicates the annual growth rate for both Sedibeng and its local municipalities over the last ten years between 2005 and 2015.

Table 2.23 Labour Remuneration in Transport Sector (Current prices, R 1000)

Sector	Year	Sedibeng	Emfuleni	Midvaal	Lesedi
Transport	**2005**	612 762	448 988	80 475	83 299
	Contribution of LMs	100%	73.27%	13.13%	13.59%
	2010	986 717	726 627	139 219	120 871
	Contribution of LMs	100%	73.64%	14.11%	12.25%
	Annual growth	12.21%	12.37%	14.61%	9.02%
	2015	1 485 544	1 109 868	199 610	176 066
	Contribution of LMs	100%	74.71%	13.44%	11.85%
	Annual growth	10.11%	10.55%	8.67%	9.13%

Source: Global Insight (2016)

The contribution of Emfuleni Local Municipality to the labour remuneration of the transport sector in Sedibeng has been consistent at more than 70% over the last ten years, followed Midvaal and Lesedi Local Municipalities at more than 10%. The annual growth of labour remuneration for Emfuleni was 12.37%, Lesedi Local Municipalities at 9.02% for the period between 2005 and 2010, while Midvaal experienced growth of 14.61% over the same period. The annual growth for transport labour remuneration sector decreased during the period between 2010 and 2015. The Emfuleni Local Municipality decreased to 10.55% which is above Midvaal and Lesedi Local Municipality. Lesedi Local Municipality decreased to 9.13% and Midvaal Local Municipality to 8.48%. The growth in local municipalities affects the growth for the entire Sedibeng District Municipality; the lower the growth in local municipalities, in particular Emfuleni, the lower the growth in the district.

2.12 CONCLUSION

The Sedibeng District region is located South of Gauteng and it is anticipated that in future, as the North and East of the province run out of space, it will be the focus area of development. The population of the region has slightly increased by 1.4% compared to the provincial 2.7%. The region has three local municipalities namely Emfuleni, Midvaal and Lesedi local municipalities. Emfuleni is home to more 70% of the residents and contributes more than 70% of employment and Gross Domestic Products (GDP) in the region.

The major five contributors to economic activity in the region are manufacturing, general services (government, social and personal services), wholesale and retail, finance and business and lastly transport. They are major employers and significant contributors to Gross Value Added. The freight movement to the main business centres of South Africa, which is Cape Town and Durban passes through the region and the roads used are N1 and N3.

The following can be summarised on socio-economic role of transport in the region:

- From 2005 to 2015, the population density has increased in the Sedibeng Municipal area from 775.97 to 893.23, which amounts to an increase of 1.5% per annum over the last ten years.
- Emfuleni Local Municipality (97.1%) is more urbanised than Midvaal (58.2%) and Lesedi (86.1%) Local Municipalities. It is also more urbanised than the Gauteng (96%) and Sedibeng (86.1%). The least urbanised area is Midvaal Local Municipality.
- The Sedibeng district area shares a similar trend with the entire Gauteng province where the number of illiterate people has decreased from 2005 to 2015 across all races. They have decreased from 35 886 to 22 954, that is 3.6% per annum over the last ten years, in comparison to Gauteng's decrease of 3.5% per annum over the same period.
- The GDP-R of Sedibeng increased from R 45.7 billion in 2005 to R61.5 billion in 2015. That is an increase of 3.46% per annum in ten years. The Gauteng GDP increased from R807.705 billion to R1 075.56 billion, which amounts to an increase of 3.32% per annum over ten years; slightly less than that of Sedibeng Region.

- There has been a decrease of GDP-R in Sedibeng in 2015 from R62.077 billion to R61.505 in 2014, which amounts to 0.9%. In 2015 the Sedibeng District contributed 10% to the Gauteng Province GDP. Emfuleni Local Municipality is the largest economy in the Sedibeng region, at R61.505 billion, which amounts to 80%.
- The largest contributor to the Gross Value Added by Region (GVA-R) is manufacturing, followed by finance, community services, trade, transport, electricity, construction, mining and agriculture. The contribution of transport increased from R2.946 billion in 2005 to R3.567 billion in 2015, which amounts to an increase of 2.11% per annum over the last ten years. In Gauteng, contribution increased from R70.623 billion to R98.520 billion over the same period and amounts to an increase of 3.95% per annum, which is above the Sedibeng.
- The Sedibeng annual disposable income increased from R26.56 million in 2005 to R34.69 million in 2015, which amounts to an increase of 3.06% per annum over the last ten years. While in Gauteng it increased from R479.65 million to R611.3 million, which amounts to 2.75% per annum over the same period.
- Employment in Transport for the Sedibeng Region increased from 6 558 in 2005 to 11 005 in 2015, which amounts to an increase of 6.78% per annum. Manufacturing, as largest sector in terms of number of employment in Sedibeng Region, increased from 38 227 in 2005 to 42 405 in 2015, which amounts to 1.09% per annum over the last ten years. In comparison to Gauteng Province, which increase its employment in transport sector from 155,291 in 2005 to 259,726 in 2015, which amounts to 6.73% per annum over the last ten years.
- The labour remuneration for the transport sector in Sedibeng increased from R612.76 million in 2005 to R1 485.54 million in 2015, which amounts to 14.24% per annum over the last ten years. While the largest sector, which is manufacturing, increased from R5.5 billion in 2005 to R18.11 billion in 2015, which amounts to 22.91% per annum over the same period. Transport sector in Gauteng increased from R17.487 billion to R41.886 billion over the same period which amounted to increase 13.95% per annum.

In the next chapter, literature will be reviewed and the focus will be on theory of freight transport. It will also analyse and evaluate freight transport contribution to the economic growth. Comparative studies from other countries will also be sought from Brazil, Russia, India, China and South Africa (BRICS) and developed countries. It will also look at strategic plans developed by various levels of government, to tackle the inefficiencies in freight transport. The empirical results on the contribution of transport to economic growth from the regions in developed, developing countries, African and South Africa will also be explored.

CHAPTER 3: LITERATURE REVIEW

3.1 INTRODUCTION

The chapter defines concepts such as freight movement, urban freight, transport planning, freight data collection, logistics and freight transport relative to their contribution to economic growth. Comparative case studies in developed and developing countries are also be explored. The literature review on freight also investigates how freight developed into a major industry.

The methods and means by which goods are moved are also reviewed. Urban areas generate freight movement, as goods are moved out of areas and brought to areas for consumption by consumers (World Bank, 2013:5).

3.2 DEFINITIONS AND CONCEPTS

3.2.1 Freight

The word ‘freight’ is derived from the Middle Dutch and Low German words of “vracht and vrecht,” meaning the price for transporting an item by sea (Savy & Burnham, 2013:18). Savy and Burnham (2013) further illustrate the definition by the evolution of its French equivalent, “fret” (noun), from the price of transporting merchandise by sea (thirteenth century) to include the cargo itself (sixteenth century), to the price of hiring a ship, and then the hiring of a ship used for transporting merchandise (both seventeenth century), and to any mode transport. In English, the noun ‘freight’ covers the following:

- Transport of goods more slowly than by express.
- The goods transported (British English in case of ships: Americans use the word ‘cargo’).
- The charge for transporting goods.
- A load or a burden (the phrase ‘fraught with danger’ keeps the link to old Dutch (Savy & Burnham, 2013:18).

Freight is a consequent demand responding on a need to move goods to various industrial and residential locations (Australian Government, 2011:8).The Federal Government (2009:8) describes freight as moving goods to where people need them and moving goods where they are required, the material conditions for people to

develop and for social exchange are created. Freight can, therefore, be defined as the movement of goods from origin to destination, which is where such goods will be needed. It facilitates social and economic interaction and puts a value on such goods for either final consumption or further processing.

3.2.2 Logistics

The process that ultimately results in goods received by customers according to their requirements is the logistics. The logistics would have entailed planning, implementing and controlling efficient flow and storage of goods or services from the point of origin. (Schoemaker et al., 2006:12). Historically, in a military and then civilian context, logistics meant a set of physical operations, material actions on products, peripheral to their manufacturing transformation (both before and after). While manufacturing modified the shape or physical-chemical character of products, logistics modified their spatial character. It encompassed transport (displacement in space) and warehousing (displacement in time), as well as related operations of handling, packing and even packaging of products (Savy & Burnham, 2013:246).

Logistics is about finding the lowest overall costs for the operation and not confined to lowest transport or storage costs. It should be measured against consumer satisfaction and the total effectiveness of the value chain (CSIR, 2008:8).

Hesse and Rodrigue (2003:172) asserted that transformation, production, distribution, transport, material supply, information and movement of goods constitute some activities of logistic. Incuded in these activities are physical distribution, transport sector, material management and generated transport subdivision (McKinnon, 1988:33).

The objectives set for logistics management are almost as diverse as the terminology is used in the field of study. They vary according to the approach followed in the study of logistics management. Shahia *et al.* (1994:20), find objectives formulated, for instance, from a macroeconomic point of view, a marketing point of view, a transport economics point of view and a business economics point of view. The following examples give a summary of different points of view:

- Objectives of logistics as being the gaining of a competitive advantage in the market, allowing consideration of costs.

- Objectives of logistics as being the provision of logistical systems at the least possible total costs that comply with the predetermined standard of customer service.
- Objectives of logistics management are to develop the highest possible efficiency in the logistics system. This cost efficiency can be measured by cost and quality of service (Shahia *et al.*, 1994:20).

Therefore, logistics can be explained as the management of the goods between the point of origin and point of consumption in order to meet some necessities for households or businesses. The logistics of material items usually involves the integration of information flow, material handling, production, packaging, inventory, transportation, warehousing and often security. The management of logistics seeks to maximise the economic value of products and thereby contribute to economic growth.

3.2.3 Freight movement

Ross and Lee (2014:1) explain freight movement as supporting economic activity, improving quality of life, contributes to pollution and consumption of energy. Ross and Lee (2014:1) further describe freight movement as part of production process, from raw material, manufacturing, finished products, retail and transportation to customers for final consumption.

The Puget Sound Regional Council (2010:6) defines freight either discretionary or locally derived. Discretionary freight moves through the region as a point of transfer, moving to destinations outside the region, state, or the country. Locally derived freight serves or results from regional population and employment. Both of these play an important role regarding the regional freight and goods transportation system but must be considered distinctly for a complete understanding.

Local demand for freight and goods movement can be described as derived demand, because it is driven by factors such as industry growth or decline, shifting population patterns, and changing regional income. The efficient movement of freight is critical for local, provincial and national economic viability. Federal Highway Administration (2011:1) views understanding the movement of freight and its attributes as crucial to promoting efficiency and economic development.

The types and patterns of freight transport movement within an urban area depend on a wide range of factor. The location, type of industry, supply chain structures, transport infrastructure, access to area, sizes and weights of goods are among wide range of factors freight movement depend on (BESTUFS, 2012:6).

Therefore, freight movement connects two points, which is demand and supply for goods. The movement of freight supports daily lives of people by providing essential goods and services needed for their livelihood. The efficient movement of freight will enhance social and economic development of people, because goods and services can be effectively transported to them wherever they are.

3.2.4 Urban freight

Research by Researchomatic (2012:1) defines urban freight transport as type of transport functioning in an urban environment and specifically the movement of goods for commercial entities in urban areas. This includes the pickup and deliveries of materials, supplies, consumables, parts, mail that a business needs to operate and also include households.

Urban freight transportation, sometimes also referred to as city logistics, aims to decrease damaging externalities, such as emission, noise and congestion, linked with freight activities at the same time supporting required economic and social development (Crainic *et al.*, 2009:432). Zhang *et al.*(2013:4) cautioned ever the growing number of private vehicles, soaring demand of urban freight transportation services as a challenge to urban areas and this dictates a need to shift toward environmentally sustainable logistics and freight technologies.

The Urban Freight Transport (UFT) is dominated by the road freight transport which is highly competitive and critical to the functioning of urban economies (European Commission, 2012:4). Lindholm (2013:1) further describes urban freight a facilitator for economic growth and employment.

Urban freight transport is important for many reasons and among others (BESTUFS, 2012:5) a direct bearing on the efficiency of the economy, major employer, industrial and trading activities, sustaining existing lifestyles, enhancing competitiveness and the negative social and environmental effects.

The urban goods transport plays an important role in the quality of life in urban areas, since sizeable share of traffic moves in urban areas with a high density of population and mixed use of public space, where external costs are easily felt (BESTUFS, 2012:6). According to Visser (2013:3), the various problems both encountered and caused by urban goods transport, can be categorised are accessibility, congestion, environmental issues, safety issues and energy consumption.

3.2.5 Transport planning

Transport Canada (2011:38) identifies transport planning as essential for designing accessibility to industrial, commercial, residential and recreational facilities. Figure 3.1 indicate steps which should be considered in planning for transport. The steps show importance of transportation planning in shaping the vision of community or any level of government in serving its constituency (Federal Highway Administration, 2013:1).

Figure 3.1 shows steps which should be taken into account in planning for transport:

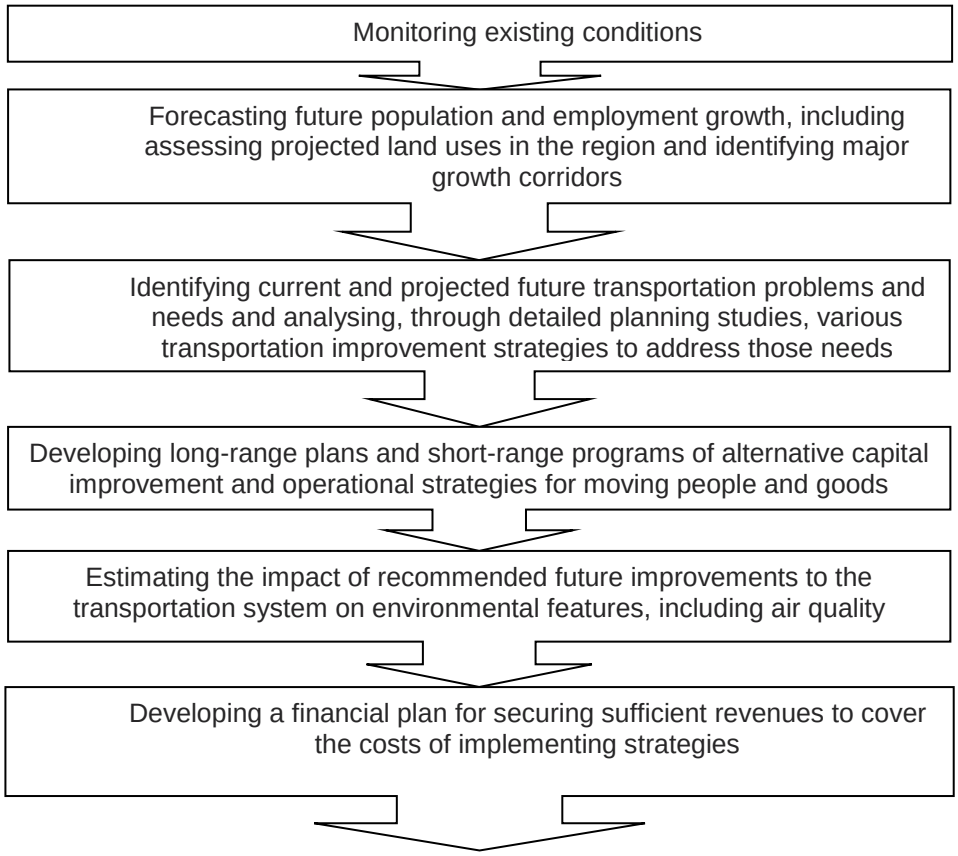


Figure 3.1 Planning for transport Source: Own compilation (Federal Highway Administration Transportation 2013:3)

The National Land Transport Strategic Framework (NLTSF) (Department of Transport, 2006) gives local authorities a framework on how to develop their transport plans. The NLTSF requires development of Integrated Transport Plans (ITP) to guide public transport operations, prioritization of transport infrastructure, movement of freight and ascertaining demand and supply operating licenses for various mode of public transport. Transportation planning is consultative, provides a way for the community to input on broader social issues, such as the relationship of travel choices to the environment and social equity. Wilson (2001:16) argued that transportation planning adds value to people's lives linking them to social and economic destinations.

Therefore, the purpose of transport planning strives to develop plans for linking people and goods with origin and final destinations. Transport Planning has traditionally followed the planning model of defining goals and objectives, identifying problems, generating alternatives, developing plans, implementation and monitoring.

3.2.6 Freight data collection

Browne & Allen (2006:2) showed that most freight data collection is initiated on national scale by national government in most countries, this result in difficulty on distinguishing between urban and non-urban data and geographical location. The amount and size of data collected when converted to geographical area might be very small and not representative. The origin-destination (OD) matrices plays substantial role on estimation of traffic congestion to the road network and ascertaining mitigation factors to reduce negative impacts.

The synthesis report by the Federal Highway Administration (2011:2) identifies twelve different types of surveys that can be useful in the collection of data for freight, they are "roadside/intercept surveys, combined telephone/mail-back surveys, telephone interview surveys, mail-out/mail-back surveys, personal interview surveys, internet surveys, focus and stakeholder group surveys, commercial vehicle trip diary surveys, global Positioning System (GPS) vehicle tracking surveys [more broadly, Intelligent, transportation System (ITS) technologies] license plate match surveys—manual, License plate match surveys—electronic and administrative surveys." Browne and Allen (2006:10), in their synthesis of data collection methods, mention that techniques in data collection on urban freight are Interviews, group discussions,

questionnaires, observation surveys, infrastructure/inventory surveys and Traffic counts.

Table 3.1 lists advantages and disadvantages of using various techniques in data collection.

Table 3.1: The advantages and disadvantages of collecting data techniques

Technique	**Advantages**	**Disadvantages**
Web search	Low cost, less time to collect data, low level of effort to collect data	Low level of accuracy of data collection. It depends on the frequency of publication.
Trade publication	Low cost, less time to collect data, low level of effort to collect data	Low level of accuracy of data collection. It depends on the frequency of publication.
Reports	Low cost, less time to collect data, low level of effort to collect data	Low level of accuracy of data collection.
Interviews	High level of data collection provides deep knowledge in a certain sector.	Time consuming and high data collection cost.
Convenience samples	High level of data collection provides deep knowledge in a certain sector. They are a great way to obtain cost data for cost data elements that are not expected to vary greatly from the company to company or region to region.	High data collection cost.
Random surveys	High level of data collection provides deep knowledge in a certain sector. They are the most beneficial for cost data elements that might have fluctuations from the company to company or region to region.	High data collection cost (Cost prohibitive). Although random surveys are most unbiased mean of collecting the data, they can seriously bias the results if sampled universe include entities that do not meet the stated criteria.

Source: Federal Highway Administration (2011:8)

Wenzel and Brill (1998:24) describe the steps for developing a survey:

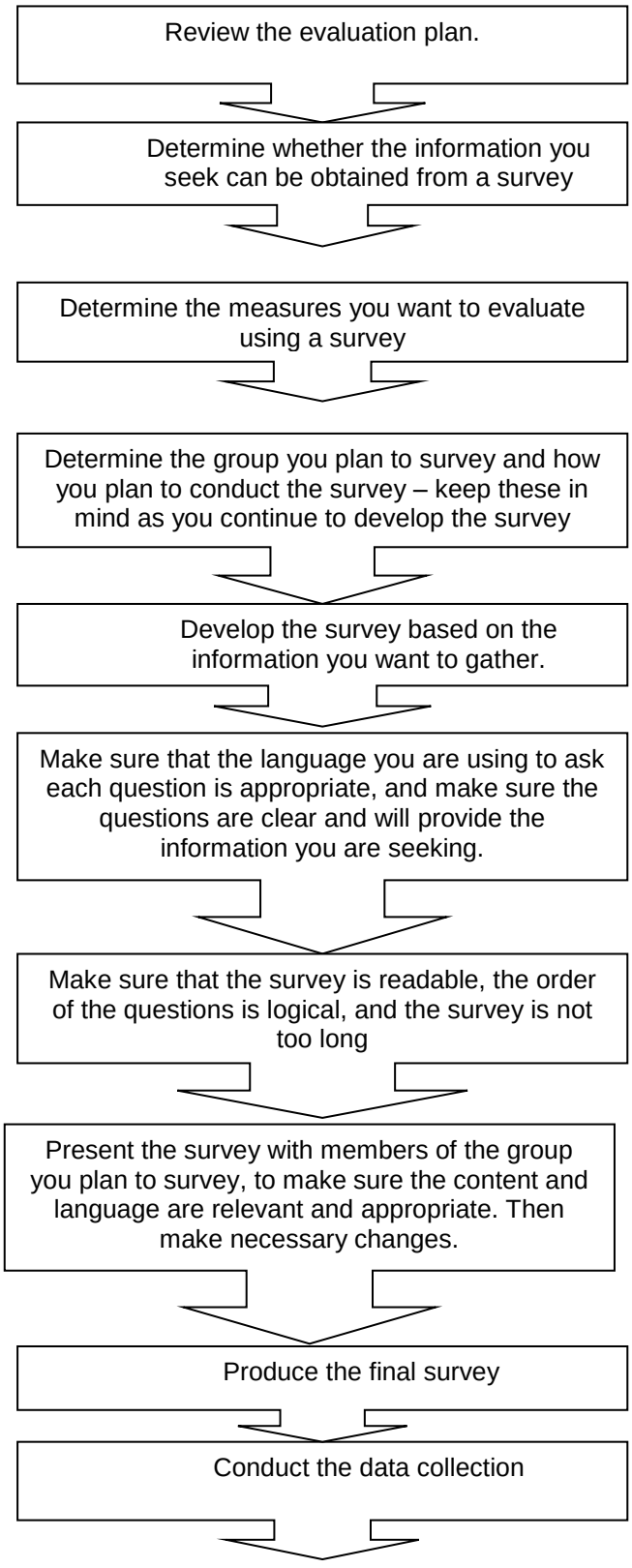


Figure 3.2 Steps for developing survey Source: Own compilation from Wenzel and Brill (1998:24).

Therefore, continued movement of freight without adequate regulations and restrictions result in traffic congestion at transport terminals. The main techniques of

collecting freight data can be through websites, trade publications, reports, interviews and surveys. The best technique to be used to collect data will be determined by the accuracy of data required, costs and time available.

3.3 ECONOMICS AND TRANSPORT

3.3.1 Introduction

The interdependence between freight, transport activities and economic development is historical. The countries such as Egypt, China, Greece and Roman Empire in primeval times grew their economies by developing river and maritime routes (Filip & Catalin, 2014). Zhao *et al.* (2017) argued that the sustainability of transport system is crucial for underpinning the economic performance and prosperity of nations.

Transportation, as Litman (2017:15) stated connects people, business and resources to facilitate economic activities and thereby contribute to economic growth. The World Bank (2013:1) defines efficient transport as a critical component of economic development, globally and nationally and transport availability affects global development patterns and can be a boost or a barrier to economic growth within individual nations and regions.

In motivating for transport investments economic growth is justified as crucial element to get more resources. The connection between industrial and commercial centres increases potential for job creation, reduced time travel cost and accessibility of the market Australasian Transport Research Forums (2011).

The return on transportation investments in economic development generally is the greatest for freight, services, and business travel (Litman, 2017:45). The Federal Highway Improvement Administration (2016) regards improved freight transportation systems as contributing in the reduction of the costs for delivery of goods and services; also supports faster, more reliable transportation from one place to another and economic growth. The development of transport infrastructure activities has attracted keen interests among scientific researchers with transportation regarded as reflection of the economic activity (Skorobogatova & Kuzmina-Merlino, 2016).

According to Eddington Transport Study (2006) transportation is the enable of economic activity and has a direct and indirect impacts economic development. The

relationship between economy and transport is very complicated and less comprehended. The performing transport system contributes and facilitates improvement in productivity and economic growth. The House of Commons (2011) argues that despite changes in economic conditions and transport demands, the predominant view, including academics, business groups, local authorities and transport professionals still held a view that Eddington's broad analysis of the linkages between transport and the economy are true.

The wealth of researched economic information has provided relative strength on relationship between transport improvements and economic performance (Federal Highway Improvement Administration 2013). Filip and Catalin (2014) asserted that in the development and diversification of trade between countries worldwide, international freight transport has an important role and transport activity is a premise in achieving economic cooperation agreements.

As a productive operation (Savy & Burnham, 2013:33), transport adds value, a use value and an exchange value, to goods to which it is applied, and is incorporated into other components of value represented by manufacturing, warehousing, and of course the indirect production represented by research, planning, marketing, insurance and so forth. In a market economy based on specialisation and division of labour, transport is partly integrated into other sectors, but for that segment operated by specific capital interests, it forms a special industry. In its study on freight transport in the world, the World Bank (2013) has noted that the cost of freight transport is an important factor in the competitiveness of the country's economy. With high transport costs large economies of scale will remain unexploited and economic opportunities remain untapped.

3.3.2 Theory on transport and economy

"Economic science uses the word "goods" in its broadest sense" (Immers & Stada 2007:6), and everything that aids in satisfying a human need falls under this banner. The required goods are moved to the market and consumers can decide on whether such goods meet their needs for ultimate consumption. These goods will only be purchased if consumers can derive value out of them.

The households and business engage in daily activities with households traveling to meet their needs and business providing means of transport. This result in

environment where transport infrastructure and economic transactions occur, thereby influence economic transactions of household and business (Connecticut Academy of Science and Engineering, 2013:8).

The improvements in mobility, accessibility, costs reduction and reliability of transport bring about increased economic activity. The extensive study (SACTRA 1999, Weisbrod 2008) cited that improved mobility leads to new trade between locations, accessibility improvements lead to larger consumer markets and improving reliability reduces the uncertainty and risk associated with transportation networks in supply chain logistics.

Table 3.2 provides an overview of the economic impacts due to transportation investments by type of impact.

Table 3.2 Economic impacts due to transportation investment

Impacts on transportation supply	Impacts on transportation demand	Microeconomic impact	Macroeconomic impact
• income from transport operations (fares and wages) • Access to wider distribution markets and niche	• improved accessibility • time and cost savings • productivity gains • division of labour • Access to wider range of suppliers and consumers • economies of scale	• rent income • lower price of commodities • higher supply of commodities	• Formation of distribution networks • Attraction and accumulation of economic activities • increased competitiveness • growth of consumption • Fulfilling of mobility needs

Source: Kockelman *et al.* (2013).

For instance, a vibrant economy with more disposable income will lead to more activity and travel pursuits and result in economic growth. There are mainly two types of software used to analyse economic impact on transports projects (Connecticut Academy of Science and Engineering, 2013:56) namely REMI TranSight (TranSight) and Transportation Economic Development Impact System (TREDIS). TranSight model projects the portion of commodities that stay in the region comparative to those that are exported from the region and this information

can give details on how changes in one industry has impacted on others in the region (Connecticut Academy of Science and Engineering, 2013:56).

In measuring and estimating the efficiency of the interaction between the transport network infrastructure, industrial and household compositions, TREDIS (Connecticut Academy of Science and Engineering, 2013:56 is applied. The interaction of the industry and household structures to meet social needs is boosted by transportation and thereby contributes to local and regional economic growth.

3.3.3 Empirical results on transport and economy

Litman (2017) asserts that economic activities connect people, businesses and resources and policies are developed to influence transport to support economic development. The empirical results on transport and economy will ascertain such results on regional economies, for developed and developing countries, Africa and South Africa.

3.3.3.1 Developed countries

Ecorys *et al.* (2015:17) ascertained that European freight transport and logistics create sizeable jobs, influence efficiencies in other sectors of the economy and thus contribute to European economy. Marshal and Webber (2007:1), in their brief on the case for a better transport investment in Leeds City Region showed that up to 25% of the potential benefits of major transport investments in Leeds currently go un-counted by the Department for Transport.

On its study on the impact of transport in Florida, Florida Department of Transport (2015:14) concluded that on a basic level transportation affects quality of life. The study revealed that in Florida, transportation improvements reimbursed billions of dollars of benefits to families and individuals every year. The benefits impacted positively on the economy with reduced travel times, opportunities and accessibility to facilities.

3.3.3.2 Developing countries

In India, the Mumbai Metropolitan Region Development Authority (2008), in its study for Comprehensive Transport Study for the region, acknowledged that to support the regional economic growth and deal with challenges of movement of people, goods

and reduce levels of poverty, more transport investment is required in the region. It, therefore, requested intervention of national government for more resources.

From the empirical relationship, Wang (2009:113) concluded that there is a mutual collaborative correlation between Xinjiang transportation industry and Xinjiang economic growth. In this Chinese province, Wang (2009) further argued the creation of favorable situation for the transportation industry pushed the development of Xinjiang regional economy.

The movement of goods and people between Helsinki and St. Petersburg resulted into both Finnish and Russian republic to establish Smart Transport Corridor between the two towns, in an attempt to booster economic growth in both towns and countries (Fitsrus, 2013:5). The Smart Transport Corridor is aimed at modernising the trade between the two towns through innovative Transport Intelligent System that will enhance economic growth of both countries by freight and passenger volumes between the two countries.

3.3.3.3 Africa

African Economic Outlook (2005-2006) cited poor quality of Angola's transport infrastructure as an obstacle for investments into industries other than oil. Subsequently, Angola was given a loan of $2 billion worth of loan by China's Eximbank to rehabilitate roads and railways which are critical to access mineral exports and grow the economy. Sequeira *et al.* (2014:14), in providing evidence on impact of transportation on the economy, pointed out that anchor projects have been significant in providing the economic rationale for the upgrade of the Maputo Corridor.

Nairobi City in partnership with Kenyan National Government expanded and developed Nairobi highway (A2) which connects Ethiopia to the North. The construction of the northern, southern and eastern bypasses and rehabilitation of major route artilleries (Waweru, 2012:28). The transportation projects improved the shape of areas' economic health and quality of life. Transport system not only provided for the mobility of people and goods, it also influenced the patterns of growth and economic activities by providing access to land.

African Bank Development Group (2017) has invested in major project of 240km of roads in Southern Ethiopia, which targets to grow the economy by unlocking the agricultural prospects of the region, that will not only increase the production of coffee sesame, but also assist incubation of smaller farmers into efficient agro cottage industries building the capacity to participate in the lucrative coffee value chain.

3.3.3.4 South Africa

In its Spatial Development Framework Review, Buffalo City Metropolitan Municipality (2013:143) in the Eastern Cape stated that growing manufacturing sector, East London Industrial Development Zone (IDZ), the incoming and outgoing movements of goods will depend on reliable freight transport system to contribute to economic growth of the region.

Frieslaar and Jones (2006:1) pointed out that the N1 corridor within the Cape Town Metropolitan Area is a crucial transport channel, enabling an exceptional high level of movement of freight, passengers, commuters, tourists, business traffic and recreational traffic. The corridor contributes to the regional economic growth and furthermore has significant sites within the corridor that, if developed, could make provision for an additional 10 000 dwellings units and 50 000 job opportunities.

City of Tshwane (2015) Comprehensive Integrated Transport Plan identified infrastructure as a powerful catalyst, providing the building blocks for development that ensures growth. The transport infrastructure will be used to stimulate economic growth and improve mobility with the ultimate goal being to improve social equity, health and well-being, resilience of cities, urban-rural linkages and productivity of both urban and rural areas. The Comprehensive Integrated Transport Plan requires the city to channel more resources to the transport infrastructure projects for the next five.

The City of eThekwini (2014) will be focusing on port and logistics over the next 10 years; it anticipates that this will be the biggest area of growth within the local economy. This is premised on the realisation of a number of projects, including a radical shift from road based freight transport, to rail as well as a more efficient logistics system, which provides the backbone for a more competitive economy.

3.3.4 Conclusion

Empirical results show that there is a strong relationship between transportation and economic development. The production and consumption of goods or services contributes towards the economic growth of the region or country. Therefore, the efficient movement of freight adds value to goods or services, contributes to reduction of transport costs and logistics thus helping in economic development.

3.4 CASE STUDIES

3.4.1 Freight in developed countries

3.4.1.1 Europe

The vision for Urban Freight Transport (UFT) as set out in the European Commission's 2011 Transport White Paper encourages efficiency both economically and environmentally on freight collection and deliveries in urban areas to reduce negative impacts as caused by emissions and increase in generalized costs.

The Commission introduced the quantified policy goal for UFT of "essentially CO2-free city logistics in major urban centres by 2030". The policy recommends switch to other non-road modes for transporting freight flows over 300km. The policy measures includes efficient deliveries, low emission vehicles, intelligent transport systems, night deliveries, intermodal transfer facilities, developing and disseminating good practice (European Commission, 2012:15).

The European Commission (2016) affirms that transport and logistics represent a substantial share of business and of household expenditure. Transport and logistics account to around 9-10% of GDP, 10-15% of production costs of individual companies and 12% of house-holds total final consumption.

3.4.1.2 The Netherlands

The freight transport in the Netherlands have experienced increase in recent years due to economic globalization bringing longer journeys and just in time concept requiring smaller vehicles and frequent deliveries. In Netherlands the road transport dominates other modes with 80.8% of total goods transport in 2002 (Van Duin, 2013:6).

In an endeavour to resolve accessibility and environmental problems of freight transport problems in cities, the Ministry of Transport and Public Works initiated study on feasibility of urban distribution centres as part of National Transport Policy (Visser *et al.*, 1999:19). The urban distribution centres were subsequently introduced to solve accessibility and environmental problems of freight transport in cities.

The cities of the Netherlands, as required by the National Transport Policy, introduced measures to regulate freight transport in their cities. Among measures introduced were:

- Introducing speed limits for freight vehicles, regardless of downtown or suburb
- The designs of loading and unloading zones to regulate the traffic flow going in and out of the downtown.
- To restrict times that freight vehicles are allowed to do deliveries in city centres.
- To restrict freight vehicles on certain roads according to weight, width, length and height.

Statistics Nederland (2016) regards transport sector as essential to the economy of the country having 37 000 companies, producing nearly 80 billion Euros in sales, employing almost 490 000 people and represents around 4.5 percent of the gross domestic product. The importance of transport services on the economy is reflected on airports, ports, storage, cargo handling, shipping and the postal and courier services.

3.4.1.3 United Kingdom (UK)

Marshall and Webber (2007), in their study on transport investment and economic growth in the United Kingdom, cautioned that Britain's cities are at competitive disadvantage in the global economy as results of underestimating economic impacts of transport investments and political disinterest.

The negative impact of fuel prices, land value, time lost in road congestion has prompted government to explore methods of realizing savings and the introduction of Freight Consolidation Centres (UK Department of Transport, 2010:1).

Freight Consolidation Centres (FCCs) are distribution centres situated nearby town centre, shopping centre or construction sites, at which portion of loads are consolidated and from which a lesser number of consolidated loads are transported to the target area. FCCs have been established in the UK through a small number of high profile sites over the previous decade – Heathrow, Bristol Broadmead, Sheffield Meadowhall and the London Construction Consolidation Centre (UK Department of Transport, 2010:1)

In developing the FCC, the UK has developed a more inclusive approach to Private Public Partnerships (BESTUFS 2012:35). The recognition of negative impact caused by urban freight transport resulted in national government urging local government to pay special attention on freight transport and incorporate it to Local Transport Plans (LTPs) and form Freight Quality Partnerships (FQPs) which should include private sector. Docherty and MacKinnon (2013), in assessing the role of transport in London's economy, argue that improved transport system benefit economy as result of better roads, cost advantages and efficient logistics.

3.4.1.4 Germany

In Germany, development of Güterverkehrszentrums (GVZs or Cargo Traffic Centres) and City logistic were profound in changing approach to urban freight transport. GVZs are designed to create inter-regional networks between metropolis whereas City-Logistik want to arrange the delivery of goods within urban areas and have been achieved at Augsburg, Dörpen, Dortmund, Hannover, Leipzig, München, Neurenberg, Rostock, and Trier (Visser *et al.*, 1999:21). In other German (as well as Swiss) cities, joint service of delivering goods to urban areas by different transport companies commonly known City-Logistik projects also commenced. BESTUFS, (2012:40) pointed out that presence of a GVZ is not a pre-condition for City-Logistik, both concepts benefit from this combination. In characterising the relationship between transport and logistics, Heyman (2015) classified the logistics sector in Germany as depicted by innovative and diversified companies, as well as very good location factors.

3.4.1.5 France

The absence or little available freight data resulted into concerns by both freight transport sector and city authorities. It was impediment to the development of policy

framework on curbing for ever increasing challenges related to urban freight transport. This lead to French government through Transport Ministry (MELTT) and the Environmental and Energy Agency ADEME launching the research study focused on freight transport surveys in urban areas, modelling, starting pilot projects and formulating policy recommendations.

The programme aimed at providing useful information to several groups of players that planners involved in traffic and transport, managing road networks, managing national transport infrastructures, in central and local government officials and transport sector as a whole. The first phase of the program which was between 1993-1996, collected information on urban goods flow, diverse stakeholders view on urban transport, concerns, challenges, plans and suitable urban freight transport model (Visser *et al.*, 1999:23).

The second key element was the focus on innovations in city logistics, to provide businesses with a choice of efficient and sustainable solutions for their urban supply chain (Dablanc, 2011:9). The French embarked on assessment of urban freight movement and created a permanent urban freight transport monitoring system. The central goal was to quantify flow of goods in urban areas. The city logistics were also initiated to enhance efficient movement of freight in central business districts.

3.4.1.6 United States of America (USA)

The need for efficient freight transportation became a more pressing national issue. The US Department of Transportation (DOT) took cursory steps to address the improvement of freight mobility and assisting in freight planning. Table 3.3 displays specific actions that the DOT has taken to improve the freight mobility.

Table 3.3: Specific Actions of the DOT Regarding Freight, Since 2002.

Dot Action	**Description**
Finance Guidebook for Freight	Summarises the potential funding available for freight projects.
Freight Analysis Framework	Quantifies existing freight flows and forecasts future freight flows along national corridors and through international gateways
Intermodal Freight Technology Working Group	Cooperative effort of public and private stakeholders to identify and operationally test technology solutions to freight transportation issues.
Transportation Planning Capacity Building Program	Provides a source of information to state departments of transportation and MPOs. Through this program, information has been posted on how to include freight interests in the planning process.
Freight Professional Development Program	Offers training, education, technical assistance, and a resource library to assist state and local officials, as well as private stakeholders in freight transportation planning and systems.
Guide to Quantifying the Economic Impacts of Federal Investments in Large-Scale Freight Transportation Projects	Helps to ensure that freight projects are appropriately considered in national, regional, and state decisions about the future of transportation system investments.
Freight Industry Roundtable and Draft Framework for a National Freight Policy	The Freight Industry Roundtable outreach effort led to the creation of the Draft Framework for a National Freight Policy, which is a new policy initiative to address freight transportation concerns. Viewed as a living document, the Draft Framework is intended to stimulate discussion and local responses.

Source: Midioski (2013:2)

The USA has incorporated freight in all its transport planning, and guides all its government structures on how freight should be integrated in planning and has the capacity building programs for both private and public institutions. The studies undertaken proved that investment in transport infrastructure might increase, reduce production and boost economic growth (Tingting *et al.*, 2014:61).

The National Economic Council and the President's Council of Economic Advisers (2014:21), in making economic analyses of transportation infrastructure investment, acknowledged that improving and expanding America's freight transportation will supports economic growth and international competitiveness.

3.4.2 Freight in developing countries

The developing countries have moved on par with developed countries in tackling challenges of the urban goods transport, developing technologically advanced port facilities, airports, distribution centres, road and rail infrastructure (United Nations, 2013:66).

3.4.2.1 Brazil

More than 85% of Brazilians live in urban areas hence the importance of urban passenger land transport. Brazilian commuters living in cities use public or non-motorised transport for 70% of their trips and bus systems are a widely used mode of transport. The government invested billions of dollars in expanding urban public transport systems and in Sao Paulo this led to an increase of public transport use of 25% over the last four years alone (Messo, 2013:1). The trucks in Brazil are most common mode of road transport used to ferry freight and less is carried by other form of transport especially rivers and waterways. The only area using rivers and waterways as mode of transport is Amazon because of difficult access to some isolated villages (Brazil Government, 2013).

The growth in freight activities resulted in increasing of cargo tonnages, enhancing economic growth, putting pressure on transportation infrastructure and questioned its reliability in handling freight expansion. The period between 2006 and 2010 saw an increase of 20% in freight handled by all modes of transport in Brazil as measured in tonnes per year (Carlos *et al.*,2015:1).

In the analyses of services and performance of Brazilian economy, Arbache, (2014) noted that the Business services, Travel services and Transport services account for most of Brazil's services exports, with shares of 56%, 17% and 14% in 2013, respectively. While other large Latin American countries export mostly Transport services and Travel services, more than half of Brazilian exports are Business services, with large contributions from professional services such as Architecture, engineering and other technical services as well as legal, accounting and management consulting services. In addition, the composition of Brazilian services exports is somewhat similar to those observed in other large emerging economies, such as China and India.

Brazil Government (2013) developed National Plan for Logistics and Transport (PNLT) which intends to integrated all modes of transport that are roads, waterways, rail, ports and air over the next 20 years. They will invest in all modes of transport to increase transport and logistic competitiveness of Brazil.

3.4.2.2 China

The economy of China was decentralized from 1990s to a more of an open economy which is commercialized and competitive. This resulted in changing of movement patterns in particular freight and passenger volumes thereby putting more demand on transport infrastructure (Nogales, 2004:1).

The Beijing municipal logistics administration is composed of the Municipal Commission of Development and Reform, Traffic Management Bureau, Commission of Commerce and Environmental Protection. The Beijing municipality developed Transport Program in 2005 for the period 2004-2020, which will be guiding all transport activities including policies, plans, legislation and infrastructure investment (Dasburg-Trompe *et al.*, 2011:38). The program encourages improvement and efficiencies in road freight, logistics parks, freight hubs and discourages use of vehicles that pollutes air.

China has moved away from central command planning to market responsive planning. The development of Beijing Transport Development Programme (2004-2020) for its capital city was of utmost importance. It was aimed at guiding the formulation of transport policies, transport planning and implementation. The hosting of 2008 Olympic Games facilitated the establishment of Olympics logistics centres, which were later integrated to existing logistic resources.

In developing a vision for Canadian Council (2014), the Task Force on Transport and Economy recognized that China has become the most aggressive infrastructure investor in the world investing on average 8.5% of national GDP. The country increased railway by 54% in 2015 and planned by 2020 for 157% increase in expressways, 62% increase in airports and 132% increase in container terminal.

3.4.2.3 India

The challenge of urban freight in India has resulted into cities like Ahmadabad or Delhi restricting the trucks from entering the Central Business District during the day.

The trucks enters the cities only at night, as they move simultaneously massive traffic congestion is experienced and resulting into complications on the last mile (Thaller *et al.*, 2011:9).

The urban transport in Mumbai Metropolitan Region is governed by Municipal Corporation, Development Authority, Road Development Corporation, responsible for transport planning, road infrastructure and implementation of all transport related plans. This caused lack of coordination and planning on urban transport and transport infrastructure development, further complicated by different legislation governing the institution (Dasburg-Trompe *et al.*, 2011:38). The travel and transport patterns were ascertained in 2005, for Mumbai Metropolitan Region when Comprehensive Transportation Study was undertaken. The study also recommended various transport models, policies, strategies, infrastructure requirements and institutional arrangements up to the year 2031(Dasburg-Trompe *et al.*, 2011:38).

Planning Commission of India (2014:14) established that there is a close relationship between economic growth and infrastructure investment, with transport infrastructure investment being a significant component. The investment infrastructure of India is at 5.8% of the GDP and they planned to increase it to 8% of the GDP by the year 2032. The Ministry of Urban Development Government of India (2014), in its National Urban Policy it observed that as economic activities in cities expand and cities' populations grow, a considerable amount of freight traffic would be generated. The timely, efficient and smooth movement of such freight activities will be critical to the well-being of the people and the viability of the economic activities.

3.4.2.4 Russia

European Union (2011:5) cited that Russia has in 2005 adopted Transport Strategy of the Russian Federation to 2020 and extended the strategy in 2008 to 2030. The central objective of the study was promoting economic growth by investing in transport infrastructure with the later extension of the strategy putting more emphasis on transport logistic competitiveness and improving quality of life of its society. Gadelshinaa and Vakhitova (2015:250) observed that the construction and development of transport infrastructure in the country as a major element of the modernisation of regional and national economy.

The PriceWaterHouseCopper (2015) Transport and Logistics 2030 for emerging markets sees the transport and logistics industry as one of the key priorities for the economy of Russia. The Russian government has introduced laws to facilitate use of Public Private Partnership (PPP) to unlock private sector funding to finance, develop infrastructure projects and joint infrastructure ownership.

3.5 CONCLUSION

The movement of goods and people are essential elements of urban life. The urban transport must be structured in a way that meets both business and household needs to enhance daily traveling patterns. The freight transport provides required jobs and services to the urban economy. The negative impact like traffic congestion and pollution resulted in most cities and countries enacting laws, developing strategies to reduce such impact by freight transport on urban life. The literature review shows that there is a direct and indirect relationship between the transport infrastructure investment and economic growth. The underlying principle in both developed and developing countries is that freight transport serves the local and national economy and accompanies economic growth and transformation.

Table 3.4: Summery of key finding on literature review

Places	Key findings
Developed countries (Europe and America)	The efficient movement of freight adds value to goods or services, contributes to reduction of transport costs and logistics thus helping in economic development. The focus in developed countries is on managing urban freight and shifting from roads to other modes.
Developing countries (BRICS and Africa)	Also in developing countries investment in transport infrastructure was vital in unlocking economic opportunities. Increase in freight movement has resulted in most countries long developing plans and regulations to manage freight activities.

Source: Own compilation (2018)

The next chapter is aimed at providing an overview of policies, legislations and strategies that have been developed in South Africa since 1994 and have an impact on freight movements. It does not attempt to analyse all policies, but merely attempts to provide a brief overview of the existing framework of the most relevant important policies and strategies impacting on freight movement at National and Provincial level. Local Government freight considerations are contained in their Integrated Transport Plans (ITPs).

CHAPTER 4: FREIGHT POLICY ANALYSIS IN SOUTH AFRICA

4.1 INTRODUCTION

This chapter is aimed at providing an overview of policies, legislations and strategies that have been developed in South Africa since 1994, and that have an impact on freight movement activities as related to economic growth. It does not attempt to analyse all policies, but merely attempts to provide a brief overview of the existing framework of the most relevant important policies and strategies impacting on freight movement at National and Provincial level. Local Government freight considerations are contained in their Integrated Transport Plans (ITPs).

4.2 NATIONAL LEVEL

4.2.1 Constitution of South Africa (1996)

The Constitution of the Republic of South Africa (1996) contains, amongst others, the Bill of rights and the principles of co-operative government. It provides the basis for intergovernmental relations, the functional and funding mechanism of government and it provides the framework and principles for vertical integration between the various levels of government. An excerpt from the document states that this constitution is the supreme law of the republic, law or conduct inconsistent with it is invalid, and the obligations imposed by it must be fulfilled. The constitution empowers the provinces to pass legislation regarding areas of provincial concern. However, national legislation prevails over provincial legislation if the matter cannot be regulated effectively by the provinces individually or where uniformity across the country is required.

The provincial legislation should be consistent with national legislation, where contradiction occurs, national legislation supersedes the provincial legislation. Among functional areas of concurrent national and provincial legislative competence are (SA Government, 1996: schedule 4):

- Airports other than international and National airports.
- Public transport.
- Public works
- Regional planning and development.
- Tourism.

- Trade.
- Urban and rural development.
- Vehicle licensing.

National government and provincial governments have to support and strengthen the capacity of municipalities to manage their own affairs, to exercise their powers and perform their function. The constitution mandates the provinces to share responsibility with the national government for all matters impacting and regulating the economy and socio-economic development for a province (SA Government, 1996: schedule 4).

The national government provides the overall framework where it is in the national interest to have uniformity or where provinces cannot carry out the regulating function effectively, if it is done individually. A need for intensive and on-going co-ordination, communication and liaison among the different levels of government is critical for successful implementation of government programs across all levels. In summary, it can be said that Freight movement is a critical element of the economy and its co-ordination is vital among all spheres of government (SA Government, 1996: schedule 4).

There has not been a review or amendment of the constitution as far as the roles of the different spheres of the government related to transport functions. Their role as espoused in the constitution is still deemed as relevant, though material conditions have substantially changed from 1996.

4.2.2 White Paper on National Transport Policy (1996)

The White Paper on National Transport Policy, August 1996, reviewed all transport policy in existence at the time in order to ensure that transport would meet the need of all people within the constraints and resources of a changed South Africa. The relevant content for the freight strategy is summarised in the following paragraphs (Department of Transport, 1996:36):

The vision for South African Land Freight Transport is that of a system which will:

> "provides safe, reliable, effective, efficient, and fully integrated freight transport operations and infrastructure which will best meet the needs of freight customers at improving levels of service and at equitable cost in a fashion

which supports government strategies for economic and social development whilst being environmentally and economically sustainable”

Strategic objectives for Land Freight Transport are (Department of Transport, 1996:36):

- Development of a comprehensive land freight transport information system.
- Promotion and provision of seamless intermodal services.
- Optimise current capacity and maintain and develop the land freight transportation system.
- Prioritise issues in terms of sustainable economic and development needs.
- Finding practical and reasonable solution that leads to an equitable distribution of infrastructure, capital, management, operating and maintenance costs.
- Promotion of a strong, diverse, efficient and competitive transport industry, within the limits of sustainable transport infrastructure.
- Promotion of environmental protection and resource conservation, with specific reference to all aspects of transporting hazardous substances and goods.
- Enhancing the quality of freight services by providing transport customers with a safe, secure, reliable and cost-competitive system.
- Advancing human resources development and expanding participation in the freight industry through the creation and growth of entrepreneurial opportunities, training and skills development.
- Optimising road transport law enforcement.

The White Paper required establishment of consultative forum consisting of government, public and private sectors, operators, stakeholders to promote co-ordination, planning and active participation. The state owned enterprise Transnet, given its critical role on freight transport was required to have formal working relationship among itself, Departments of Transport and Public enterprises to promote co-ordinated planning, management and operations as related to freight transport. Airports and air freight policies in general policy aims to encourage competition, safeguard national interest where necessary, and encourage South African participation as much as possible (Department of Transport, 1996:36).

Government no longer sees its primary role as a provider of infrastructure, a transport operator and a regulator of bureaucracy. Instead, government plans to focus on policy and stresses the need for strategic planning. Government will seek to facilitate the coming together of key players in broader national strategies that could not be achieved singularly by any individual player (Department of Transport, 1996:2).The following observation is made with regard to the white paper, that the need for a national approach to a total freight system renders the provincial and local government role very important in many respects. It is likely that this lies at the heart of the fragmentation that exists in freight planning, despite the various co-ordination initiatives.

The white paper is still relevant as most of the policy proposals are only recently enacted with the National Land Transport Act in 2009 and its full implementation has recently started, with discussions of devolving functions of bus subsidy to local government sphere of government. The function is currently performed by the provincial sphere of government.

4.2.3 Moving South Africa (1998)

In September 1998 the Department of Transport completed the ambitious Moving South Africa (MSA) transport strategy project. MSA focuses on the strategic actions that are required to unpack the policy formulation of the 1996 White Paper on the National Transport Policy.

Since 1994, the government has been focussing on promoting value-added goods exports and increasing significantly, but the transport system is not reflecting these changes. MSA did not envision that this demand pattern would change and this formed the basis for the corridor vision for 2020 that involves the following (Department of Transport, 1998):

- A limited number of highly developed multi-modal corridors connected to a limited number of highly specialised ports.
- Two ports should focus on container traffic. International traffic should be sent to an eastern or western port depending on destination, because the ocean leg is the longest and most expensive leg of the freight journey.
- Lower density route lines should feed traffic into nodes and hubs.

- Transfers between modes must operate more efficiently.

The key strategic actions are (Department of Transport, 1998):
The Non-Transport National objectives must be made transparent, it is important to first accomplish the core function of the freight transport system namely, providing a low cost, highly reliable service with low transit times. Thereafter, the freight system can be used to target other national priorities and this must be done in a transparent manner and if any department needs the freight transport to perform a non-transport function, then the responsibility for funding it should fall outside transport. The Industrial and Transport Strategies should be aligned, new corridor developments should create standalone economies and not diminish the cargo densities with associated increases in cost on the existing corridors.

The Freight Transport System should be structured around the customer, historically the freight system was organised around the modes. The recommendation of the Moving South Africa report regarding user pays principle, explicitly indicates that customers must be charged the full cost of externalities and cross-subsidisation funding practices should be terminated. Management of differentiation, while the freight transportation system should endeavour to meet the needs of all customers, meeting the needs of any sub-sector should not compromise the economics of the main corridors and ports that constitute the backbone of the system.

4.2.4 National Freight Logistics Strategy (NFLS) (2004)

The NFLS was released in September 2005 by the Department of Transport (DoT) in recognition of the fact that freight and logistics have an impact on all segments of the economy it was developed within the Economic Cluster, under the leadership of the Department of Transport by an Inter-Departmental Task Team on Logistics (IDTTL). National Freight Logistics Strategy (NFLS)(2004) requires active role of private and public sectors in the provision of infrastructure, management and competitive environment for freight transport system (Department of Transport, 2004:3).

The vision requires that government take a more active role in regulating the freight system to ensure that the incidental costs of externalities and inefficiencies are not passed on to freight operators, but are appropriately apportioned. The NFLS goals are (Department of Transport, 2004:58):

- Increase capacity to move freight in South Africa.
- Reduced costs for the movement, storage, handling and processing of goods.
- Reduced transit, handling and processing time for goods.
- Increased access for all players in the industry.

Key priorities for intervention are as follows;

- The effective and transparent governance of the process.
- Integrated planning by public and private sector.
- Funding of the implementation.
- Integration of first and second Economy freight networks.
- Development and implementation of corridor strategies and the skills development in the sector (Department of Transport, 2004:3).

With regard to skills development, a national logistics Centre (NLC) proposed that it will function as a knowledge centre and also monitor logistics education offered at tertiary institutions. Planning must include the needs of not only the primary corridor (e.g. Durban to Gauteng), but also secondary distribution. It is only in 2015 that the National Land Transport Strategic Framework for 2015-2020 guides the transport planning authority on freight issues in their plans.

4.2.5 Road Freight Strategy for South Africa (2011)

The Road Freight Strategy for South Africa is intended to focus on the following issues (Department of Transport, 2011:3):

- Excess freight on the roads:

Reduce number of freight operators on the road to prevent further damage to road infrastructure and promote use of rail.

- Poor road conditions:

Inadequate funding has resulted into national, provincial and municipal authorities unable to properly maintain road infrastructure.

- Overloading and ineffective law enforcement:

Poor law enforcement, poorly operated weighbridge infrastructure encourages overloading.

- Slow regional integration:

The traffic congestion at South Africa's borders with neighbouring countries affect performance of freight transport industry.

- Poor road safety record:

The high number of accidents in South African roads also affect involves heavy vehicles.

The strategy aims to achieve the following strategic goals:

- Promote an optimal split between road and rail.
- Enable sustainable road infrastructure maintenance and funding.
- Curb overloading through the improvement of law enforcement and use of technology.
- Promote self-regulation.
- Promote regional economic and social integration
- Establish a system to collect freight data to support decision making and policy formulation.

4.2.6 National Land Transport Strategic Framework (2015-2020)

National Land Transport Strategic Framework (NLTSF) guides transport planning for both provincial and local government and sets goals, vision and objectives in each tier of government must seek to achieve (Department of Transport, 2015:3). The provincial government is required to develop Provincial Land Transport Framework (PLTFs) and local government the Integrated Transport Plans (ITPs) which both should include freight issues.

The NLTSF acknowledges impact freight movement activities to the economy. It requires the PLTF and ITPs in planning for freight transport to address the competition between the main land modes, road, rail, and pipeline and the modal imbalance by facilitating the potential mode shift between modes, basically to address road congestion, road safety, and logistics cost.

The objective of the NLTSF is:

- To serve as a five year framework for integrated land use and transport planning.

- To serve as an enabler of land use and transport planning aspects as guided by the National Development Plan (NDP) 2030.
- To provide the guiding principles that integrates various modes of land transport within the planning context of the NDP and support wider relevant national legislation and policy.
- To provide clarity and certainty about the transport planning priorities to enable effective decision-making about programmes and initiatives at all levels of government.
- To align transport to sustainable development.

4.2.7 Regional Distribution Centres

The Distribution centres in South Africa are privately owned and the decision on where to locate them is done at a firm level where they produce positive results for the firm. However, frequently they are located away from major transport interchanges and the work force, and they therefore contribute to system level inefficiency and congestion. Regional Management of the regional freight distribution system is necessary and calls for spatial planning that explicitly considers freight distribution, as well as detailed analyses of primary and secondary distribution system in the region, in order to come up with optimal regional solutions (Department of Roads and Transport, 2007:26). Many developed countries are following suit on consolidation of freight deliveries, before entering business district centres.

In Germany, development of Güterverkehrszentrums (GVZs or Cargo Traffic Centres) and City logistic were profound in changing approach to urban freight transport. GVZs are designed to create inter-regional networks between metropolis whereas City-Logistik want to arrange the delivery of goods within urban areas (Visser *et al.*, 1999:21). In the UK there has been introduction of Freight Consolidation Centres (Department of Transport, 2010:1) situated next to a town centre, shopping centre or construction sites, at which portion of cargo are consolidated and delivered to the target area. As trip congestion increases in most cities in South Africa, regional distribution will be critical in efficient freight movement of goods in urban areas.

4.3 PROVINCIAL LEVEL: GAUTENG PROVINCE

4.3.1 Gauteng's 25-Year Integrated Transport Master Plan

There has been extensive planning related to roads, public transport, rail, freight, air and Non-motorised Transport (NMT) done in Gauteng in the last decade by local, provincial and national governments. The Gauteng's 25-Year Integrated Transport Master acknowledged that work done in the last decade will in future have effect on Global City Region's transportation system (Department of Roads and Transport, 2013:33).

The overloading and supply chains are among constraints in Gauteng facing the freight logistic. The Department of Roads and Transport (2013) initiated the following medium term projects to expand on current and new logistic infrastructure (Department of Roads and Transport, 2013):

- Identification and prioritisation of the various freight hubs in the growth nodes.
- Establishing freight intermodal facilities on the eastern periphery of Gauteng.
- Developing efficient road linkages to the proposed freight hubs.
- Decreasing the number of heavy freight (5-and more axle) vehicles in the CBD.

A Transport Economic Regulatory Entity should be established to ensure economic efficiency; develop financing structures for strategic infrastructure; formulate incentives to develop the terminals; ensure improved operational integration of transport systems, inland ports and seaports; improve processes at borders; and to reduce externality costs. In the longer-term, adequate linkages and infrastructure should be provided to support the increased freight demand with the following (Department of Roads and Transport, 2013): First, provision of supporting infrastructure to freight intermodal facilities. Second, establishment of efficient intermodal terminals by Transnet on the periphery of Gauteng, these terminals must be able to accommodate container and palletised traffic. Third, in establishing the freight ring road concept, Gauteng has the opportunity to design the road infrastructure to accommodate abnormal loads. Currently, these loads are transported through the CBD and causes disruptions in the flow of traffic. Fourth, introducing the user pay system, this will make it more attractive for heavy vehicles

to use the freight road ring. The strategy is to create an environment for heavy vehicle operators to utilise the freight ring network and intermodal facilities. And lastly, a user-pays system in the CBD, to increase the cost of using those roads for heavy vehicles with 5 and more axles. A permit system could be introduced for 5 and more axle vehicles that need to use the internal network.

Implementation of any plans depends on institutional arrangements. Gauteng's 25-Year Integrated Transport Master Plan identified problems associated with the management and implementation of integrated, efficient and sustainable transportation systems across Gauteng, such as. The successful implementation of the Transport Master Plan will depend on the buy-in from municipalities in Gauteng, transport stakeholders outside government and availing of resources to implement the plan. The plan still needs necessary support from municipalities and transport stakeholders for its success.

4.4 LOCAL GOVERNMENT LEVEL: SEDIBENG DISTRICT MUNICIPALITY

4.4.1 Integrated Transport Plan (ITP)

The ITP requires the Sedibeng District Municipality to make assessment of freight transport in the district and develop freight logistic strategy to promote regional competitiveness among its trading areas and the province. The engagement with stakeholders will be crucial in achieving appropriate freight logistic strategy that support economic development and growth (Sedibeng District Municipality, 2008).

The absence of freight strategy in the region has prompted the ITP to recommend that such strategy should be developed and will take into account defining freight routes, accessibility to CBDs, overloading, times allowed for freight transport, traffic safety and movement of dangerous goods (Sedibeng District Municipality, 2008:170).

4.4.2 Growth and Development Strategy

In 2030 Sedibeng intends to lead to a "Metropolitan River City with a strong, diverse economy and high quality standard of living. It is a city success story, where all its residents will enjoy a healthy and safe environment and where everyone works, learns, earns and plays together"(Sedibeng District Municipality SDM, 2013:5).

In re-integrating the region to the rest of the country, the Growth and Development Strategy mentions linkages into Gauteng urban complex, Sasolburg as key advantages for freight transport logistics. The road and rail transport corridors, improved logistics support for industry, ICT (Information and Communication Technology) connectivity and residential development are focussed areas to develop and grow the economy.

4.5 CONCLUSION

The policy framework pertaining to freight at a national level focuses on creating a primary freight network consisting of nodes and corridors that functions excellently in a sustainable fashion, in order to meet the requirements of a growing economy. This back bone will support the socio-economic development objectives of government, such as the integration of the 1st and the 2nd economy, halving poverty, job creation, BBBEE, rural developments, as well as HIV and AIDS skills and environmental issues. The relative priority of each of the socio-economic criteria is not defined. When implementing freight projects, it is unlikely that all the criteria will be equally satisfied. The need for an approach to a nationally integrated freight transport system means the roles of provinces and other spheres are less well defined. The need for the various levels of government to co-ordinate and co-operate is essential in order to address the fragmentation that prevails despite various co-ordination initiatives.

The externalities must be brought into the cost of transportation of various modes and the user pays principle, must apply. The massive growth in road freight in South Africa, coupled with the relatively high level of investment in roads as opposed to rail, has resulted in certain cost and reliability levels for roads. These have significantly impacted the economy with businesses increasing their transport fleets or buying more road transport and reducing other logistics costs such as warehousing or lower inventories. Carefully considered holistic solutions need to be sought based on thorough multi-disciplinary system analyses, especially when strategic actions such as tolling or road users being charged for freight vehicles is planned. Additional costs incurred will be passed onto general consumers, resulting in economic and socio-economic detriment, such as higher prices for those who can least afford them,

global competitiveness could be further disadvantaged, and smaller SMME operators could be eliminated.

The next chapter deals with the research methodology applied in this study, as well as the design of the questions for the empirical research that was formulated and distributed to a selected group of traders, institutions and stakeholders. The chapter will also focus on the interpretation of the empirical research results, by means of quantitative and qualitative analyses.

CHAPTER 5: RESEARCH METHODOLOGY, RESULTS AND FINDINGS

5.1 INTRODUCTION

Getu and Yigzaw (2006:2) define research as a scientific examination intended at studying new facts, trying ideas and the methodological gathering, evaluation and interpretation of data to generate new knowledge and answer a certain question or solve a problem. While Walliman (2011:1) defines the research methods as the techniques used to do research and this includes tools needed to collect, sort and analyse the primary data and information needed to find conclusions.

Neuman (2011:310) associates primary data with surveys, interviews and questionnaires aimed at helping the researcher to ascertain what people think about the topic or subject. It is further argued that in survey research, one would usually sample many respondents and ask all the same questions. Kelley *et al.* (2007:261) define survey as the specific selection of a large sample of people from a pre-determined population, which is used to collect the data. The survey method was used in this study to collect information from the public and private sector organisations.

The main objective of the survey was to assess the freight movement activities in the Sedibeng District Municipality. In the public sector, the research sought to conduct a review on the roles and functions of government, regarding freight and logistics transport and freight movement activities in the region. While in the private sector, the research was ascertaining the nature and quantity of goods transported from the region to their destination. The institutional arrangement related to freight and logistics in both private and public sector, were also explored.

Secondary data was also collected, in order to determine the contribution of transport in the regional economy and freight data. The qualitative and quantitative research will be used in the study comprising of both primary and secondary data. The following section will describe the methodology and empirical part of the study, which will include the sampling frame, target population, sample method, sample size, as well as the measuring instrument for the collection.

5.2 EMPIRICAL STUDY

The empirical research methods, while it be used practically, it is often used in academic researches to collect data or through observations respond to a particular question (Moody, 2002:1). It comes up with conclusions capable of being verified with observations or experiment from the data collected (Sivasubramaniyan, 2012:4).

Data sources can be organized into various types. The most commonly used processes are observation, self-reporting (also called 'indirect observation'), archival sources or physical sources (Mouton, 2003:99). Examples of each category are presented in Table 5.1.

Table 5.1: A classification of data sources

Category	Examples
Observation	Systematic under controlled experimental or laboratory conditions.
	Participant observation in natural settings
Self-reporting	Personal and group face to face interviews
	Telephone interviewing
	Mail and electronic surveys
Archival/documentary sources	Historical documents, diaries, letters, speeches, literary texts, narratives, official memoranda, business plans, annual reports, medical records, etc.
Physical sources	Blood samples, cell tissue, chemical compounds, materials, etc.

Source: Mouton (2003:99).

The research method used to collect data in this study is primarily based on self-reporting questionnaires, directed to both public and private sector officials responsible for freight. The secondary data used in this study will be based on archival or documentary sources.

5.2.1 Target population and sampling frame

The target population in research is defined as all the cases in which the researcher would like to make generalisation, or it may be defined as the group of elements to which the researcher wants to make inference (Banjaree & Chaudhury, 2010:62). The information achieved from the specific sample is then useful for the generalisation about the entire population size (Ross *et al.*,2009:7).The target population used in this study are the companies contributing to the generation of

freight traffic in the region within the Sedibeng District Municipality, in the southern part of the Gauteng Province. The total number of companies or business that generate freight traffic are unknown and almost impossible to determine. It was decided that the possible accessible population was the top 20 transport generator businesses would be selected (SDM 2012). The businesses were generalised, and the target population did not have any specific demographic information which needed to be a target, but rather a random sample of various types of businesses within a specific geographical area. In addition, officials responsible for freight matters from provincial, regional and local government were also targeted.

5.2.2 Sample size

Shipman (1988:52) defines sampling as a systematic way of choosing a group small enough to study and large enough to be representative. Adequate sample size may be defined as the minimum number of respondents or participants which are needed for the identification of a statistically substantial change (Burmeister & Aiken, 2012:273).

The sample size of this study consists of 20 businesses within the Sedibeng District Municipality and 8 departments from province, district and local. The departments targeted were Transport, Economic, and Traffic and Roads so that each level of government has authority assigned to it.

5.2.3 Measuring instrument and data collection

Mbambo (2009:40) defines data as information obtained during the course of the investigation or study. The instruments used to collect such data are questionnaires, test, structured interview schedules and checklist. The mixed research method, consist of closed-ended and open-ended questionnaires, interviews and classroom observations. Zohrabi (2013:254) argues that quantitative are obtained through closed questionnaire while qualitative data through open ended questionnaire and developed based on research objectives.

The study will focuses on the collection of primary data, with the use of a structured, self-administered questions, where questions are structured in terms of the literature review and issues managed in comparable studies on the subject. The usage of these scales and questions allow for enough data to be collected to realize the primary objectives, as well as the empirical objectives of the study. The main aim of

the survey is to analyse and explore freight and logistics movement activities in the region, ascertain the nature and destination of goods transport, and institutional arrangement on freight management.

The questionnaire (Annexure E) aimed at private sector businesses, has three categories. The first section is the general information; the second section is distribution or procurement information; and the last statements or opinions. The questionnaire (Annexure A,B,C,D) directed to the public sector institutions, has questions exploring the role of Roads, Traffic, and Economic and Transport departments in relation to freight movement activities. Williams (2007:166) asserts that in respond to a particular research study both qualitative and quantitative methods, either separately or jointly can be applied. The quantitative research relates to statistical data while qualitative to data on logical descriptions of events.

5.4 RESULTS FROM SURVEY (PRIMARY DATA)

The questionnaires directed to public sector departments were different, because of the role and level of authority that each department and level of government has, as related to freight matters. The Roads, Economic, Transport and Traffic departments were relevant for the study. The top 20 businesses had the same standard questionnaires, in which feedback was required.

5.4.1 Road issues

The information was sought from Gauteng Provincial Roads Departments Director for Road infrastructure and planning and Managers from three (Emfuleni, Lesedi and Midvaal) local municipalities' departments responsible for the maintenance of roads. Issues analysed were design of roads, relations with freight operators, capacity of freight to handle heavy vehicles, road master plan and challenges of freight operators. The Sedibeng District Municipality is not a road authority nor does it have road master plan. There are no roads that they are required to maintain, however they do give support to locals, whenever funds are available to maintain and upgrade the roads network.

5.4.1.1 Design of roads

The road authorities were asked if they have roads designed for capacity of freight movement. Table 5.2 shows response of various institutions.

Table 5.2: Responses on design of roads regarding capacity for freight

Provincial	Emfuleni	Midvaal	Lesedi
Most provincial roads are designed to also allow heavy vehicles as most of the roads are used by freight operators to carry freight from major city centres and other provinces.	The roads are not specifically designed for freight or heavy vehicles. But certain classes (Class 3&4) of roads, in particular those of belonging municipality, can withstand movement of freight.	Roads are generally designed to take into account the nature of traffic they will attract, not necessarily only freight.	The design is general, just taking into account the nature of traffic it will generate.

Source: Survey Data (2016)

The road authorities were asked if the roads are design to carry freight transport in their areas and most authorities responded that the design of roads are not specifically designed for freight, but designed based on the nature and volume of traffic that the road will carry. This means that most roads in local municipalities are, therefore, not designed specifically to carry truck traffic, hence the deterioration of most roads in some local municipalities.

5.4.1.2 Relations with freight operators

The officials responsible for road maintenance were also asked if they have any relationship with freight operators in the areas. Table 5.3 shows the responses of road authorities on their relationship with freight operators.

Table 5.3: Responses on relations with freight operators

Provincial	Emfuleni	Midvaal	Lesedi
There are no such relations, but the transport directorate might have such relations.	There are no relations with freight operators. They only establish such relations whenever there are challenges of road damage and specific reference was made at Powerville, Vanderbijlpark and Duncanville industrial areas.	No relations with freight operators.	No relations with freight operators.

Source: Survey Data (2016)

All the road authorities do not have any relations with freight operators, except the Emfuleni Local Municipality who met with companies as the result of damage to road infrastructure.

5.4.1.3 Freight volume capacity

The officials were also asked about the capacity of the road network to handle freight volume and its impact on the road network. Table 5.4 shows responses on handling of freight volume by various road authorities.

Table 5.4: Responses on freight volume capacity

Provincial	Emfuleni	Midvaal	Lesedi
Most provincial roads can handle freight volumes. There are those roads, which are experiencing an increase in heavy vehicles, due to developments and increase in trade among major areas and provinces.	Most municipal roads are now faced with increased movement of trucks resulting into damage to the road network. This can be attributed to development in various commercial and industrial areas. Most industrial and commercial roads are damaged, especially those streets leading to	The municipal roads are faced with challenge of the increased volume of trucks resulting into damage to road network. The local municipality is growing fast, which at times outpace infrastructural development by the municipality.	There is a general concern on damage to road network by heavy vehicles. Only national and some provincial roads cope with the forever increase in trucks volume.

	those industries.		

Source: Survey Data (2016)

Most provincial roads have the capacity to carry freight volumes, while local municipality raised concerns over increased freight volume that results in damage to its road network. There are also admissions by road authorities that economic growth has outpaced responses of infrastructure provision and upgrading by the road authorities.

5.4.1.4 Responses on road master planning

The province and municipalities officials were requested to provide any road master plan that dedicated certain roads to freight vehicles. Table 5.5 shows responses of road authorities.

Table 5.5 Responses on road master plan

Provincial	Emfuleni	Midvaal	Lesedi
The province does have a road master plan, which also suggests upgrading of certain roads as increase in traffic volumes in foreseen.	The municipality has a road master plan and Pavement Management System, though not updated. The plan recommends upgrading of certain roads with no mention on freight operations.	There is a municipal road master plan, though outdated. But no specific mention or emphasise on freight transport or its impact.	There is a municipal road master plan, though it is outdated. No specific mention or emphasise on freight transport or its impact.

Source: Survey Data (2016)

All local municipalities have a road master plan, though outdated, and also mention less on freight transport. The province is the only institution that has a plan that indicates specific roads that need upgrading due to foreseen traffic volume increases in future.

5.4.1.5 Challenges on freight operations

The road authorities were also asked about the challenges of freight operations on road infrastructure and possible solutions to overcome. Table 5.6 shows road authorities' challenges on freight operations.

Table 5.6 Responses on challenges of freight operations.

Provincial	Emfuleni	Midvaal	Lesedi
The challenge is on those roads that are facing an increase in freight traffic volumes, resulting in an increase of maintenance costs. Such roads are identified for future upgrading.	The main challenge is damage to road network. This can be overcome through the restriction of heavy vehicles on certain streets and upgrading.	Damage to road infrastructure and inadequate funding.	Damage to road infrastructure and inadequate funding.

Source: Survey Data (2016)

The challenges on freight operations are damage to road infrastructure and inadequate funding.

5.4.1.6 Conclusion

The local authorities are facing an increase in freight traffic volumes on their road network. They have not kept in pace with increase in commercial and industrial developments in their areas. This resulted to damage to the road infrastructure that connect to individual properties. What seemed also lacking is the outdated road master plans that would have identified location of such roads and would have suggested future upgrading or alternative solutions. There are no relations with freight operators and communication is only limited to attending to problems raised by the operators on potholes or maintenance related problem.

The Provincial Roads Department has a plan and in-depth knowledge of the road network. The roads infrastructure at a Provincial level is relatively well maintained in spite of challenges faced by roads that suddenly experience an increase in freight volume due to industrial and commercial developments in some areas.

5.4.2 Economic issues

The questionnaire directed to Managers responsible for Economic Development departments sought to ascertain their knowledge on freight movement activities in the region and its impact on the regional economy. Information related to the inclusion of freight matters in strategic documents, relations with freight operators, data on the movement of goods in and out of the region, and challenges of transport logistics in the region.

5.4.2.1 Consideration of freight matters in strategic documents

The respondents were asked if there are any freight related matters considered in local economic development strategies or any other strategies, as found in their department. They were also asked about any intended plans or planning which will involve freight operators. Table 5.7 shows responses of authorities on freight strategic documents as it relates to freight.

Table 5.7 Responses on freight matters in strategic documents

Provincial	Sedibeng	Emfuleni	Midvaal	Lesedi
There are specific documents on freight, however in their strategic documents, it's generalised within the transport context. The GIFA (Gauteng Infrastructure Funding Agency) fund the feasibility study on Vaal Logistic Hub and other hubs in the province.	The strategic documents of the municipality that are Growth and Development Strategy and Spatial Development Framework mention Vaal Logistic Hub as a related matter to freight matters.	The LED strategy or any other documents do not specifically pay attention on freight matters as linked to economic development. It considers development of envisaged Vaal Logistic Hub as one of local economic game changers linked to Special Economic Zone.	There is no freight related matters in their strategic documents.	There is no freight related matters in their strategic documents.

Source: Survey Data (2016)

The Midvaal and Lesedi local municipalities do not have any freight related matters in their strategic documents. The Province, Sedibeng and Emfuleni Local Municipality have Vaal Logistic Hub in their strategic document as a catalyst project for economic growth in the region.

5.4.2.2 Data on movement of goods in and out the region.

The Economic Development Departments officials were requested to provide information on the movement of goods in and out of the Sedibeng Region and its economic impact. Table 5.8 shows responses of departments on the movement of goods in and out of the region.

Table 5.8 Responses on movement of goods in and out the region.

Provincial	Sedibeng	Emfuleni	Midvaal	Lesedi
There is no such information except the contribution of each sector of the economy to the Gross Domestic Products of the province. The Department of roads and transport might have such data.	No information available, except percentage of value of contribution of the general transport sector to the economy of the region.	No information.	No information.	No information.

Source: Survey Data (2016)

There is no data on movement of goods kept by the Economic Departments in municipalities. The province also does not have any information, and information on the movement of goods is kept by the Department of Roads and Transport.

5.4.2.3 The challenges of transport logistics

The respondents were asked about the challenges of transport logistics and possible solution to overcome them in the Sedibeng District region. Table 5.9 shows responses on challenges of freight logistics.

Table 5.9 Responses on challenges of transport logistics

Provincial	Sedibeng	Emfuleni	Midvaal	Lesedi
That has not been quantified or any study undertaken on that aspect. Maybe Roads and Transport have more information.	No study undertaken or strategic documents gives any details.	Unable to comment as there are not supportive documents or studies.	Unable to comment as there are not supportive documents or studies.	Unable to comment as there are not supportive documents or studies.

Source: Survey Data (2016)

There is no information obtained on the transport logistics and its challenges.

5.4.2.4 Conclusion

There is a general acknowledgement by all economic development departments that efficient movement of goods in and around the region plays an important role. In most strategies there is no specific focus or mention on transport logistics or freight movement activities as they relate to the economic development of the region. However, they considered freight movement as key in the province and will be incorporated and measured in their future strategies as done at the national level.

5.4.3 Law enforcement issues

The information was sought from Emfuleni, Lesedi, Midvaal and Provincial traffic departments' managers responsible for law enforcement in their respective areas. The Sedibeng District Municipality does not have a traffic department responsible for traffic matters in the district. The questionnaire was related to responsible department or person on freight matters, relations with freight operators, overloading facilities, freight vehicle restriction laws or regulations, traffic congestion, accidents involving trucks and freight challenges from law enforcement perspective.

5.4.3.1 Responsibility on freight matters

The respondents were asked if they have any department or person responsible for freight matter in their institution. Table 5.10 shows responses of law enforcement departments of various institutions.

5.10 Responses on freight matters

Provincial	Emfuleni	Midvaal	Lesedi
There is a dedicated specialised team that deals with all freight related matters, including overloading.	They do not have a specific person or department that deals with freight issues. Such issues are included in broader law enforcement acts and regulations as related to road traffic laws.	They do not have a specific person or department that deals with freight issues.	They do not have a specific person or department that deals with freight issues.

Source: Survey Data (2016)

Only the provincial department has a team responsible for freight issues. The overloading and weighbridges are monitored and managed by this team. The

municipalities do not have any person or team responsible for freight matters. Freight matters are handled as part of traffic officers' duties, with no special attention.

5.4.3.2 Relationship with freight operators

The respondents were asked if they have any relationship with freight operators regarding freight, transport or movement of goods. Table 5.11 shows responses of various law enforcement departments on relationship with freight operators.

5.11 Responses on freight operators

Provincial	Emfuleni	Midvaal	Lesedi
Freight operators come into contact with them at weighbridges, escorting abnormal loads and argument on imposition of traffic fines.	There is no formal relationship, only come into contact with freight operators when asked to escort abnormal loads or have a query on traffic fines.	There is no formal relationship, only come into contact with freight operators when asked to escort abnormal loads or have a query on traffic fines.	There is no formal relationship, only come to contact with freight operators when asked to escort abnormal loads or have a query on traffic fines.

Source: Survey Data (2016)

There is no relationship between law enforcement agencies and freight operators. Freight operators come to contact with traffic officials on fines queries, abnormal loads and weighbridges.

5.4.3.3 Overloading facilities

The respondents were asked if they have overloading facilities to check if freight operators have loaded goods according to allowed capacity of a truck. Table 5.12 shows responses in relation to overloading facilities.

5.12 Responses on freight overloading facilities

Provincial	Emfuleni	Midvaal	Lesedi
The Gauteng province has weighbridges in the province to prevent overloading of vehicles which contribute to the deterioration of road network. There are a number of	There are no overloading facilities in the area. The License Testing centres were sometimes used when they suspected that the truck is overloaded, but that has since stopped because trailers in a	Do not have any freight facility. Whenever there is a need, the provincial weighbridge along R59, is used.	The overloading facility or weighbridge they use is on N3. But they only weigh trucks if they are suspicious or see possible overloading. Because of distance, time and

weighbridges in Gauteng, owned by municipalities, province and SANRAL have 4 and operate all SANRAL facilities.	truck had to weight separately and later determined the entire weight of the truck. That was time-consuming and court dismissed most overloading traffic fines issued. The N3 and R59 have overloading facilities which are also used by provincial traffic officers.		process, they have since discontinued such operations, because at times they will take such effort and find that the truck is within the limits.

Source: Survey Data (2016)

The weighbridges are owned by Provincial Department and SANRAL on provincial and national roads in Gauteng. The municipalities make use of provincial weighbridges to check overloading by freight operators.

5.4.3.4 Freight vehicles restrictions

The respondents were asked if they have any by-laws, regulations or any other measures that restrict movement of freight vehicles in their areas of jurisdictions. Table 5.13 shows responses of various law enforcement agencies in relation to freight restrictions.

Table 5.13 Responses on freight vehicle restrictions

Provincial	Emfuleni	Midvaal	Lesedi
Most provincial roads have the capacity to handle free movement of heavy vehicles.	The Road Traffic Act guides the law enforcement agencies on how to deal with freight issues. The acts prohibit certain types of trucks from entering, for instance the CBD or residential areas, but due to poor signage the trucks cannot even see such signs.	Trucks are prohibited in residential areas. Fortunately, they do not have major challenge on freight issues due to relatively small area.	They also use the Road Traffic Act to guide them on how to deal with freight issues. Because of its relatively small area, they seldom had to deal with major challenges related to freight vehicle violations of traffic laws.

Source: Survey Data (2016)

Most provincial roads have a capacity to handle freight loads and have no restriction on its use by the trucks. Local municipalities have placed restrictions on trucks for certain roads and residential areas in particular. The challenge is on poor signage notifying freight operators of such restrictions.

5.4.3.5 Traffic congestion

The respondents were asked about contribution of freight to traffic congestion in their areas of jurisdictions. Table 5.14 shows responses on traffic congestion.

5.14 Responses on freight contribution to traffic congestion

Provincial	Emfuleni	Midvaal	Lesedi
During peak hours especially in the roads that are at the centre, north and east of Gauteng, they do experience traffic congestion by the freight trucks on national roads (N1,N3, N14) and provincial (R24,R59)	The freight vehicles contribute a lot towards traffic congestion, especially during peak hours in the morning and afternoon. At times takes a lot of parking or obstructs traffic when making deliveries.	Freight contribution to traffic congestion is when it blocks the traffic flow.	They experience traffic congestion during obstruction of streets as the result of vehicle breakdowns or deliveries which seldom happens.

Source: Survey Data (2016)

The freight transport contributes to traffic congestion during peak hours along the provincial roads. The local municipalities also face traffic congestion when vehicles deliver goods or trucks block streets.

5.4.3.6 Road accidents

The respondents were asked about contribution of freight to road accidents in their areas of jurisdictions. The below table, 5.15 shows responses of various law enforcement authorities on road accidents.

Table 5.15: Responses on freight contribution to road accidents

Provincial	Emfuleni	Midvaal	Lesedi
The heavy vehicle contribution to fatal accidents in Gauteng is not significant, but can be deadly. Heavy vehicles during last year, 2015, only amounted to 6% of the fatal road accidents.	They are not significant in residential areas and such it will be difficult to tell how much they contribute, because accidents are recorded without singling out freight vehicles. The provincial and national roads, in particular the R59, are areas that might have noticeable accidents involving freight vehicles.	They seldom come across accidents involving freight vehicles in residential, commercial and industrial areas. Only along the R59 when they had to attend to accidents involving heavy vehicles.	Accidents involving trucks are not significant in the municipal routes, but heavy on routes managed by province especially R23 to Balfour and R29 to Nigel, which all pass through municipal boundaries.

Source: Survey Data (2016)

The accidents experienced by freight operators are along the provincial roads. Roads managed by municipalities do not have a challenge on accidents involving trucks. However, there is a caution by authorities that accidents involving trucks can be fatal.

5.4.3.7 Challenges on freight operations as related to law enforcement

The respondents were asked about challenges of freight operations as related to law enforcement. Table 5.16 shows responses related to challenges of freight operations.

Table 5.16 Challenges on freight operations

Provincial	Emfuleni	Midvaal	Lesedi
The challenge is at times behaviour of drivers, particularly linked to fatigue. Overloading does happen, but freight operators are increasingly working within vehicle load limits. At times loading facilities are ignored by the freight operators.	The area has grown and in some cases next to residential areas, the road infrastructure and signage must take that into account before enforcing any restrictions. There is also a need for overnight freight facility because most heavy vehicles at night park in the CBDs.	At times there is a tendency of freight operators to deliver goods outside the working hours of law enforcement and ignorance of restrictions where signage is put.	The main challenge is freight avoiding toll gates and passes through municipal infrastructure, thereby causing traffic congestion and damage to road infrastructure. Ignoring signage by truck operators is also a challenge.

Source: Survey Data (2016)

The local municipalities have a major challenge on damage to municipal roads infrastructure by trucks. Freights operators also use restricted areas and CBDs as overnight freight facility.

5.4.3.8 Conclusion

The provincial law enforcement agencies are capacitated to deal with any freight challenges that might surface. They also have weighbridges in the strategic road network though they will like to increase, because of increasing volume of freight vehicles on other roads. The municipalities are generally incapacitated to deal with issues of freight in their jurisdiction. They do not have weighbridges, they have poor road signage, and the increased commercial and industrial development that outpaced road network and restrictions.

5.4.4 Transport issues

The response on the transport issues were from the officials in the Provincial Department of Roads and Transport and Sedibeng District Directorate on Transport. Local municipalities in the district do not have a competency on transport planning, however, the region is obliged by law to contact them before finalising regional transport plans. The questionnaire requested information on whether there is a division or people responsible for freight issues, relations with freight operators,

freight databank, and incorporation of freight issues in Integrated Transport Plans (ITP), dedicated freight facilities, freight master plan and challenges of freight operators.

5.4.4.1 Department or person responsible for freight matters

The Provincial Department of Roads and Transport and Sedibeng District Municipality are only institutions assigned to perform transport function in the region. The respondents were asked if they have any Department, division or any person responsible for freight matters. Table 5.17 shows responses from both the region and province.

Table 5.17 Responses on department or person responsible for freight matters

Sedibeng	Province
There is no department or anyone responsible for freight issues.	They have a department and officials responsible for freight issues in the province.

Source: Survey Data (2016)

Only the province has a department responsible for freight issues across the province.

5.4.4.2 Relationship with freight operators

The respondents were asked if they have any relationship with freight operators in the region regarding freight, transport or movement of goods. Table 5.18 shows responses on relationship with freight operators.

Table 5.18 Response relationship with freight operators

Sedibeng	Province
There is no relationship with freight operators in region.	The province has a relationship with freights operators. There is continual engagement with freight operator's organisation that is Road Freight Association, on issues affecting operators in the province. And effective and efficient movement of goods in the province.

Source: Survey Data (2016)

The Sedibeng District Municipality does not have a relationship with freight operators, while the province has such relationship with freight operators' organisation, the Road Freight Association.

5.4.4.3 Freight databank

The respondents were asked if they have freight databank where all movement of goods in the region are recorded. Table 5.19 shows responses by both institutions on freight databank.

Table 5.19 Response on freight databank

Sedibeng	Province
The municipality has never undertaken any study on freight issues or collecting data on movement of freight in the region. However, the province has taken some studies related freight in the province which included the region. The number of heavy which is the data we have can give a glimpse of freight movement in the region. They contribute to about 32% of vehicle population.	There is currently a process undertaken to develop freight databank for the province. In June 2016 there was a traffic count on heavy vehicles along major provincial roads. In Sedibeng the counts between Alberton and Vereeniging along the R59 had most vehicles, followed by the N3 and R554.

Source: Survey Data (2016)

The freight databank is in the process of being updated. However, in June 2016 traffic counts were conducted in the region.

Figure 5.1 shows daily movement of trucks along provincial roads that are in Sedibeng District Municipal area.

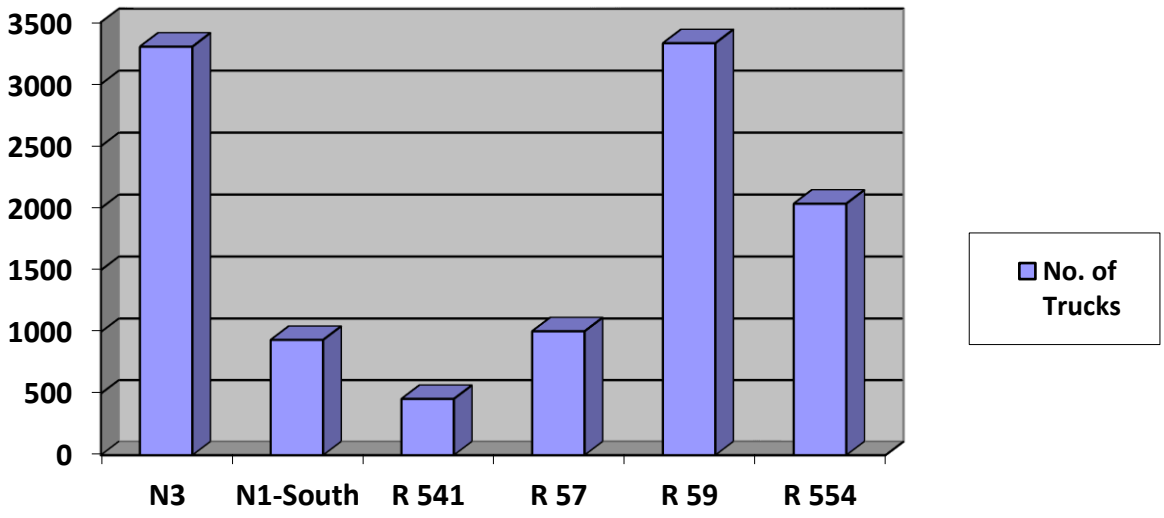


Figure 5.1 Freight movements along provincial roads: June 2016 Source: Survey Data (2016)

The heavy vehicle traffic counts are along N3 at Heidelberg TCC, N1 south at Grassmere Plaza, R541 between Villiers and Vereeniging, R57 between Vereeniging and Sasolburg, R59 between Alberton and Vereeniging, R554 between Heidelberg

Road and Osborn road. The total of registered vehicles that are licensed and those not licensed in Sedibeng is 287 392, and 93 221 are light and heavy load vehicles of which their Gross Vehicle Mass (GVM) is equals to and greater than 3500kg (Sedibeng District Municipality, 2016).

Figure 5.2 shows registered licensed and unlicensed vehicles in Sedibeng, with loading vehicles at 32%, passenger vehicles carrying more than 12 at 1%, passenger vehicles carrying less than 12 at 58%, minibus vehicles at 3% and others 6%.

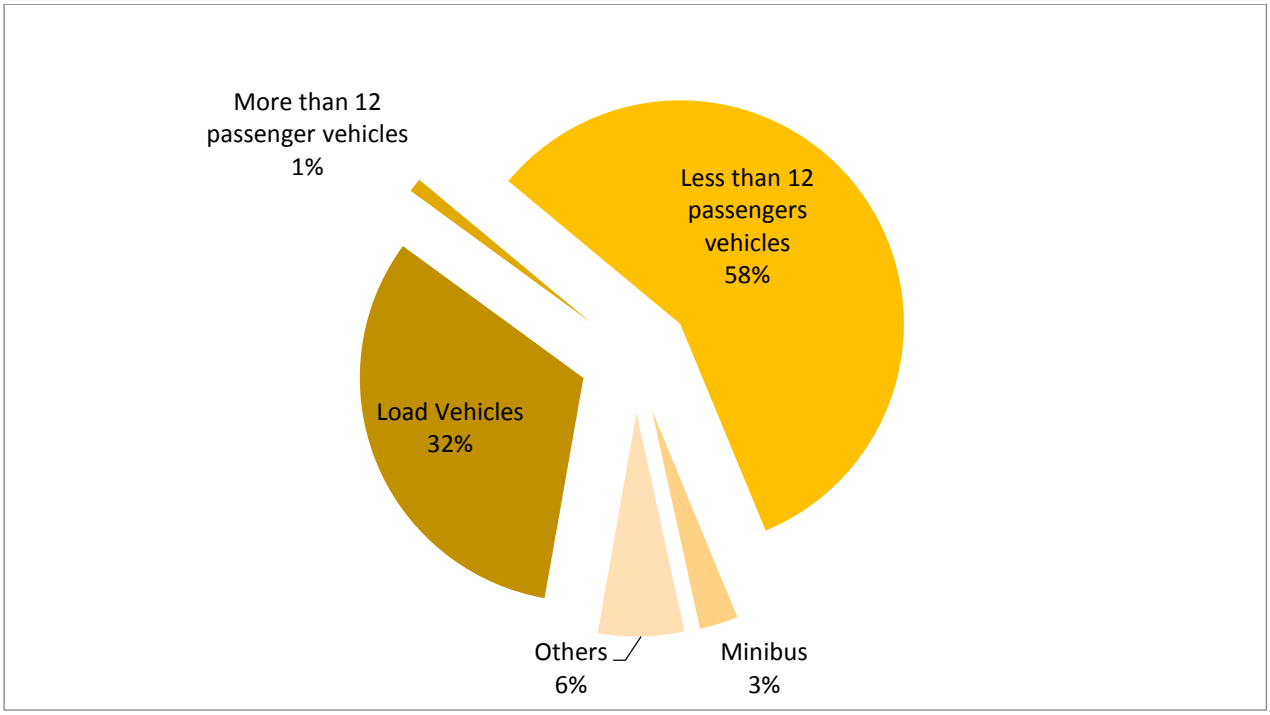


Figure 5.2 Proportion of Sedibeng vehicles population Source: Survey Data (2016)

5.4.4.4 Incorporation of freight issues in the Integrated Transport Plan (ITP)

The respondents were asked if they have the Integrated Transport Plan (ITP) that incorporated freight issues. Table 5.20 shows responses incorporation of freight issues into transport planning by both institutions.

Table 5.20: Responses on ITP

Sedibeng	Province
The ITP has identified a gap on freight issues and requested assessment, incorporation and study on freight issues in the next cycle of the ITP.	The 25 year Integrated Transport Master Plan has identified four clusters that need intervention, which are land use development, strategic public transport network, and freight transport and road network. Therefore, this shows that freight issues are incorporated in provincial-wide integrated transport plans.

Source: Survey Data (2016)

Both Sedibeng and Gauteng Province have recognised a need to incorporate freight issues in Transport planning with Province going into detail in its Integrated Transport Master Plan.

5.4.4.5 Freight facilities

The respondents were asked if they have dedicated freight facilities for trucks. Table 5.21 shows responses on freight facilities by both province and the region.

Table 5.21 Response on freight facilities

Sedibeng	Province
The CBD and Vereeniging in particular have a number of trucks that park overnight. Various businesses have approached the municipality complaining about that and also offering solutions. The municipality partnered with province on Vaal Logistic Hub.	The province has identified a need to have freight hubs across the province. In Sedibeng Municipality, a feasibility study on freight logistics has been undertaken.

Source: Survey Data (2016)

There are no freight facilities in the region owned by the government. But there is currently a feasibility study on Vaal Logistic Hub.

5.4.4.6 Freight Plan

The respondents were asked if they have any Freight Plan that includes movement of dangerous goods in the region. Table 5.22 shows responses on freight plan by both Sedibeng and Gauteng Province.

Table 5.22 Response on freight plan

Sedibeng	Province
There is no freight plan. However, the ITP has recommended that the region should develop a freight plan for the region.	25-Year Integrated Transport Master Plan includes a freight logistic plan, which requires developing of certain logistics infrastructure, which among others includes logistics hubs, weighbridges, and rail and air cargo infrastructure.

Source: Survey Data (2016)

The province in its Integrated Transport Master Plan has a freight plan which recommends how the province should handle issues of freight. The Sedibeng District Municipality does not have a freight plan.

5.4.4.7 Challenges of freight operations

The respondents were asked if they have any challenges of freight operations and possible solutions to overcome them in the Sedibeng District region. Table 5.23 shows responses of both region and province on freight challenges.

Table 5.23 Responses on challenges of freight operations

Sedibeng	Province
Damage to road infrastructure, overnight parking in CBDs, traffic congestion as the result of blocking of streets. Freight plan will go in detail on how we resolve the challenges.	Contribution by heavy vehicle to Traffic congestion in all major routes. Damage to road network roads not are upgraded and experiencing an increase in the number of heavy vehicles. The major challenge is in decreasing the number of heavy vehicles on the road and shift road freight traffic to rail.

Source: Survey Data (2016)

The challenge at regional level is damage to road infrastructure, overnight parking and congestion in CBD caused by trucks. While the province has a vision of moving freight from road to rail, in an attempt to reduce traffic congestion and damage to road network.

5.4.4.8 Conclusion

The province has developed a freight logistic plan that forms an integral part of the total planning process in their 25 year Integrated Transport Master Plan. The plan outlines the profile of freight in the province and planned infrastructure to support

effective and efficient movement of goods in Gauteng. The Sedibeng District Municipality lacks strategies and studies on freight transport. However, the ITP has noticed the gap and also the lack of details in the provincial freight plan. The registration of vehicles shows that there are significant loading vehicles which are a third of a total population of registered vehicles in Sedibeng.

5.4.5 Industrial and commercial survey

A questionnaire was developed for the survey of the top 20 companies, which sought to understand the nature of industry, type of goods carried, origin and destination, infrastructure used and tonnes carried. The major challenge in submission of the questionnaire was procedures and protocols that were associated in completing the questionnaire, as most companies were cautious on the sensitivity of information they will give. In other companies meetings with senior management were convened, to ensure that they clearly understand the main objective of the study.

The method used to receive the results was person-to-person interviews and the collection of completed forms and in others e-mails received from the respondents. Other companies had to be replaced, because they do not generate adequate freight traffic, outside the jurisdiction of Sedibeng, relocated to Johannesburg in terms in operation where there was difficulty in getting information from their head office. While doing the research, others were included because they contribute significantly in freight movement activities, which was not foreseen when proposal was made on freight generators companies.

5.4.5.1 Type of business

The companies were requested to provide information on the type of business they are conducting. Table 5.24 shows various types of businesses interviewed.

Table 5.24 Responses on type of business

No	Name of Company	Type of business
1	Glen Douglas Dolomite (Pty) Ltd	Quary/Mining
2	Malesela Taihan Electric Cabble (Pty) Ltd	Cable manufacture
3	Clotan Steel (Pty) Ltd	Steel trader
4	KWS Carriers	Transport
5	AfriSam South Africa	Construction
6	PC van Rensberg Transport	Transport of bulk materials
7	DCD Heavy Engineering	Heavy Engineering/Manufacturing
8	Vision Transport	Transport
9	Bophelong Bricks (Pty) Ltd	Brick Manufacture
10	Lime Distributors (Pty) Ltd	Manufacturing and Transportation
11	Karan Beef	Agriculture Feedlot
12	Pro Roof Steel Merchants	Steel manufacturing
13	Air products South Africa	Gas Industry
14	Nampak Products Limited	Packaging Manufacturer
15	PBD Boeredienste	Manufacturing of fertilizer
16	Cape Gate (Pty) Ltd	Steel and Wire Manufacture
17	ABI	Fast Moving Consumer goods
18	Vanderbijlpark ARCELLOR MITTAL	Steel manufacturing
19	African cables	Manufacture of electrical cables
20	Delta Bricks	Brick Manufacturer

Source: Survey Data (2016)

Figure 5.3 shows percentage summary of respondents' type of businesses.

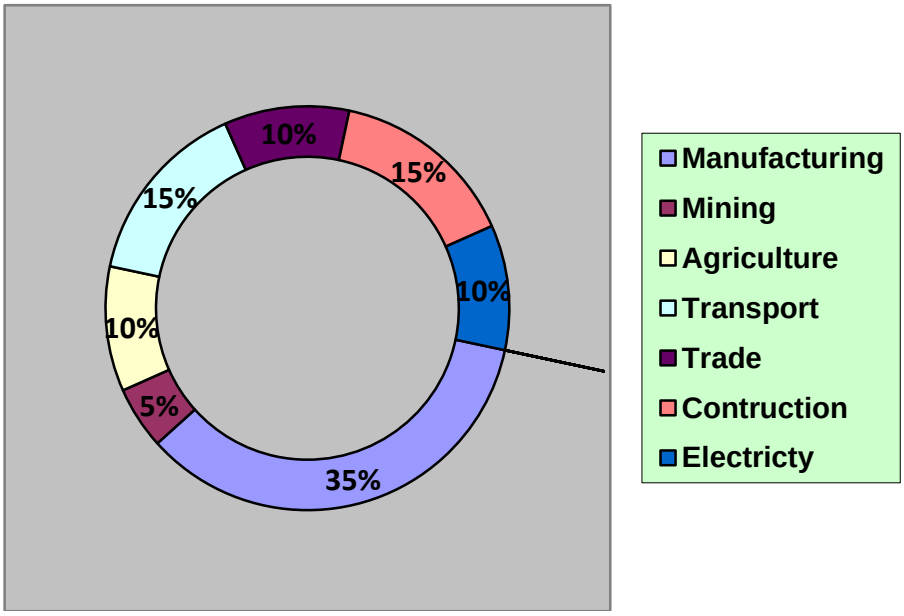


Figure 5.3 Types of businesses Source: Survey Data: 2016

The manufacturing sector had the highest response at 35% on companies responded, followed by transport and construction at 15% each, agriculture, trade and electricity at 10% each and mining at 5%.

5.4.5.2 Size of business

The respondents were requested to share information on the size of their business, taking into account both number of full-time employees and total turnover.

Table 5.25 shows how the size of business was determined.

Table 5.25 Size of business

Size	Number of employees	Total Annual turnover
Large	More 200	More than R40 million
Medium	More than 50 but less than 200	More R10 million but less than R40 million
Small	More than 10 but less than 50.	More R4 million but less than R10 million

Source: Grobler (2006)

Table 5.26 shows size of business for each company surveyed.

Table 5.26 Response on size of business

No	Name of Company	Size of business
1	Glen Douglas Dolomite (Pty) Ltd	Large
2	Malesela Taihan Electric Cabble (Pty) Ltd	Large
3	Clotan Steel (Pty) Ltd	Large
4	KWS Carriers	Medium in terms of employees but large in turnover
5	AfriSam South Africa	Large
6	PC van Rensberg Transport	Medium in terms of employees but large in turnover
7	DCD Heavy Engineering	Large
8	Vision Transport	Medium
9	Bophelong Bricks (Pty) Ltd	Medium
10	Lime Distributors (Pty) Ltd	Medium
11	Karan Beef	Large
12	Pro Roof Steel Merchants	Large
13	Air products South Africa	Large
14	Nampak Products Limited	Large
15	PBD Boeredienste	Medium
16	Cape Gate (Pty) Ltd	Large
17	ABI	Medium
18	Vanderbijlpark Arcelor Mittal	Large

19	African cables	Large
20	Delta Bricks	Medium

Source: Survey Data (2016)

Figure 5.4 shows that most respondents were large companies, followed by medium companies.

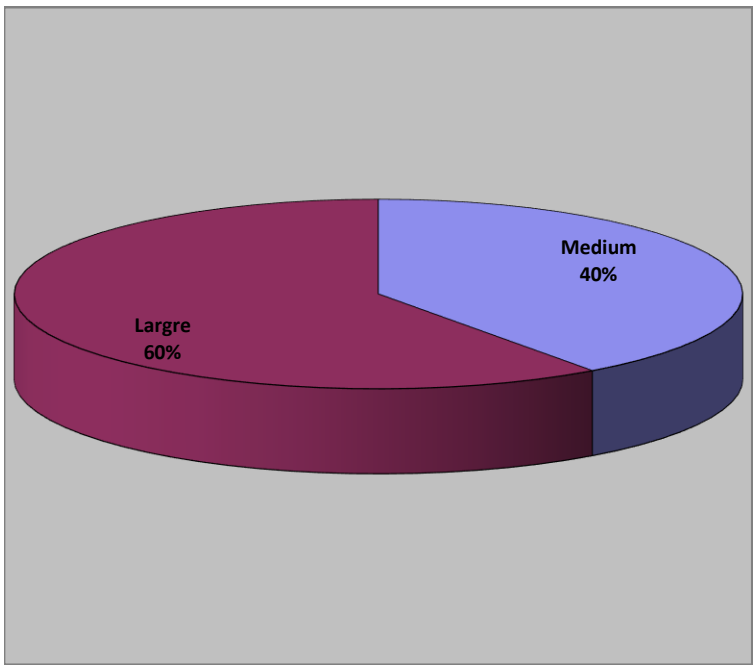


Figure 5.4 The respondents' size of business. Source: Survey Data (2016)

Most respondents represented large companies constituting 60% of those surveyed with medium companies at 40% and none were from the small companies.

5.4.5.3 Period of business existence

The respondents were asked about the duration of their business' existence. Table 5.27 shows the number of years surveyed companies were in business.

Table 5.27 Response on period of business existence

No	Name of Company	Number of years
1	Glen Douglas Dolomite (Pty) Ltd	Longer than 10 years
2	Malesela Taihan Electric Cabble (Pty) Ltd	Longer than 10 years
3	Clotan Steel (Pty) Ltd	Longer than 10 years
4	KWS Carriers	5 to 10 years
5	AfriSam South Africa	Longer than 10 years
6	PC van Rensberg Transport	Longer than 10 years
7	DCD Heavy Engineering	Longer than 10 years
8	Vision Transport	Longer than 10 years
9	Bophelong Bricks (Pty) Ltd	Longer than 10 years
10	Lime Distributors (Pty) Ltd	Longer than 10 years
11	Karan Beef	Longer than 10 years

12	Pro Roof Steel Merchants	Longer than 10 years
13	Air products South Africa	Longer than 10 years
14	Nampak Products Limited	Longer than 10 years
15	PBD Boeredienste	Longer than 10 years
16	Cape Gate (Pty) Ltd	Longer than 10 years
17	ABI	Longer than 10 years
18	Vanderbijlpark ARCELLOR MITTAL	Longer than 10 years
19	African cables	Longer than 10 years
20	Delta Bricks	Longer than 10 years

Source: Survey Data (2016)

Figure 5.5 shows the period that the respondents have been in business.

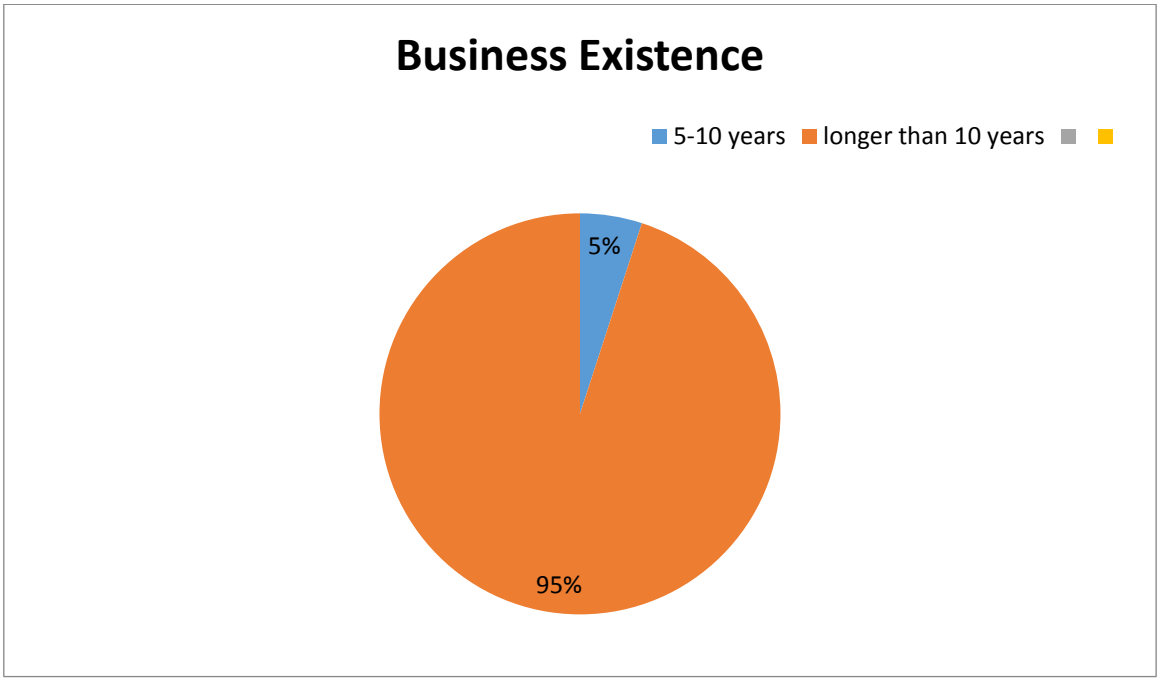


Figure 5.5 Period of business existence. Source: Survey Data 2016

Most companies (95%) surveyed have been in business for more than ten years, while 5% were between 5-10 years.

5.4.5.4 Responsibility on freight matters

The respondents were asked if they have a department or person responsible for freight matters in the company. Table 5.28 indicates the freight functional responsibilities by various companies.

Table 5.28 Response on responsibility on freight matters

No	Name of Company	Freight responsibility
1	Glen Douglas Dolomite (Pty) Ltd	Has freight department (procurement and sales).
2	Malesela Taihan Electric Cabble (Pty) Ltd	Has despatch department responsible for packaging and distribution of final products.
3	Clotan Steel (Pty) Ltd	Has freight division.
4	KWS Carriers	Yes, has freight department.
5	AfriSam South Africa	Yes, has logistics department responsible for transportation.
6	PC van Rensberg Transport	Yes, is their competency of moving goods.
7	DCD Heavy Engineering	Yes, Have a person responsible for freight related matters.
8	Vision Transport	Yes, it is a dedicated transporter.
9	Bophelong Bricks (Pty) Ltd	Yes, has a person responsible for transport co-ordination.
10	Lime Distributors (Pty) Ltd	Yes, have a Head of Department for Logistics situated at their head Office.
11	Karan Beef	Yes, they have department and person responsible for freight matters.
12	Pro Roof Steel Merchants	Yes, they have a person and department responsible for freight related matters.
13	Air products South Africa	Yes, they have a person and department responsible for freight related matters.
14	Nampak Products Limited	Yes, have Group logistics Procurement.
15	PBD Boeredienste	Yes, have employees responsible road transport deliveries.
16	Cape Gate (Pty) Ltd	Yes, have own fleet and transport.
17	ABI	Yes, have Logistic department.
18	Vanderbijlpark Arcelor Mittal	Yes, has logistic department.
19	African cables	Yes, have logistics.
20	Delta Bricks	Yes, have person responsible for freight matters.

Source: Survey Data (2016)

All the respondents indicated that they have Logistics Departments or someone responsible freight activities in the businesses.

5.4.5.5 Fleet to transport goods

The respondents were asked if they have any vehicles of their own to transport goods they produce. Table 2.29 shows responses from various companies on whether they have their own vehicles.

Table 5.29 Responses on fleet to transport goods

No	Name of Company	Fleet
1	Glen Douglas Dolomite (Pty) Ltd	No fleet to transport goods. Make use of sub-contractors or some customers collect.
2	Malesela Taihan Electric Cable (Pty) Ltd	No fleet. Fleet outsourced from 1ton to Superlink. They make use of sub-contractors.
3	Clotan Steel (Pty) Ltd	Yes, has its fleet of about 200 ranging from sedan to delivery trucks of which 90 are heavy vehicles.
4	KWS Carriers	Yes, combined with sub-contractors diesel tankers and tippers.
5	AfriSam South Africa	No, all vehicles outsourced. Make use of sub-contractors.
6	PC van Rensberg Transport	Yes, have 40 horse and trailers.
7	DCD Heavy Engineering	Yes, having two vehicles, tri-axle and twin axle for loads less than 30 tons. For loads above 30 tons use sub-contractors.
8	Vision Transport	Yes, has fleet as dedicated transporter.
9	Bophelong Bricks (Pty) Ltd	No, make use of sub-contractors.
10	Lime Distributors (Pty) Ltd	Yes, they have their own vehicles to transport their products.
11	Karan Beef	Yes, they have their own fleet to transport final products.
12	Pro Roof Steel Merchants	Yes, have their own fleet but also make use of sub-contractors.
13	Air products South Africa	Yes, have their own fleet.
14	Nampak Products Limited	No, make use of sub-contractors.
15	PBD Boeredienste	Yes, for internal transport requirements, but make use of sub-contractors for external.
16	Cape Gate (Pty) Ltd	No, make use of sub-contractors.
17	ABI	Yes, have own vehicles delivering to merchandise and sub-contractors delivering to customers.
18	Vanderbijlpark Arcelor Mittal	No, make use of sub-contractors.
19	African cables	No, make use of sub-contractors.
20	Delta Bricks	No, make use of sub-contractors.

Source: Survey Data (2016)

Figure 5.6 shows that the majority of companies (50%) have outsourced transportation of goods, 35% have their own fleet and 15% use a combination of sub-contractors and their fleet.

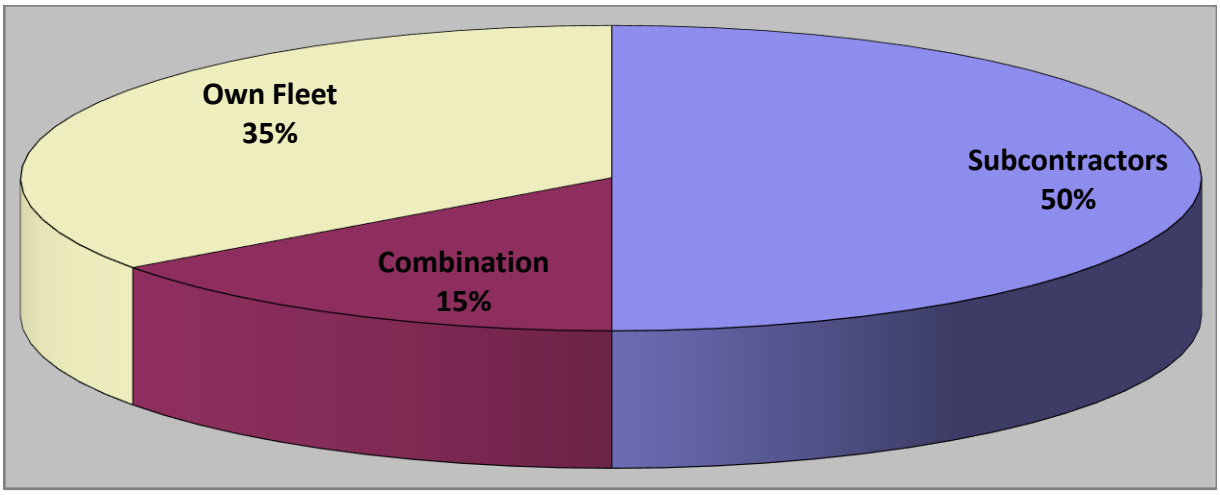


Figure 5.6 Transportation of goods Source: Survey Data (2016)

5.4.5.6 Goods transported or distributed (Outbound)

The respondents were asked about the volume of goods that they transport or distribute per annum. Table 5.30 indicates volumes of goods handled by each company surveyed.

Table 5.30 Response on goods transported or distributed.

No	Name of Company	Goods transported or distributed
1	Glen Douglas Dolomite (Pty) Ltd	Sand and stone 1 500 000 tons
2	Malesela Taihan Electric Cable (Pty) Ltd	Final products 18 000 tons
3	Clotan Steel (Pty) Ltd	Steel plus-minus 120 000 tons
4	KWS Carriers	Mining commodities 3 967 800 tons
5	AfriSam South Africa	Bulk 600 000 tons, bags 45 000 tons
6	PC van Rensberg Transport	Sand, Chrome, coal 600 000 tons
7	DCD Heavy Engineering	Mills, Winders, Reclaimer Drums etc, 25 000 tons
8	Vision Transport	Solvents oil and tons not disclosed
9	Bophelong Bricks (Pty) Ltd	Bricks/Paving Plus minus 90 000 000 tons
10	Lime Distributors (Pty) Ltd	300 000 tons of lime
11	Karan Beef	Calves 180 000 tons, Beef sales 100 800 tons
12	Pro Roof Steel Merchants	Plus-minus 66 000 tons of steel
13	Air products South Africa	Plus-minus 360 000tons of liquid gas
14	Nampak Products Limited	Plus-minus 2 200 000 tons of packaging

15	PBD Boeredienste	60 000 tons Fertiliser bagged
16	Cape Gate (Pty) Ltd	200 000 tons steel, 100 000 tons wire
17	ABI	Beer and spirits 15 600 000 million tons
18	Vanderbijlpark Arcelor Mittal	Steel 2 200 000 tons
19	African cables	30 993 tons of cable
20	Delta Bricks	Bricks 3 360 000 tons

Source: Survey Data (2016)

Table 5.31 shows total tonnage of goods transported out of the region per sector.

Table 5.31 Tonnage per sector by top 20 freight companies

SECTOR	TONNAGE PER ANNUM
Manufacturing	5 451 000
Mining	1 500 000
Agriculture	340 800
Transport	4 567 800
Trade	15 720 000
Constructions	93 360 000
Electrical	48 993
TOTAL	120 939 600

Source: Survey Data (2016)

Figure 5.7 shows the volume of goods transported per sector of the top 20 companies surveyed.

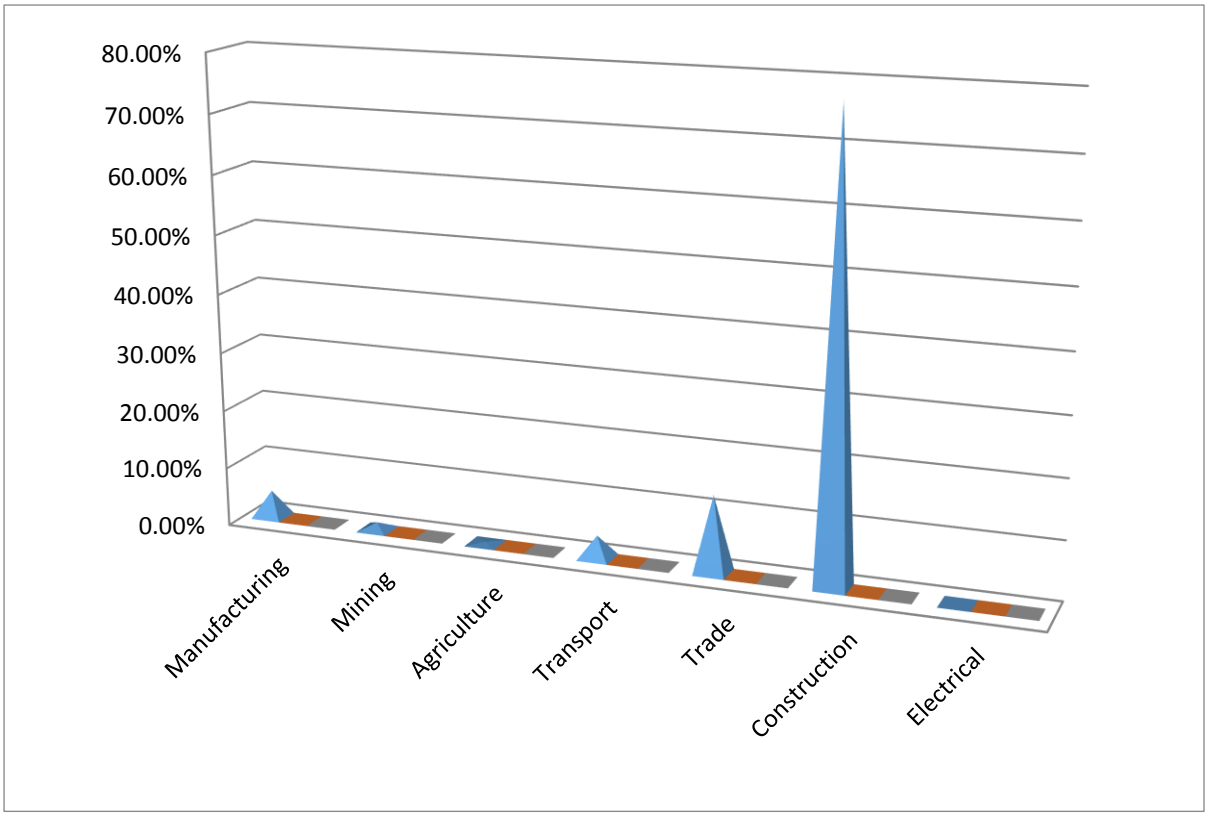


Figure 5.7 Goods Transported (Outbound)

The construction sector is the largest sector transporting goods out of the region at 77% of the total businesses survey, followed by trade at 13%, manufacturing at 4.5%, transport at 3.78%, mining at 1.25% and agriculture at 0.28% and electrical which is almost negligible in tonnage transported.

5.4.5.7 Goods procured or received (Inbound)

The respondents were asked about the volume of goods they procured or received per annum. Table 5.32 indicates volume of goods received by top 20 companies surveyed.

Table 5.32 Responses on goods procured or received (Inbound)

No	Name of Company	Goods procured or received
1	Glen Dougle as Dolomite (Pty) Ltd	General goods. 150 tons
2	Malesela Taihan Electric Cable (Pty) Ltd	Raw material. 17 533 tons
3	Clotan Steel (Pty) Ltd	Steel 120 000 tons
4	KWS Carriers	None
5	AfriSam South Africa	600 000 tons
6	PC van Rensberg Transport	None
7	DCD Heavy Engineering	Steel plates 9 000 tons
8	Vision Transport	None
9	Bophelong Bricks (Pty) Ltd	Raw material 90 000 tons
10	Lime Distributors (Pty) Ltd	300 000 tons of lime
11	Karan Beef	Calves 000 tons, Feedlot ingredients 560 000 tons
12	Pro Roof Steel Merchants	70 000 tons of steel
13	Air products South Africa	1305,96 tons of liquid gas
14	Nampak Products Limited	48 000 tons of raw material
15	PBD Boeredienste	60 000 fertiliser (bulk and bagged)
16	Cape Gate (Pty) Ltd	500 000 raw material
17	ABI	Beer and Spirits 18 million tons
18	Vanderbijlpark Arcelor Mittal	Raw material 870 500 by rail Raw materials 5 800 000 million tons by Rail
19	African cables	Raw materials 31 000 tons
20	Delta Bricks	Ash and cement 189 520 tons

Source: Survey Data (2016)

Table 5.33 shows the total number of goods procured or coming to the region by each sector of the top 20 companies surveyed.

Table 5.33 Goods procured/Received (Inbound)

SECTOR	TONNAGE PER ANNUM
Manufacturing	7 727 400
Mining	150 000
Agriculture	715 000
Trade	18 200 000
Constructions	90 199 520
Electrical	48 533
TOTAL	116 890 453

Source: Survey Data (2016)

Figure 5.8 shows the percentage of goods coming to the region per sector of the top 20 companies surveyed.

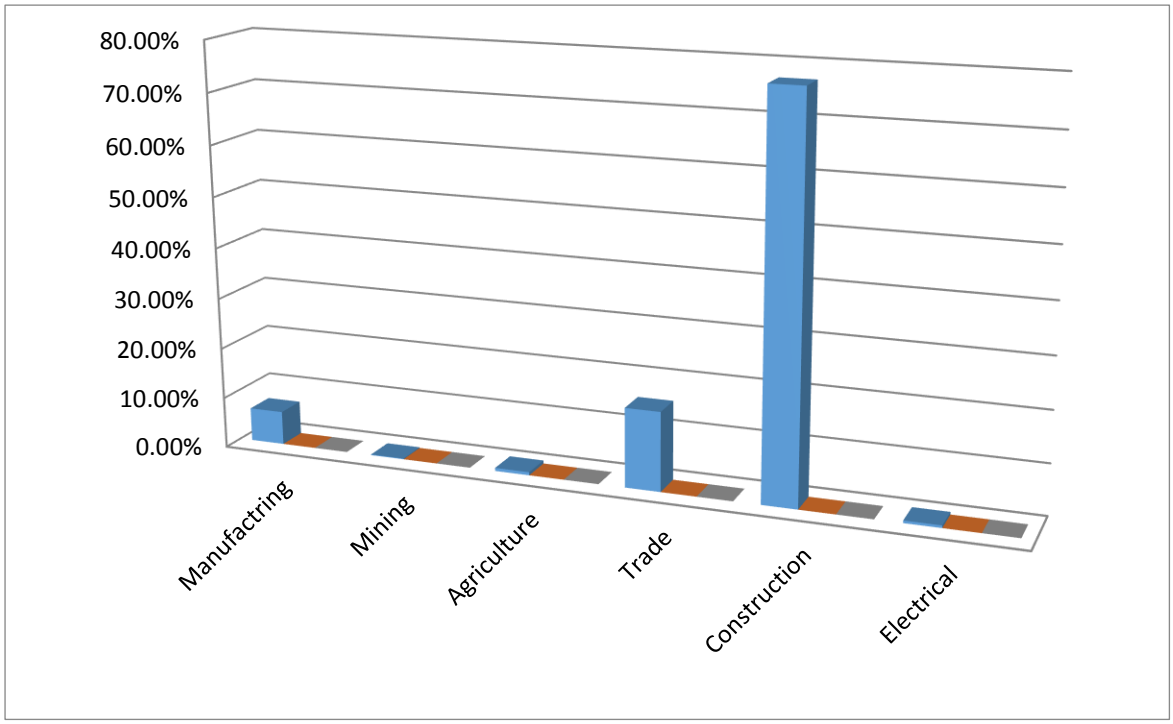


Figure 5.8 Goods procured/Received (Inbound). Source: Survey Data 2016

The construction sector is the largest sector that receives goods in the region at 77% of the total businesses surveyed, followed trade at 16%, manufacturing at 7%, agriculture at 1%, mining and electrical at just above 0% which is almost negligible in total tonnage received by the region.

5.4.5.8 Areas business sell or distribute their products

The respondents were asked about the areas in which they sell or distribute the products. The below table, 5.34 shows how the top 20 companies surveyed trade with other regions.

Table 5.34 Response on areas business sell or distribute their products

No	Name of Company	Areas business sell or distribute their products
1	Glen Douglas Dolomite (Pty) Ltd	City of Johannesburg (CoJ)10%, Ekurhuleni (CoE)10%. Vaal Triangle 80%.
2	Malesela Taihan Electric Cabble (Pty) Ltd	City of Johannesburg(CoJ) 70%, City of Tshwane (CoT) 2%, Ekurhuleni(CoE) 2%, West Rand 5%, Other provinces 21%
3	Clotan Steel (Pty) Ltd	City of Johannesburg(CoJ) 30%, City of Tshwane (CoT)10%, Ekurhuleni (CoE)10%, West Rand 5%, Other provinces 35%, Africa 10%
4	KWS Carriers	Other provinces (Not responded)
5	AfriSam South Africa	City of Johannesburg(CoJ) 19%, City of Tshwane (CoT)20%, Ekurhuleni(CoE) 22%, West Rand 23%, Other provinces 13%, Africa 3%
6	PC van Rensberg Transport	City of Johannesburg (CoJ)40%, City of Tshwane (CoT)40%, Ekurhuleni (CoE)10%, West Rand 5%, Other provinces 5%,
7	DCD Heavy Engineering	Other provinces 10%, Africa 20%, World 70%
8	Vision Transport	City of Johannesburg (CoJ)20%, City of Tshwane (CoT)20%, Ekurhuleni (CoE)20%, West Rand 20%, Other provinces 20%
9	Bophelong Bricks (Pty) Ltd	City of Johannesburg (CoJ)23%, City of Tshwane (CoT)7%, Ekurhuleni (CoE)18%, West Rand 7%, Other provinces 45%
10	Lime Distributors (Pty) Ltd	Local 10%, City of Johannesburg(CoJ) 52%, City of Tshwane(CoT)10%, Ekurhuleni (CoE)15%, West Rand 5%, Other province 5%, Africa 3%.
11	Karan Beef	Local 5%, City of Johannesburg (CoJ)55%, City of Tshwane (CoT)10%, Other province 10%,
12	Pro Roof Steel Merchants	City of Johannesburg (CoJ)30%, City of Tshwane (CoT)10%, Ekurhuleni 10(CoE)%, West Rand 5%, Other province 35%, Africa 10%.
13	Air products South Africa	Rest of the world (declined to give details)
14	Nampak Products Limited	Local 15%, City of Johannesburg (CoJ)5%, Ekurhuleni (CoE)30%, West Rand 5%, other provinces 45%.
15	PBD Boeredienste	10% local, 90% other provinces
16	Cape Gate (Pty) Ltd	Difficult to allocate percentage have sell and distribute to all areas
17	ABI	90% Sedibeng, 10% to other provinces
18	Vanderbijlpark Arcelor Mittal	Local 10%, City of Johannesburg (CoJ)18%, Ekurhuleni (CoE)61%, West Rand 5%, other provinces 1%, Africa 5%
19	African cables	Local 5%,, City of Joburg (CoJ) 37%,City of Tshwane (CoT) 8%,Ekurhuleni (CoE) 9%,West Rand 4%, other provinces 37%
20	Delta Bricks	Local 40%, City of Joburg (CoJ) 40%, West Rand 10%, other provinces 10%.

Source: Survey Data (2016)

Table 5.35 shows the areas to which top 20 businesses surveyed sell their products as per sector.

Table 5.35 Outbound areas (Summary of export of goods)

Sector	Local	CoJ	CoT	CoE	West Rand	Other Province	Africa	World
Manufacturing	10%	21%	13%	18%	5%	12%	7%	14%
Mining	80%	10%	0%	10%	0%	0%	0%	0%
Agriculture	2.5%	32.5%	5%	10%	0	55%	0%	0%
Transport	25%	25%	20%	15%	7.5%	7.5%	0%	0%
Trade	50%	15%	5%	5%	2.5%	20%	2.5%	0
Construction	12%	18.5	12.5%	16%	13.5%	26%	1.5	0%
Electrical	3.5%	53.5%	5%	5.5%	4.5%	22.5%	3%	2.5%
Total Average	**26%**	**25%**	**9%**	**11%**	**5%**	**20%**	**2%**	**2%**

Source: Survey Data (2016)

Figure 5.9 indicates the average percentage of trading by each sector of the top 20 companies make, with other places.

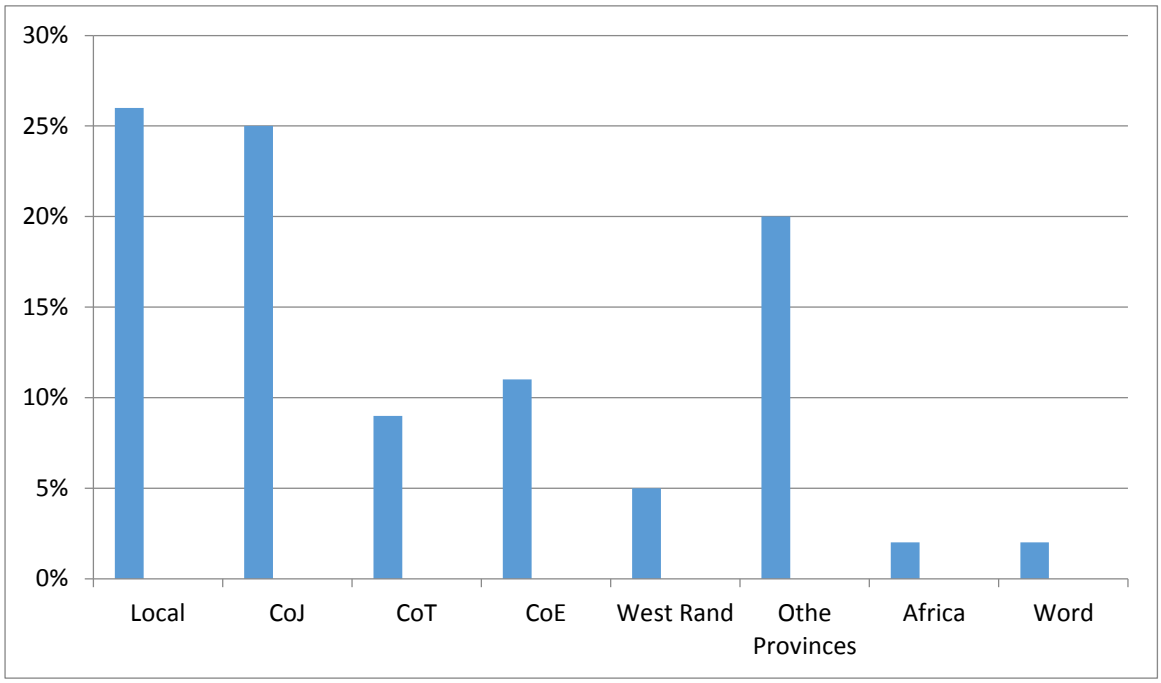


Figure 5.9 Summery of export of goods

In the total number of goods transported, 26% was destined for regional consumption, 25% to City of Johannesburg (CoJ), 9% City of Tshwane (CoT), City of Ekurhuleni (CoE), 5% West Rand, 20% to the provinces, Africa and rest of the world each at 2%.

5.4.5.9 Inbound areas (Summary of import of goods)

The respondents were asked about areas in which they procure or receive their products from. Table 5.36 shows places from which the top 20 companies procure their goods.

Table 5.36 Response on areas business procures or receives their products

No	Name of Company	Areas business procure or receive their products
1	Glen Douglas Dolomite (Pty) Ltd	City of Johannesburg 10%, Ekurhuleni 10%. Vaal Triangle 80%.
2	Malesela Taihan Electric Cabble (Pty) Ltd	City of Johannesburg 7%, City of Tshwane 3%, Other provinces 15%, Africa 15%, Rest of world 50%
3	Clotan Steel (Pty) Ltd	99% from Vaal Triangle, 1 % rest of world (Others)
4	KWS Carriers	None
5	AfriSam South Africa	Not responded
6	PC van Rensberg Transport	City of Johannesburg 10%, City of Tshwane 10%, Ekurhuleni 10%, West Rand 10%, Other provinces 60%,
7	DCD Heavy Engineering	Province 20%, World 80%
8	Vision Transport	None
9	Bophelong Bricks (Pty) Ltd	Other provinces 100% (Gauteng Vaal area), OFS Mpumalanga
10	Lime Distributors (Pty) Ltd	100% other province
11	Karan Beef	Local 5%, City of Tshwane 4%, Other provinces 76%, Africa 15%
12	Pro Roof Steel Merchants	Local 70%, Other provinces 30%
13	Air products South Africa	Rest of the world-Not responded
14	Nampak Products Limited	30% other provinces, 70% rest of the world
15	PBD Boeredienste	10% other provinces (Lime), 90% rest of the world
16	Cape Gate (Pty) Ltd	Difficult to allocate percentage but procure in all areas
17	ABI	20% City of Tshwane, 50% Ekurhuleni, 30% West Rand
18	Vanderbijlpark Arcelor Mittal	100% from other provinces
19	African cables	Other provinces 30, Africa 10%, World 60
20	Delta Bricks	Local 50%, other provinces 50%

Source: Survey Data (2016)

Table 5.37 shows the areas from which the top 20 businesses surveyed procure their products per sector.

Table 5.37 Inbound areas (Summary of export of goods)

Sector	Local	CoJ	CoT	CoE	West Rand	Other Province	Africa	World
Manufacturing	14%	0	0	0	0	56%	0	30%
Mining	80%	10%	0	10%	0	0	0	0
Agriculture	2.5%	2%	0	0	0	43%	7.5%	45%
Trade	49.5	0	10%	25%	15%	0	0	0.5
Construction	30%	0	0	0	0	70%	0	0
Electrical	0	3.5%	1.5%	0	0	20%	10%	65%
Total Average	**29.3%**	**2.6%**	**1.9%**	**5.8%**	**2.5%**	**31.5%**	**2.9%**	**23.4%**

Source: Survey Data (2016)

Figure 5.10 shows the average summary of areas from which the top 20 companies procure their goods.

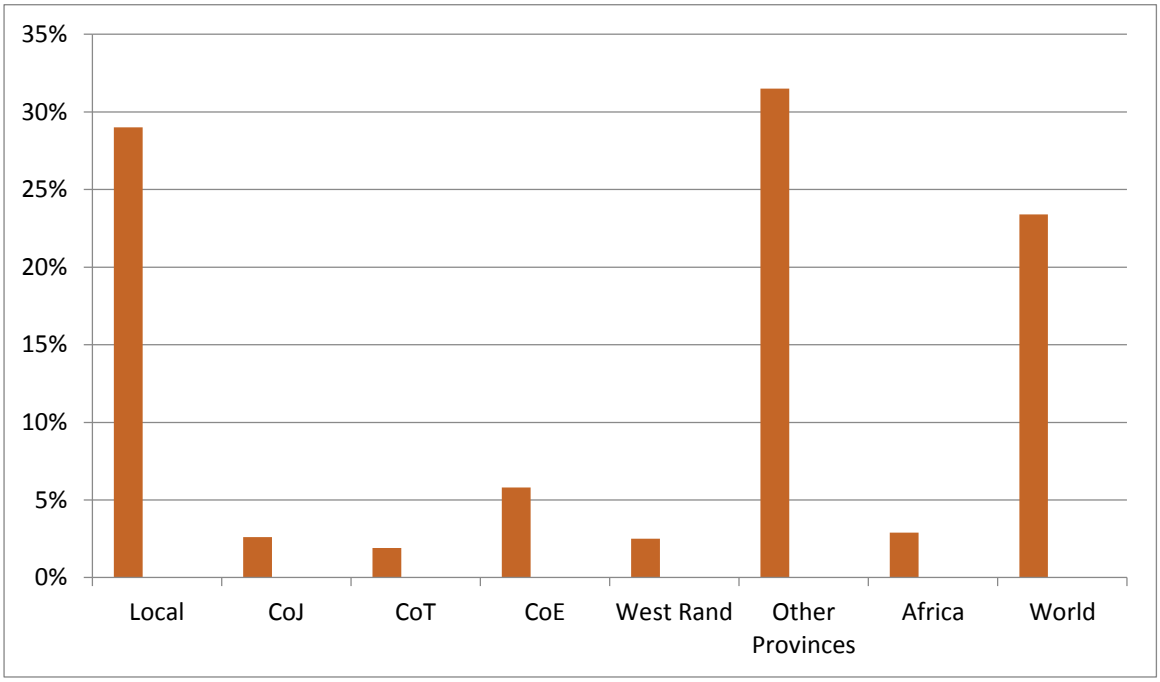


Figure 5.10 shows places summary of import of goods. Source: Own compilation

The businesses surveyed trade to other provinces at 31,5%, followed by the local 29% and the world at 23.4%. More than 50% of goods procured by the top 20 companies come from other provinces and the world.

5.4.5.10 Mode of transport

Respondents were asked about the mode of transport that they use for export. Table 5.38 indicates the mode of transport used by the top 20 companies, to export the goods.

Table 5.38 Response on mode of transport for export

No	Name of Company	Mode of transport
1	Glen Douglas Dolomite (Pty) Ltd	100% road
2	Malesela Taihan Electric Cabble (Pty) Ltd	Roads 85%, Rail 2%, Air 13%
3	Clotan Steel (Pty) Ltd	100% road
4	KWS Carriers	100% road
5	AfriSam South Africa	100% road
6	PC van Rensberg Transport	100% road
7	DCD Heavy Engineering	20% roads and 80% by sea
8	Vision Transport	100% road
9	Bophelong Bricks (Pty) Ltd	100% road
10	Lime Distributors (Pty) Ltd	80% Road, 20% Rail
11	Karan Beef	100% road
12	Pro Roof Steel Merchants	100% road
13	Air products South Africa	100% road
14	Nampak Products Limited	95% road, 5% air
15	PBD Boeredienste	100% road
16	Cape Gate (Pty) Ltd	99% roads, 1 % air
17	ABI	100% road
18	Vanderbijlpark Arcelor Mittal	100% road
19	African cables	100% road
20	Delta Bricks	100% road

Source: Survey Data (2016)

Figure 5.11 shows the mode of transport used by the top 20 companies to export goods to various places.

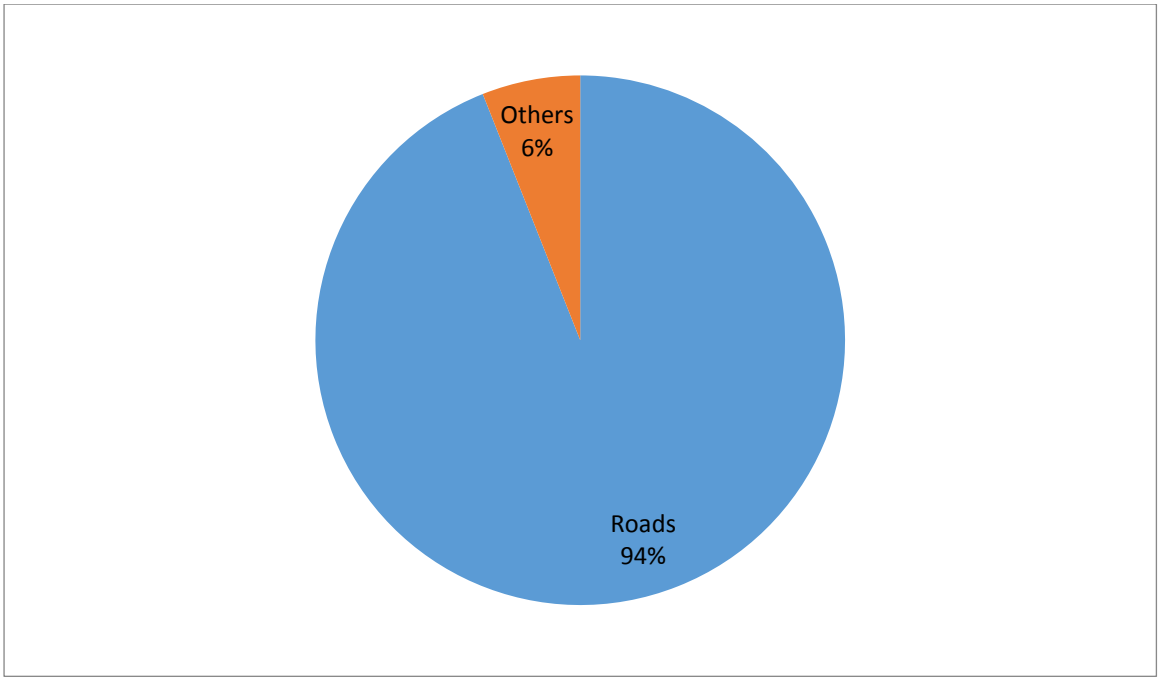


Figure 5.11: Mode of transport used for export

Table 5.38 and Figure 5.11 show that the majority of companies surveyed make of roads to transport their goods to their customers. The use of road infrastructure amounts to an average of 94%, with air, sea and rail sharing the 6%. Therefore, most companies use the road infrastructure to transport goods produced to various places.

5.4.5.11 Relationship with government

The respondents were asked if they have any relationship with government.

Table 5.39 Response on relationship with government

No	Name of Company	Relationship
1	Glen Douglas Dolomite (Pty) Ltd	None
2	Malesela Taihan Electric Cabble (Pty) Ltd	Contracts with municipalities
3	Clotan Steel (Pty) Ltd	None
4	KWS Carriers	None
5	AfriSam South Africa	None
6	PC van Rensberg Transport	None
7	DCD Heavy Engineering	None
8	Vision Transport	None
9	Bophelong Bricks (Pty) Ltd	None
10	Lime Distributors (Pty) Ltd	Yes, mainly with state owned enterprises.
11	Karan Beef	None
12	Pro Roof Steel Merchants	None

13	Air products South Africa	Yes, compliance with movement of dangerous goods
14	Nampak Products Limited	None
15	PBD Boeredienste	All transport carried out by independent contractor
16	Cape Gate (Pty) Ltd	None
17	ABI	None
18	Vanderbijlpark Arcelor Mittal	None
19	African cables	None
20	Delta Bricks	None

Source: Survey Data (2016)

Table 5.39 shows that there is no relationship between freight logistic departments of companies and government. The relationship will only be limited to client-customer relationship in those companies that do business with government or state owned enterprises.

5.4.5.12 Challenges by freight operators

The respondents were asked about their challenges and possible solutions. Table 5.40 shows challenges faced by the top 20 companies as related to freight operations.

Table 5.40 Response on challenges by freight operators

No	Name of Company	Challenges
1	Glen Douglas Dolomite (Pty) Ltd	Traffic on R59
2	Malesela Taihan Electric Cabble (Pty) Ltd	Poor roads and traffic
3	Clotan Steel (Pty) Ltd	Bad service, long delays in driver's license renewal, traffic officers not helpful, downtime non-uniform procedures, strikes, early closure of traffic offices
4	KWS Carriers	Road Infrastructure
5	AfriSam South Africa	No rail infrastructure in Vanderbijlpark
6	PC van Rensberg Transport	State of roads and traffic
7	DCD Heavy Engineering	Permits for abnormal loads take too longer to secure. Service needs to improve by training personnel, Escorts are always either not available or late. Route surveys such as ESCOM, TELKOM lines, bridges pose challenges to abnormal loads. These needs to be initially considered when developing these infrastructures.
8	Vision Transport	No comment
9	Bophelong Bricks (Pty) Ltd	Bad roads resulting in alternative roads

		used and delays, traffic congestion in certain roads resulting delivery time delays, road markings not visible.
10	Lime Distributors (Pty) Ltd	Poor road infrastructure and lack of completion in time of projects, inability of infrastructure to withstand heavy vehicles weight, Traffic congestion
11	Karan Beef	Poor road infrastructure, narrow roads, Traffic congestion, road accidents, few law enforcement officials and the poor job that they do.
12	Pro Roof Steel Merchants	State of roads and e-tolls
13	Air products South Africa Air	Improvement of road surface for commercial vehicles and repairs to potholes
14	Nampak Products Limited	Good infrastructure, good developments in progress and need to tackle lawlessness
15	PBD Boeredienste	Conditions of road causes damage to truck tyres
16	Cape Gate (Pty) Ltd	Theft of raw and other material, condition of access routes
17	ABI	Low hanging cables, gravel roads, potholes damaging tyres
18	Vanderbijlpark ARCELLOR MITTAL	Road infrastructure
19	African cables	Road infrastructure
20	Delta Bricks	Road infrastructure

Source: Survey Data (2016)

The main challenges faced by all top 20 companies in the region are related to the state of road infrastructure, traffic congestion, crime and e-tolls.

5.4.6 Summary of primary results

The results obtained from the survey questionnaire on analysis of freight movement activities in the Sedibeng region indicate significant freight movement activities in the region and the attention that the government is giving to issues of freight. The majority of products produced in the region are destined to outside the region. This is similar as it relates to goods coming into the region; most companies procure their raw material for their final products outside the region. The preferred mode of transporting the majority of products is by road, yet the road infrastructure is in a poor state and needs attention. The poor relationship between the private and public sectors makes it difficult for understanding the freight movement activities as an essential contributor to regional economic development.

5.4.6.1 Public sector

The road authorities acknowledged that the road infrastructure network is generally under pressure from a high level of utilisation. There is far too much freight on the roads, which leads to damage to the road infrastructure and traffic congestion, with its attendant pollution and accidents. The provincial road authority acknowledged the challenges and had future plans on how to overcome the challenges. This view was opposite compared to municipalities who seemed uncertain about how to deal with the challenges in the long term. The municipalities cite shortage of funds as the major stumbling block.

The local authorities are facing an increase in freight traffic volumes on their road network. They have not kept in pace with the increase in commercial and industrial developments in their areas. This resulted in damage to the road infrastructures that connect to individual properties. What also seemed to be lacking is the un-updated road master plans that would have identified location of such roads and suggested future upgrading or alternative solutions. The law enforcement at local municipalities does not have the capacity to deal with freight matters, while their provincial counteract have some capacity, though not adequate to deal with the extent of the challenges.

Parsons *et al.* (2009:4) indicates that the lifeblood of a region's economy is the capacity to efficiently, competitively and cost-effectively transport raw materials, components and finished goods. All economic development departments have admitted that efficient movement of goods in and around the region plays an important role. In most strategies, there is no specific focus or mention of transport logistics or freight movement activities, as they relate to the economic development of the region. The Provincial Economic Department has undertaken studies in partnership with Transport Department of Freight Logistics Hubs and its contribution to economic development and the efficient movement of freight.

The province has developed a freight logistic plan that forms an integral part of the total planning process in their 25 year Integrated Transport Master Plan. The plan outlines the profile of freight in the province and planned infrastructure to support effective and efficient movement of goods in Gauteng. It has also recognised the

need of developing freight databank along its provincial roads with the intention of getting a better understanding freight movement activities.

The Sedibeng District Municipality lacks strategies and studies on freight transport. However, the ITP has noticed the gap and also the lack of details in the provincial freight plan. The next circle of their ITP would also focus in freight studies. The registration of vehicles shows that there are significant loading vehicles, which are a third of a total population of registered vehicles in Sedibeng.

5.4.6.2 Commercial and industrial

The total volume of goods produced in the region of the companies that were surveyed was 120.9 million tons. The construction sector is the largest sector that transports goods out of the region, at 77% of the total businesses survey, followed by trade at 13%, manufacturing at 4.5%, transport at 3.78%, mining at 1.25% and agriculture at 0.28% and electrical which is almost negligible in tonnage transported.

26% of the total quantity of goods transported was destined for regional consumption, 25% to City of Johannesburg, 9% City of Tshwane, 11 City of Ekurhuleni, 5% West Rand, 20% to other provinces, Africa and rest of the world each at 2%.

The total volume of goods produced outside the region and used for final products of the companies surveyed was 116.89 million tons. The construction sector is the largest sector that receives goods in the region, at 77% of the total businesses surveyed, followed by trade at 16%, manufacturing at 7%, agriculture at 1%, mining and electrical at just above 0% which is almost negligible in total tonnage received by the region. The areas from which these raw materials are coming, are 29% within the region, 2.6% from City of Johannesburg, 1.9% City of Tshwane, 5.6%City of Ekurhuleni, 2.5% West Rand, 31.5% from the provinces, 2.9% Africa and the remaining 23.4% from the rest of the world.

The use of road infrastructure almost amounts to an average of 94%, with air, sea and rail sharing the 6%. There were relationship between freight logistics department and government. The relationship will only be limited to client-customer relationship in those companies that do business with government or state owned enterprises.

The challenge faced by all companies in the region was mainly the state of road infrastructure with some raising the issues of traffic congestion, crime and e-tails.

5.4.7 Conclusion

The efficient movement of urban freight is a challenge that cannot be tackled by freight carriers or government separately but it should be viewed as community issue requiring joint effort to improve transport system (Czerniak, 2000:1). The objective of the primary data was to analyse freight movement activities in the Sedibeng Region. From the results obtained, there is a significant movement of freight activities coming in and outside the region. The volume of goods coming in and out the region is almost equal, with goods coming out slightly higher.

The goods from construction, trade and manufacturing were dominant in terms of freight movement activities, both outbound and inbound. The majority of the goods produced were for local market, followed by the Johannesburg region and Tshwane, while inbound goods were from local or regional producers, followed by other provinces and the world. The majority of freight movement activities are across the road infrastructure. All companies surveyed expressed concerns over poor road network.

World Bank (2009:2) freight transport provides necessary essential services to urban economy as business and households meet to fulfil their needs. In spite of its importance many cities have neglected surveys and policies aimed at enhancing freight transport to boost economic development and growth. All levels of government and respective departments that have direct and indirect influence on freight movement activities are giving attention to freight transport. There are various initiatives underway, ranging from developing freight databank to freight master plan and strategy.

The following chapter is a concluding overview, attempting to present the regional proposed scenario in relation to the bigger national picture. It gives summary on empirical results, impact of the transport sector on the economy, achievement of research objectives, recommendations on areas for improvement, limitations of the study and future research on the topic. In addition, it provides a summary of the research on freight activities, as well as conclusions on the problems of freight transport in the region and required intervention.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1 INTRODUCTION

Lindholm (2013:1) regards urban mobility as essential to facilitate movement of goods required by business and households for the functioning of urban economy and thereby contributing to employment and economic growth. The efficient movement of freight is important for local, provincial, and national economy and comprehension of the movement of freight and its characteristics is vital to promote efficiency and economic development (Federal Highway Administration, 2011:1).

In defining the state of freight in South Africa, the National Freight Logistic Strategy defines it as follows:

> "The freight system in South Africa is fraught with inefficiencies at the system and firm levels. There are infrastructure shortfalls and mismatches, the institutional structure of the freight sector is inappropriate, and there is lack of integrated planning. Information gaps and asymmetries abound, the skill base is deficient and regulatory frameworks are incapable of resolving problems in the industry" (Department of Transport, 2004:4).

There has been acknowledgement throughout the world that freight plays an active role in growing the economy and not enough attention is paid to it (Brickenhoff *et al.*, 2009:24). In response to freight challenges in South Africa, the Department of Transport has developed the National Land Transport Strategic Framework (NLTSF), which guides transport planning for all tiers of Government. The Provincial Land Transport Frameworks (PLTFs) is derived from the NLTSF and guides the transport planning in provinces. The Integrated Transport Plans (ITPs) are guided by both NLTSF and PLTFs, it provides a framework for developing transport plans at local government level (Department of Transport, 2015:3).

The Sedibeng District Municipality's Integrated Transport Plan (ITP), in its transport planning process has identified a need of making assessment of freight movement activities and logistics. The ITP also emphasised a need of integrating freight transport to the transport planning process of the district (Sedibeng District Municipality, 2008:170). The Road Freight Strategy for South Africa (Department of Transport, 2011:3) noted that continual increase in freight movement on road

network has put road network under severe pressure from high level of utilization. In efficient railway to carry freight has made road transport automatic choice among hauliers. The main objective of this chapter is to provide a summary of the study and to give meaningful recommendations on freight movement activities related to economic growth in the Sedibeng region.

6.2 SUMMARY OF FINDINGS ON EMPIRICAL RESULTS

6.2.1 Freight movement activities

The survey revealed that the sectors that transported high volumes of goods tonnage in sequence were construction, trade, manufacturing, transport, mining, agriculture and electrical (Table 5.30). Areas that these goods were transported to, from high to low percentage, were for local regional consumption, City of Johannesburg, City of Tshwane, City of Ekurhuleni, West Rand, other Provinces and to the rest of the World (Table 5.34). This shows that there is a high volume of goods from within the region and to the City of Johannesburg.

On goods destined for the region, the volume of goods tonnage from high number to low number were from construction, trade, manufacturing, agriculture, mining and electrical (Table 5.32). The areas that bring goods to the region come from other provinces, the rest of the world, City of Ekurhuleni, Africa, City of Johannesburg, West Rand and City of Tshwane (Table 5.36). This shows that most goods coming to the region are from the City of Ekurhuleni and other provinces outside Gauteng.

6.2.2 Road Transport infrastructure

From the responses on the survey questionnaire, it is apparent that road infrastructure is essential for effective and efficient movement of freight for both the public and private sector (Tables 5.4, 5.6, 5.12, 5.39). The efficiency of the road freight transport system in South Africa will only be possible on good and well maintained road network for transporting goods.

The heavy goods vehicles are dominant mode of transport in South African roads and one of the major causes of concern in the road freight system is the point that heavy goods vehicles are currently not contributing adequately to compensate for negative externalities caused on the roads in South Africa (Department of Transport, 2011).

6.2.3 Role of public sector

The state with its various tiers and departments should play a pivotal role in creating an enabling environment to effective and efficient freight movement to bolster economic growth. The provincial level of government that is roads, economic, law enforcement and transport have some programs related to freight transport and acknowledge its limitations. Local government still needs to define and strengthen its role on freight movement activities (Chapter 5: section 5.3.1 to section 5.3.4). The survey reveals that there is no role that the local government plays or intends to play in response to the ever increasing freight movement activities in the region.

6.2.4 Institutional arrangements

The volume of goods moving in and out of the region warrant co-operation between private and public sector freight and logistics departments. The survey revealed that there is no such relationship, especially in the region. The relationship is on an ad-hoc basis to address the challenges at hand. While the provincial department of transport seeks to establish long term relationship with transport operators through their association, there are no such attempts in the region (Table 5.3, 5.7, 5.11, 5.17 and 5.38).

6.3 SUMMARY OF THE IMPACT OF TRANSPORT SECTOR ON THE ECONOMY

6.3.1 Quantitative impact

- The contribution of transport in Sedibeng to the Gross Value Added by Region (GVA-R) increased from R2.946 billion in 2005 to R3.567 billion in 2015, which amounts to an increase of 2.11% per annum over the last ten years (Chapter 2, 2.10, Table 20.21).
- Employment in transport for the Sedibeng Region increased from 6 558 in 2005 to 11 005 in 2015, which amounts to an increase of 6.78% per annum over the last ten years (Chapter 2, 2.10, Table 20.22).
- The labour remuneration for the transport sector in Sedibeng increased from R612.76 million in 2005 to R1 485.54 million in 2015, which amounts to a 14.24% increase per annum over the last ten years (Chapter 2, Table 20.22).
- The total volume of goods transported to places outside (exported) Sedibeng region by all sectors of the top 20 companies surveyed amounted to 120.94

million tons per annum (Chapter 5, Table 5.31, Figure 5.6). The construction sector is the largest sector transporting goods out of the region at 77% of the total businesses survey, followed by trade at 13%, manufacturing at 4.5%, transport at 3.78%, mining at 1.25%, and agriculture at 0.28%.

- The total volume of goods transported to (imported) Sedibeng region from other places by all sectors of the top 20 companies surveyed amounted to 116.89 million tons per annum (Chapter 5, Table 5.33, Figure 5.7). The construction sector is the largest sector that receives goods in the region at 77% of the total businesses surveyed, followed by trade at 16%, manufacturing at 7%, agriculture at 1%, mining and electrical at just above 0%, which is almost negligible in total tonnage received by the region.
- The total volume of goods transported, a total of 26% was destined for regional consumption, 25% to City of Johannesburg (CoJ), 9% City of Tshwane (CoT), City of Ekurhuleni (CoE), 5% West Rand, 20% to other provinces, Africa and the rest of the world each at 2% (Chapter 5, Table 5.35, Figure 5.8).
- The total volume of goods coming to the region was from other provinces at 31.5%, followed by the region 29% and the world at 23.4%. More than 50% of goods procured by the top 20 companies come from other provinces and the world (Chapter 5, Table 5.37, Figure 5.9).
- The majority of companies surveyed make use of the road system to transport their goods. The use of road infrastructure amounts to an average of 94%, with air, sea and rail sharing the remaining 6%. Therefore, most companies use the road infrastructure to transport goods produced to various places (Chapter 5, Table 5.39, Figure 5.10).

6.3.2 Subjective impact (Case study)

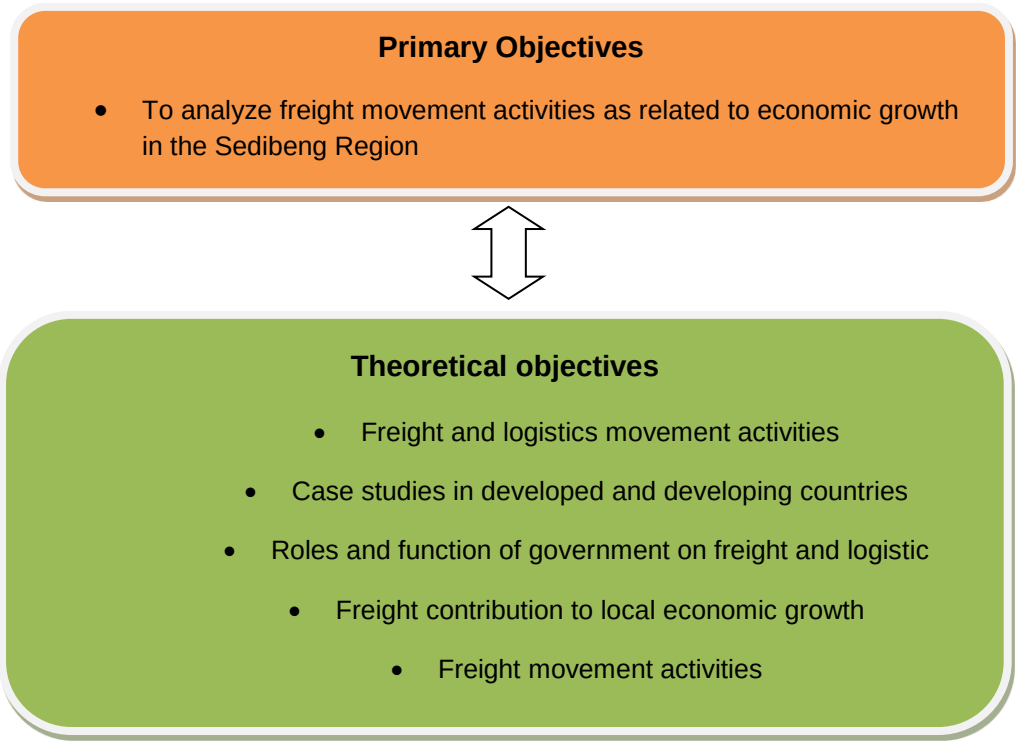
- The European freight transport creates jobs, adds value to supply chain management process and logistics, its efficiency reduces business costs and thus contributes significantly to the development and growth of European economy (Chapter 3, 3.3.3.1).
- The movement of goods and people between Helsinki and St. Petersburg resulted into both the Finnish and Russian Republics to establish Smart

Transport Corridor between the two cities in an attempt to boost economic growth in both towns and countries (Chapter 3, 3.3.3.2).

- The African Bank Development Group has invested in a major project of 240km of roads in the Southern Ethiopia, which targets to grow the economy by unlocking the agricultural potential of the region and capacitating farmers to participate in lucrative coffee value chain (Chapter 3, 3.3.3.3).
- In its Spatial Development Framework Review, Buffalo City Metropolitan Municipality (2013:143) in the Eastern Cape stated that growing manufacturing sector, East London Industrial Development Zone (IDZ), the incoming and outgoing movements of goods will depend on reliable freight transport system to contribute to economic growth of the region (Chapter 3, 3.3.3.4).

6.4 ACHIEVEMENT OF RESEARCH OBJECTIVES

The research objectives were set out in Chapter 1 (section 1.4) which focussed on three different objectives namely, primary, theoretical and empirical objectives. Figure 6.1 shows the three respective objectives.



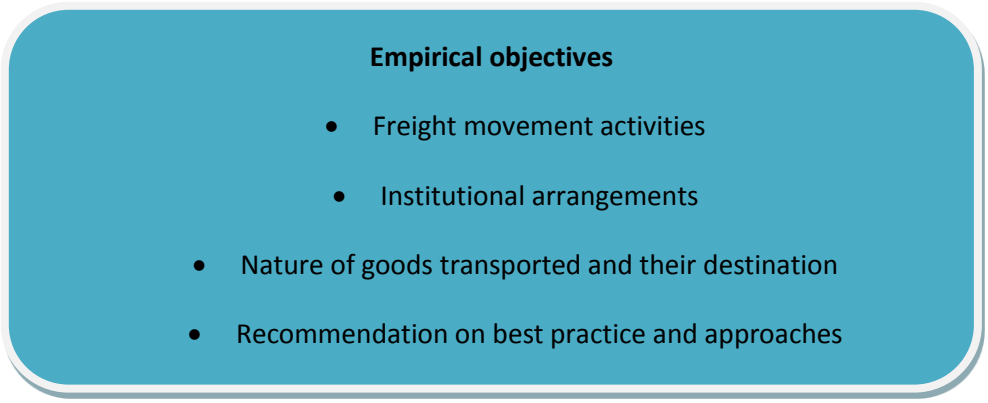


Figure 6.1 Structure of the study objectives Source: Own Compilation (2016)

6.4.1 Primary objective

The primary objective of the study was to analyse the freight movement activities related to the economic growth in the Sedibeng Region.

- Chapter 2 gives the socio-economic profile of Sedibeng, describing the area and giving information of the area in terms of strategic road network, population, number of household, social development and economic analysis. The contribution of the transport sector to the Gross Value Added (GVA) is also explained in (Table 2.13 to Table 2.16).
- Chapter 5 (section 5.3.5.1 to section 5.3.5.12) showed the sectors that contributed to freight movement activities in the region. The sectors surveyed were construction, trade, manufacturing, transport, mining, agriculture and electrical. Also revealed were areas that trade with industries in the region, City of Johannesburg, City of Tshwane, City of Ekurhuleni, West Rand, other provinces and to the rest of the World.

6.4.2 Theoretical objectives

- The first theoretical objective was an explanation on freight and logistics movement activities (Chapter 3: section 3.2 to section 3.5). Freight is about movement of goods to meet a certain need in society. The ability to effectively move, store, and improve information in order to satisfy requirements of the customer, is referred to as logistics.
- The second theoretical objective was case studies in developed and developing countries on how freight is managed Chapter 3 (section 3.9) shows that freight movement activities in urban areas have received attention

in developed countries and developing countries are putting up policies and strategies to ensure that urban freight find expression in their plans. The freight consolidation centres or logistics hubs in urban areas are the direction most countries are taking, to reduce negative externalities of freight.

- The third theoretical objective was exploring the roles and function of government on freight and logistics transport. Chapter 4 seeks to provide an overview of policies, legislation and strategies of various levels of governments play in freight movement activities.
- The fourth theoretical objective explains freight contribution to local economic development. Chapter 3 (section 3.8) shows the importance of freight as a catalyst to the economic growth.
- The fifth theoretical objective seeks to ascertain freight movement activities in the region from existing literature. Chapter 5 (section 5.3.1 to section 5.3.4) revealed that government has not undertaken any study to assess or measure freight movement activities in the region.

6.4.3 Empirical objectives

- The first empirical objective was the analysis of freight movement activities in the Sedibeng region. Chapter 5 (section 5.3.5.1 to section 5.3.5.12) showed the sectors that contributed to freight movement activities in the region. The sectors surveyed were construction, trade, manufacturing, transport, mining, agriculture and electrical.
- The second empirical objective was ascertaining institutional arrangements pertaining to transportation of goods in the region. Chapter 5 (section 5.3.5.4 and section 5.3.5.11) revealed that most companies have Logistics Departments focussing on the management of goods in their companies. There is also no relationship with local government.
- The third empirical objective was ascertaining the nature of goods transported and their destination. Chapter 5 (section 5.3.5.6 to section 5.3.5.9) revealed that the sectors that transported high volume of goods tonnage in their sequence were construction, trade, manufacturing, transport, mining, agriculture and electrical. Areas that these goods were transported from high to low percentage were for regional consumption, City of Johannesburg, City

of Tshwane, City of Ekurhuleni, West Rand, Other Provinces and to the rest of the World.

- The fourth empirical objective was a formulation of recommendations regarding best methods and approaches regarding best practice methods and approaches on freight and logistics in the region. Chapter 3 (section 3.9.1). Local and national governments are taking decisive actions to enhance working conditions, partnerships, skills and integrate urban freight sector into development plans.
- Chapter 3 (section 3.3.3) also showed that there is a direct and indirect relationship between transport and economics. The developed and developing countries in their studies to grow regional economies, came to the same conclusion.

6.5 RECOMMENDATIONS ON AREAS OF IMPROVEMENT

The movement of freight supports the daily lives of people by providing essential goods and services needed for their livelihood. The efficient movement of freight will enhance social and economic development of people, because goods and services can be effectively transported to them wherever they are. The survey has revealed the extent of freight movement activities in essential sectors in the region, and also showed the contribution of the transport sector to the regional economy. Such high movement of goods has its own negative externalities such as traffic congestion, damage to public infrastructure and pollution.

The origin and destination (OD) matrices play crucial role in understanding movement of trucks on road network and the linkages. While movement of freight is essential for the economy there are negative impact like damage to roads network, pollution, traffic congestion and overloading that needs to be managed and regulated (Van Zuylen *et al.*, 2009).

The private sector operates freight transport using public road transport infrastructure managed and regulated by public authorities through legislation. The public authorities have realized a need to involve freight operators in planning and regulating freight transport operations because they are users of public transport infrastructure and at times impact negatively on infrastructure and society.

The intervention required on freight movement activities are periodical surveys intended to plan more effectively for such movement, so that public infrastructure equally responds to any growth. More co-operation and partnership is required to plan and meet the challenges of regional economic growth.

6.5.1 Efficient movement of freight activities

The movement of people is essentially regarded as transportation forgetting that people will need goods and services on daily basis to need their needs. In meeting their daily needs efficiency of freight movement is critical. The transportation of freight is a derived demand related to the production and consumption of goods and services. The production and consumption of goods or services contributes towards the economic growth of the region or country. Therefore, the efficient movement of freight adds value to goods or services and contributes to costs of such goods or services.

The survey revealed a magnitude of freight movement activities in the region, which is unknown to the local and provincial authorities. The surveys might not have sufficiently covered freight activities. This, therefore, means that the local authorities must also collect freight data activities, which should form an integral part of the development and reviewing of the Integrated Transport Planning. This will ensure that transport planning entails incorporation of both passenger and goods movements.

6.5.2 Transport infrastructure

The conditions of the transport infrastructure are critical to efficient freight transport as there is direct and indirect relationship between transport and economic growth. The more transport infrastructure performs the better are prospects of economic development. Mahmudah *et al.* (2010:1), mentions that the relationship between transport infrastructure and economic development has, at least, three important effects for the freight movement and business.

Firstly, the relationship between transport infrastructure and regional productivity inferred that investment in transport infrastructure increase productivity and influence economic development. Secondly, transport infrastructure facilitating efficient movement of goods reduces production costs and lastly transport infrastructure affects location of industries. The development strategy intended to attract new

industries or investment in the region must ensure that provision of transport infrastructure meet requirements of new industries or investments.

From the results obtained, it is apparent that all companies are complaining about the state of the poor road infrastructure. This was admitted by local authorities who point out that the development of road infrastructure was outpaced by rapid economic development in the region. This is in spite of the fact that most companies surveyed have more than ten years in existence. As an intervention geared at keeping these companies in the region, an assessment of road infrastructure is essential to assess the type and volume of goods transported and how the infrastructure responds. The road master plan should be developed, focusing on how transport infrastructure contributes to efficient and effective freight movement activities.

6.5.3 Enhancing role of public sector

The private sector operates, controls and manages freight distribution with little or no oversight from the public sector. The commercial dynamics of freight distribution are less known by public sector yet the public sector tends to seek direct control and oversight over public transport system with planning and regulatory attempts (Klastorin, 1995:56).

The increase in freight movement activities indicates a functioning and growing economy and if not well monitored it can bring a lot of negative externalities like noise, accidents, pollution, traffic congestion, overloading and sever damage to transport infrastructure. The public sector, through its law enforcement agencies, must play its role in ensuring compliance to law by freight operators.

Therefore, there should be visibility in road signage throughout the region, in particular speed limit, truck restrictions, loading areas, stop signs and others. While the developing countries are still developing policies and strategies over freight movement activities in urban area areas, the developed countries and cities are looking into freight consolidations centres. In Europe, urban distribution centres were introduced to solve accessibility and environmental problems of freight transport in cities. The public sector should include, as one of options, the distribution centres as practiced in developed countries and adapt them to local conditions. The local economic strategies and studies should also take into account the contribution of

freight logistics in regional economy. The logistics costs as a percentage of GDP have remained at a stable level of 12.5% for the period between 2011 and 2013 and have grown significantly over the past years (Viljoen, 2014:4).

6.5.4 Institutional arrangements

Freight operations are carried out by private companies meeting social needs of households and businesses. The public sector develops policies, regulations and laws for freight activities to ensure that externalities are reduced and economic development is enhanced. Private sector is encouraged to take active role during development of polices and plans shaping freight logistic industry (Visser *et al.*,1999:10). The interaction between private and public sector is essential to ensure that freight transport activities bolster economic development and growth. The need for institutional arrangements has also been emphasised by the Gauteng's 25 year Integrated Transport Master Plan.

There must be a sharing sessions between the public and private sector institutions, to share information on regulatory environment and freight movement activities. Such interaction should input into transport planning process, changes in regulations and future capital investment by private and public sectors that will have a direct or indirect bearing on freight movement. Establishment of a forum would be an ideal vehicle to improve relations among stakeholders.

6.5.5 Guidelines for developing Regional Freight Transport Strategy

The following issues should form a base for developing freight strategy

- Compile detailed freight databank indicating movement of goods in the region.
- Determine road network conditions and roads frequently used by freight.
- Linkage of primary Industrial Areas and major Transport Facilities.
- Management of overall road infrastructure network capacity.
- The need to ensure that the transport system is able to accommodate goods movement in an efficient manner.
- Regulation of heavy vehicles to CBDs
- Limitations on vehicle classes permitted on some routes.
- Provision for movement of hazardous and abnormal loads.
- Aligning the freight strategy to strategies and plans of municipality
- Aligning the freight strategy to provincial and national strategies and plans

6.6 LIMITATIONS OF THE STUDY AND FUTURE RESEARCH

The following limitations have been found within the study:

- The approach to the survey was based on 20 companies contributing freight movement activities in the region. There were no similar surveys or studies that would allow for a comparison to be made or which to build on.
- Larger survey will be in future.

6.7 CONCLUSION

The urban freight, freight logistics, freight transport and freight movement activities have been interlinked and used interchangeably through being subject groups on their own. From the empirical evidence it was found that the road infrastructure and institutional challenge pose a threat to efficient and effective movement of freight movement activities. Therefore, there are areas requiring attention and improvement on part of the SDM in attending to road infrastructure and incorporating issues of freight in strategic plans.

The survey results showed that there are significant freight movement activities that come in and out of the region. The areas that showed strong trade with the region were City of Johannesburg, City of Tshwane and City of Ekurhuleni. It was also found that there are significant trading movement activities within the region and noticeable trading with Africa and rest of the world. There was also an absence of the relationship on freight movement activities between the private and public sector. The study concluded that the road infrastructure must be given attention and strong co-operation between the private and public sector should be forged, for planning the positive contribution of freight movement activities to regional economy.

This chapter revealed the empirical findings of the study, both in terms of primary and secondary data. The various objectives in terms of primary, theoretical and empirical objectives were identified within the study and the achievements of the objectives were indicated within the chapter. The study has proven that freight movement activity is related to economic growth, and investment in transport infrastructure is an enabler for economic growth.

Freight movement is the essential subject for the economic development of the region, as it connects people with the products and services they need to sustain the

flow of everyday life. The future research should focus on integrating freight movement activities into transport planning and local economic development. In so doing, the freight movement activities will receive attention every five years when sectoral plans, like the Local Economic Development Strategy and Integrated Transport Plan, are developed. The development of a freight strategy will be required to integrate freight movement activities, institutional arrangements, cooperation among freight stakeholders and transport infrastructure.

REFERENCE LIST

African Development Bank Group. 2017. Infrastructure, cities and urban development department, Annual report 2016. Ivory Coast: Abidjan.

African Economic Outlook. 2005-2006. www.oecd.org/dev/publications/africanoutlook. Date of access: 11 Oct. 2017.

Ahmed, S. 2009. Statistical methods for sample surveys. John Hopkins University: Bloomberg.

Allen, J., Anderson, S., Browne, M. & Jones, P. 2000. A framework for considering policies to encourage sustainable urban freight traffic and goods/service flows. UK: University of Westminster.

Allen, J., Thorne, G. & Browne. M. 2007. Good Practice guide on Urban Transport. European Commission. Europe.

Arbache, J. 2014. Serviços e Competitividade Industrial no Brasil. Brasília:Confederação Nacional da Indústria:

Australian Government. 2011. National land freight strategy. Discussion Paper. http:www.infrastructureaustralia.gov.au/publications/files/NLFS_22011 Date of access: 15 Oct. 2016.

Australasian Transport Research Forum. 2015. Proceedings 30 September – 2 October 2015, Sydney, Australia Publication. http://www.atrf.info/papers/index.aspx. Date of access: 1 Jun. 2017.

Banjeree, S. & Chaudhury, S. 2010. Statistics without tears: populations and samples. *Industrial Psychiatry Journal*, 19(1):60-65.

Best Urban Transport Freight Solution (BESTUFS). 2007. Good practice on urban freight transport. European Commission. European.

Best Urban Transport Freight Solution (BESTUFS). 2012. Good practice guide on urban freight transport. http://www.eltis.org/docs/tools/English_BESTUFS_Guide.pdf Date of access: 19 Nov. 2016.

Brazil Government. 2013. Transportation. http://export.gov/brazil/static/CC_BR_DoingBusiness_CCG_PDF_Chap4_Transportation_Latest_eg_br_063770.pdf Date of access: 23 Nov. 2016.

Brickenhoff, P., Simpson, C. & Garber, S. 2009. Relationship of freight transport to economic development. USA: Oregon.

Browne, M. & Allen, J. 2006. Urban freight data collection - synthesis report. Europe: University of Westminster.

Buffalo City Metropolitan Municipality. 2013. Spatial development framework review. East London: BCMM

Burmeister, E & Aitken, L.M. 2012. Sample size: how many is enough? *Austrian Critical Journal*, 1(25):271-274.

Byrne, A. 2007. Freight movements and logistics in the South-East region, Ireland: implications for regional policy. Ireland: Waterford Institute of Technology.

Canadian Council of Ministers Responsible for Transportation and Highway Safety. 2014. Transport and Economy. Canada.

Carlos, P. Barrosa, L.A., Gil-Alanab, A. and Peter, W. 2015. An empirical analysis of freight transport traffic modes in Brazil, 1996–2012.London. Routledge.

City of eThekwini. 2014. Port and logistics. Durban: City of Ethekwini

City of Tshwane. 2015. Comprehensive integrated transport plan. Pretoria. City of Tshwane

Crainic, T.G., Ricciardi, N. & Storchi, G. 2009. Models for evaluating and planning city logistics systems. Transportation Science. Germany: Universiteit Utrecht.

Connecticut Academy of Science and Engineering. 2013. Analyzing the economic impacts of transportation projects. USA: Connecticut Department of Transportation.

CSIR. 2008. State of logistics of logistics survey for South Africa. www.csir.co.za/sol Date of access: 10 Nov. 2016.

Czerniak, R.J. 2000. Urban freight movement: what form will it take. Mexico: New Mexico State University.

Dablanc, L. 2011. Commercial goods transport, Paris, France. United Nations.

Dasburg-Tromp, N., Schoemaker, J. & Maurer, H. 2011. Urban logistics practices synthesis of selected case studies. http://www.inovamais.pt/turblog/results/D3.pdf--urban Date of access: 2 Nov. 2016.

Department of Roads and Transport. 2004. Strategic Agenda for Transport in Gauteng. Gauteng Province. Government Printers.

Department of Roads and Transport. 2007. Gauteng Province Freight Transport Implementation strategy. Gauteng Province. Government Printers.

Department of Roads and Transport. 2013. Gauteng 25 year integrated transport master plan, Gauteng Province. Johannesburg: Government Printers.

Department of Transport. 1996. White paper on national transport policy. Pretoria: Government Printers.

Department of Transport. 1998. Moving South Africa, South African. Pretoria: Government Printers.

Department of Transport. 2004. National freight logistics strategy (NFLS). Pretoria: Government Printers.

Department of Transport. 2006. National land transport strategic framework. Pretoria: Government Printers.

Department of Transport. 2011. Road freight strategy for South Africa. Pretoria: Government Printers.

Department of Transport. 2015. National land transport strategic framework, 2015-2020. Pretoria: Government Printers.

De Villiers, G. 2014. South African freight logistics update. Pretoria: Arup.

Docherty, I. & MacKinnon, D. 2013. Transport and economic development. London: Sage.

Ecorys, Fraunhofer, TCI, Prognos and Aueb-Rc/Translog. 2015. Fact-finding studies in support of the development of an EU strategy for freight transport logistics. European Commission.

Eddington Transport Study. 2006. The case for action: Sir Rod Eddington's advice to government, summary report. London.

Emfuleni Local Municipality. 2015. Local Economic Development Strategy. Vanderbijlpark.

European Commission. 2012. Study on urban freight transport. http://ec.europa.eu/transport/themes/urban/studies/doc/2012-04-urban-freight-transport.pdf Date of access: 5 Nov. 2016.

European Commission. 2016. European semester thematic fiche transport. European Union

European Union. 2011. Status report concerning planned transport investments in Russia, Belarus, Ukraine, Central Asia and the Far East. http://www.transbaltic.eu/wp-content/uploads/2010/09/Task-3.1-Status-Report.pdf Date of access: 5 Nov. 2016.

Federal Government. 2008. Freight Transport and Logistics Masterplan. Druckerei Conrad GmbH, Berlin, Germany.

Federal Government. 2009. Freight transport and logistics master plan. Berlin, Germany: Druckerei Conrad,

Federal Highway Administration. 2011. Freight transportation surveys: a synthesis of highway practice. Washington, White House.

Federal Highway Administration. 2013. Freight transportation surveys: a synthesis of highway practice. Washington, White House.

Federal Highway Administration. 2016. Freight transportation: improvement and economy. https://ops.fhwa.dot.gov/freight/documentd/improve_econ.pdf. Date of access: 2 June 2017.

Filip, N. & Catalin, P. 2014. The role of transportation in economic development. https://www.researchgate.net/publication/280313162 Date of access: 1 Jun. 2017.

Fitsrus. D.S. 2013. The smart transport corridor Helsinki-St. Petersburg. Helsinki: Ministry of Transport and Comminications.

Florida Department of Transportation. 2015. Florida transportation trends and conditions. Impact of transportation: transportation and the economy. USA: FDT.

Frieslaar, A. & Jones, J. 2006. The N1 corridor Cape Town: an integrated multimodal transport strategy for the corridor. Cape Town:Roggebaai.

Gadelshinaa, L.A. & Vakhitovab, T.M. 2015. The place and role of transport infrastructure in the interregional integration of the Russian Federation regions: Kazan.

Getu, D. & Yigzaw, T. 2006. Research methodology. Ethiopia: University of Donga.

Global Insight. 2016. Regional explorer. www.ihsglobalinsight.co.za. Date of access: 14 July 2017.

Government of India. 2014. National Urban Transport Policy. New Delhi:Government.

Grobler, W.C.J. 2006. Vaal logistic hub.Vanderbijlpark: University of North West.

Havenga, J.H., De Bod, A., Simpson, Z.P., Viljoen, N. & King, D. 2016. A logistics barometer for South Africa: towards sustainable freight mobility. *Journal of Transport and Supply Chain Management,* 10(1): a228. http://dx.doi.org/10.4102/jtscm.v10i1.228 Date of access: 23 Nov. 2016.

Havenga, J.H., Simpson, Z.P., King, D., De Bod, A. & Braun, M. 2016. Logistics barometer South Africa, 2016. : Stellenbosch: Stellenbosch University.

Hesse, M. & Rodrigue, J.P. 2003. The transport geography of logistics and freight distribution. USA .Hempted..

Heyman, E. 2015. Logistics in Germany: only modest growth in the near term. Frankfurt: Deutsche Bank.

House of Commons. 2011. Transport and economy. Third report of the session. London: The Stationery Office Limited.

Immers, L.H. & Stada, J.E. 2007. Basics of transport economics. Heverlee, Belgium: Katholieke Universiteit Leuven.

Kelly, J,M., Clark, B., Brown, V., & Sitzia, J. 2007. Good practice in the conduct and reporting of survey research. *International Journal of Quality in Health Care*, 15(3):261-266.

Klastorin, T. 1995. Urban goods and intercity freight movement. Washington.

Kockelman, K., Chen, D., & Nichols, B. 2013. The economics of transportation systems: a reference for practitioners. TxDOT project 0-6628: economic

consideration in transportation system development and operations. Washington: TxDOT

Lindholm, M. 2013. Urban freight transport from a local authority perspective –a literature review. http://www.openstarts.units.it/xmlui/bitstream/handle/10077/8869/ET_2013_54_3%20Lindholm.pdf?sequence=1 Date of access: 19 Nov. 2016.

Litman, T. 2017. Evaluating transportation economic development impacts. London: Victoria Transport Policy Institute.

Mahmudah, N., Parikesit, D., Malkhamah, S., Priyanto, S. & Zuidgeest, M. 2010. Regional freight transportation planning: an overview of developing methodology. Putrajaya: University Tanaga National.

Manager: Transport. 2015. Freight transport in the region [personal interview]. 25 Sept., Sedibeng District Municipality, Vereeniging.

Marshall, A. & Webber, C. 2007. Transport investment and economic growth. London: Centre for Cities.

Mbambo, D.E. 2009. Research methodology. Pretoria: UNISA.

Mckinnon, A. 1988. Physical distribution. (*In* Marshall, J.N., *ed*. Services and Uneven Development. Oxford University Press, Oxford.

Messo, M.D 2013. Land transport. Brazil. http://www.booming brazil.nl/uploads/media/Land_Transport_in-Brazil.pdf Date of access: 16 Dec. 2016.

Midioski, L. 2013. The need for a federal urban freight policy in the US. http://www.planning.dot.gov/documents/briefingbook/bbook_07.pdf Date of access: 10 November 2016.

Moody, D. 2002. Empirical research methods. Melbourne: Monash University.

Mouton, J. 2003. How to succeed in your master's and doctoral studies: a South African guide and resource book. 4th impression. Paarl: Van Schaik Publishers.

Mumbai Metropolitan Region Development Authority. 2008. Comprehensive transportation study for Mumbai metropolitan region. India: Transform.

National Economic Council and the President's Council of Economic Advisers. 2014. An economic analysis of transportation infrastructure investment. Washington: White House.

Neuman, W.L. 2011. Social research methods qualitative and quantitative approaches. 7th ed. USA: Allyn & Bacon.

Nogales, A. 2004. China: transport sector brief. http://www.worldbank.org/transport/transportresults/regions/eap/eap-china-output.pdf--brief Date of access: 16 Dec. 2016.

Planning Commission of India. 2014. India transport: moving India to 2032. New Delhi: Routledge.

PRASA. 2017. Mobernization of the rolling stock. http://prasa.com/stations%Modernisation.html Date of access: 17 Aug. 2017.

PricewaterhouseCoopers. 2015. Transportation and logistics 2030, Volume 3: Emerging Markets. Pretoria: PricewaterhouseCoopers.

Puget Sound Regional Council. 2010. Regional freight strategy. Washington: Puget Council.

Researchomatic. 2012. Urban freight transport. http:/www.www.researchomatic.com/essay/Urban-Freight-Transport-138175.aspx Date of access: 31 Oct. 2016.

Rodrigue, J.P. & Notteboom, L. 2013. The geography of transport systems. New York: Routledge.

Ross,C.L. and Lee,D.H.W.2014. Freight movement, port facilities and economic competitiveness. Atlanta: Georgia Department of Transport.

Ross, K.N., Saito, M., Dolota, S., & Ikeda, M. 2009. The SACMEQ Data Archive (Version1.2). Paris: International Institute for Educational Planning.

Savy, M. & Burnham, J. 2013. Freight transport and the modern economy. New York: Routledge.

Schoemaker, J., Allen, J., Huschebeck, M. & Monigl, J. 2006. Quantification of urban freight transport effects: European Commission, 2006. http:www.bestufs.net…/key_issues/BESTUF_Quantification_of_effects.pdf Date of access: 15 Oct. 2016.

Sedibeng District Municipality. 2008. The district integrated transport pan (DITP). Vereeniging.

Sedibeng District Municipality). 2013. Integrated development plan (IDP). Vereeniging.

Sedibeng District Municipality. 2014. Integrated Development Plan (IDP) Vereeniging.

Sedibeng District Municipality. 2015. Integrated development plan (IDP). Sedibeng Municipality. Vereeniging.

Sedibeng District Municipality. 2016. Integrated development plan (IDP). Sedibeng Municipality. Vereeniging.

Sedibeng District Municipality. 2017. Integrated Development Plan (IDP). Sedibeng Municipality. Vereeniging.

Sedibeng District Municipality. 2012. Growth and development strategy 2. Sedibeng Municipality, Vereeniging.

Sequeira, S., Hartmann, N & Kunaka, O. 2014. Reviving trade routes: evidence from Maputo corridor. Africa transport policy program. Washington: World Bank Group.

Shahia, M., Smut, C.A. & Cronje, J.N. 1994. UNISA: transport economics (Honours) Only study guide for TRALOG (Transport Logistics). Pretoria: UNISA.

Shipman, M. 1988. The limitations of social research. 3rd ed. London: Longman.

Sivasubramanniyan, P. 2012. Research Methodology: An introduction. In Quarternary Research, 1(3): 335-500.

Skorobogatova, S. & Kuzmina-Merlino, L. 2016. Conference on reliability and statistics in transportation and communication: transport infrastructure development performance. Latvia : Riga.

South African Government. Constitution of South Africa. 1996. Pretoria: Government Printers.

Standing Advisory Committee on Trunk Road Appraisal (SACTRA). 1999. Transport and the economy. report to UK department of environment and transport. London:UK Department of Transport.

Statistics Nederlands. 2016. Transport and mobility. Hague:Bonaire

Statistics South Africa. 2012. Census 2011. Pretoria. Government Printers.

Thaller, C., Moraitakis, N., Rogers, H., Sigge, D., Clausen, U., Pfohl, C., Hartmann, E. & Hellingrath, B. 2011. Analysis of the logistics research in India – White Paper http://ganga.iiml.ac.in/~samir/Analysis%20of%20the%20Logistics%20Research%20in%20India.pdf--analysis of logistic research in India Date of access: 16 Dec. 2013.

The Eddington Transport Study. 2006. The case for action: Sir Rod Eddington's advice to Government. United Kingdom: UK Department of Transport.

Tingting, T., Edward, Y., Roland, K. & Roberts, K. 2014. *Journal of the Transportation Research Forum,* 53(1):65-81.

Transport Canada. 2011. Active transportation In Canada: a resource and planning guide. Ottawa: Government Printers.

United Kingdom, Department of Transport. 2010. Freight consolidation centre study. Transport and research. UK: Department of Transport.

United Nations. 2013. Planning and designing for sustainable urban mobility: global report on human settlement. Geneva: United Nations.

Van Duin, J.H.R. 2013. Chaos in urban freight policies? A comparison between Dutch cities. http://www.econstor.eu/bitstream/10419/86297/1/04-126.pdf Date of access: 16 December 2016.

Van Zuylen, H., Ma, Y. & Kuik, R. 2009. Freight origin-destination estimation using bayesian networks based on multiple data sources. Nederland: Erasmus University Rotterdam.

Viljoen, N. 2014. 10th state of logistics survey for South Africa, 2013. Pretoria: CSIR.

Visser, J., Van Binsbergen, A. & Toshinori, N. 1999. Urban freight transport policy and planning. Australia :Cains.

Visser, J.G.S.N. 2013 Urban freight transport policies and planning in Europe: an overview and classification of policy measures. http://www.johanvisser.nl/mediapool/51/519305/data/Microsoft_Word_-_paperNUFCjvisser.pdf Date of access: 19 Nov. 2013.

Wahad, M.M.A. 2014. Convenience sampling. http://www.conveniencesampling.net/html Date of access: 21 Sept. 2014.

Walliman, N. 2011. Research methods: the basics. 1st edition. London: Routledge.

Wang, J. 2009. An empirical study of the relationship between transportation and economic growth in Xinjiang province. *International Business Research Journal,* 2-22.

Waweru, M.D. 2012. Design of the transport network for the Nairobi county. Nairobi: University of Nairobi.

Weisbrod, G. 2008. Models to predict the economic development impact of transportation projects: historical experience and new applications. Washington: Department of Transport.

Wenzel, S.A. & Brill, E. 1998. Mapping a path for evaluation: a planning guide. 2nd ed. Chicago:Congretional Research Service.

Williams, C. 2007. Research methods. *Journal of Business and Economic Research*.*Vol 5. No.3*.

Wilson, R. 2001. Assessing communicative rationality as a transportation planning paradigm. USA: California State Polytechnic University.

Worldbank. 2009. Freight transport for development toolkit: urban freight. Washington: World Bank.

World Bank. 2013. Railway reform: toolkit for improving rail sector performance. http://www.ppiaf.org/sites/ppiaf.org/files/documents/toolkits/railways_toolkit/ch1_1_3.html Date of access: 10 November 2016.

Zhang, B., Yao, T., Friesz, T.l. & Liu, H. 2013. Urban freight transportation planning: a dynamic stackelberg game-theoretic approach. United States: Pennsylvania State University.

Zhao, X., Mahendra A., Godfrey, N., Dalkmann, H., Rode, P. & Floater, G. 2017. Unlocking the power of urban transit systems for better growth and a better climate. Technical note. New Climate Economy, London and Washington, DC. http:// newclimateeconomy.report/misc/working-papers/ Date of access: 2 Jun. 2017.

Zohrabi, M. 2013. Mixed method research: instruments, validity,reliability and reporting findings. Finland: Academy Publisher Manufactured.

ANNEXURE A: QUESTIONNAIRE ON PUBLIC SECTOR:ROADS

PUBLIC SECTOR: ROADS

This Questionnaire is directed to **Officials for the Roads maintenance** in provincial and local governments. Four interviews will be aimed one official from Gauteng Province, Emfuleni, Lesedi and Midvaal Local municipality.

Instructions:

- You are requested to participate in this research survey and express your opinion and knowledge about freight issues in Sedibeng District Municipal Area.
- The survey is **strictly confidential**: kindly do not put your name on the questionnaire.
- Please be open and honest in your answers
- Please answer all questions. (Select with a cross).

  Level or tier of government

Provincial	District Municipality	Local Municipality

- POSITION:_____

1. Does the municipality/province have roads designed for movement of freight only?

Yes	No

2. Can you please elaborate/explain your above mentioned answer?

_____

_____

_____

_____

3. Do you have any relationship with freight operators in the region?

Yes	No

4. Can you please elaborate/explain your above mentioned answer?

_____

_____

_____

_____

_____

_____

_____

5. Does the roads network in the region having capacity to handle freight volume in the region:

Yes	No

6. Can you please elaborate/explain your above mentioned answer?

_____

_____

_____

_____

7. What is the impact of freight vehicles to the road network?

_____
_____
_____
_____

8. Does the province/municipality has a road master plan that dedicated certain roads to freight vehicles:

Yes	No

9. Can you please elaborate/explain your above mentioned answer?

_____
_____
_____
_____
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_____
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_____

10. What are the challenges of freight operations on road infrastructure and possible solutions to overcome them in the Sedibeng District region?

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THANKS VERY MUCH FOR YOUR PARTICIPATION IN THIS SURVEY

ANNEXURE B QUESTIONNAIRE ON PUBLIC SECTOR:ECONOMIC

PUBLIC SECTOR: ECONOMIC DEVELOPMENT

This Questionnaire is directed to **Officials working at the Economic Development departments** responsible for freight issues both in provincial and local governments. Five interviews will be aimed one official from Gauteng Province, Sedibeng District Municipality, Emfuleni, Lesedi and Midvaal Local municipality.

Instructions:

- You are requested to participate in this research survey and express your opinion and knowledge about freight issues in Sedibeng District Municipal Area.
- The survey is **strictly confidential**: kindly do not put your name on the questionnaire.
- Please be open and honest in your answers.
- Please answer all questions. (Select with a cross).

  Level or tier of government

Provincial	District Municipality	Local Municipality

- POSITION:_____

11. Are freight related matters considered in your local economic development strategy or any other strategies at your institution.

Yes	No

12. Can you please elaborate/explain your above mentioned answer?

_____

_____

_____

_____

13. Do you have any relationship with regards to planning, plans or implementation with freight operators in the region?

Yes	No

14. Can you please elaborate/explain your above mentioned answer?

_____

_____

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15. Does your Department/institution have data on movement of goods in and out of the region and economic impact thereof:

Yes	No

16. Can you please elaborate/explain your above mentioned answer?

_____

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17. From economic point of view, what are the challenges of transport logistics and possible solution to overcome them in the Sedibeng District region?

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THANKS VERY MUCH FOR YOUR PARTICIPATION IN THIS SURVEY

ANNEXURE C QUESTIONNAIRE ON PUBLIC SECTOR: LAW ENFORCEMENT

PUBLIC SECTOR: LAW ENFORCEMENT

This Questionnaire is directed to **Officials in the Law enforcement sector** responsible for freight issues in provincial and local government departments. Four interviews will be aimed one official from Gauteng Province, Emfuleni, Lesedi and Midvaal Local municipality.

Instructions:

- You are requested to participate in this research survey and express your opinion and knowledge about freight issues in Sedibeng District Municipal Area.
- The survey is **strictly confidential**: kindly do not put your name on the questionnaire.
- Please be open and honest in your answers
- Please answer all questions. (Select with a cross).

Level or tier of government

Provincial	District Municipality	Local Municipality

POSITION:_____

18. Do you have division or person responsible for freight related matters in your Department:

Yes	No

19. Can you please elaborate/explain your above mentioned answer?

_____

_____

_____

_____

20. Do you have any relationship with freight operators in the region regarding freight, transport or movement of goods?

Yes	No

21. Can you please elaborate/explain your above mentioned answer?

_____

_____

_____

_____

22. Do you have overloading facilities in your area:

Yes	No

23. Can you please elaborate/explain your above mentioned answer? (Where it is and how does work,etc)

_____

_____

_____

_____

24. Do you have freight vehicles restrictions laws or regulations in your area:

Yes	No

25. Can you please elaborate/explain your above mentioned answer?

_____

_____

_____

_____

26. Does freight contribute to traffic congestion in the region:

Yes	No

27. Can you please elaborate/explain your above mentioned answer?

_____

_____

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_____

28. Does freight contribute to road accidents in the region:

Yes	No

29. Can you please elaborate/explain your above mentioned answer?

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30. What are the challenges of freight operations and possible solutions to overcome them in the Sedibeng District region?

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ANNEXURE D QUESTIONNAIRE ON PUBLIC SECTOR: TRANSPORT

PUBLIC SECTOR: TRANSPORT

This Questionnaire is directed to **Officials in the Transport sector** responsible for freight issues in provincial and local government departments. Two officials will interviewed each responsible for fright issues in both Gauteng Department of Transport and Sedibeng department responsible for transport.

Instructions:

- You are requested to participate in this research survey and express your opinion and knowledge about freight issues in Sedibeng District Municipal Area.
- The survey is **strictly confidential**: kindly do not put your name on the questionnaire.
- Please be open and honest in your answers
- Please answer all questions. (Select with a cross)

Level or tier of government

Provincial	District Municipality	Local Municipality

POSITION:_____

31. Do you have division or person responsible for freight related matters in your Department:

Yes	No

32. Can you please elaborate/explain your above mentioned answer?

_____

_____

_____

_____

33. Do you have any relationship with freight operators in the region regarding freight , transport and movement of goods?

Yes	No

34. Can you please elaborate/explain your above mentioned answer?

_____

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_____

35. Do you have freight databank in your region:

Yes	No

36. Can you please elaborate/explain your above mentioned answer?

_____

_____

_____

_____

37. Do you have the Integrated Transport Plan(ITP) that incorporated freight issues:

Yes	No

38. Can you please elaborate/explain your above mentioned answer?

_____

_____

_____

_____

39. Does the region have dedicated freight facilities:

Yes	No

40. Can you please elaborate/explain your above mentioned answer?

_____

_____

_____

_____

41. Does the region have Freight Plan that includes movement of dangerous goods in the region:

Yes	No

42. Can you please elaborate/explain your above mentioned answer?

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43. What are the challenges of freight operations and possible solutions to overcome them in the Sedibeng District region?

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ANNEXURE D QUESTIONNAIRE : PRIVATE SECTOR BUSINESS

PRIVATE SECTOR: BUSINESS QUESTIONNAIRE

This Questionnaire is directed to **Officials working for industrial and commercial sectors** responsible for freight issues in their organization. These companies contributes significantly for freight and logistics in Sedibeng.

Instructions:

- You are requested to participate in this research survey and express your opinion and knowledge about freight issues in Sedibeng District Municipal Area.
- The survey is **strictly confidential**
- Please be open and honest in your answers
- Please answer all questions. (Select with a cross).

A. GENERAL INFORMATION

44. Name of business :_____

Physical address : _____

Contact person : _____

Position :_____

Telephone : _____

E-mail address : _____

45. Type of business :_____

46. Size of business:

Size	**Full time employees**	**Total Annual turnover**
Large	More 200	More than R40 million
Medium	More than 50 but less than 200	More R10 million but less than R40 million
Small	More than 10 but less than 50.	More R4 million but less than R10 million

4. How long have has the business been in existence?

- 1-3 years ☐
- 3-5 years ☐
- 5-10 years ☐
- Longer than 10 years ☐

5. Do you have division or person responsible for freight related matters in your company:

Yes	No

6. Can you please elaborate/explain your above mentioned answer regarding the size and extent of the division?

_____

_____

_____

_____

7. Do you have your vehicles to transport goods?

Yes	No

8. Can you please elaborate/explain your above mentioned answer? (Such as how vehicles, type etc.).

_____
_____
_____
_____
_____

B. DISTRIBUTION/PROCUREMENT INFORMATION

1. Goods transported/Distributed

Type of goods	**Tons per annum**

2. Goods procured/Received.

Type of goods	**Tons per annum**

3. To which areas does your business sell/distribute its products?

	Local (Sediben	**City of Joburg**	**City of Tshwane**	**Ekurhuleni**	**West**	**Other Provin**	**Afri ca**	**Rest of**

	g)				Rand	ce		World
Percentage (Add to 100%)								

4. From where does your business procure its products?

	Local (Sedibeng)	City of Joburg	City of Tshwane	Ekurhuleni	West Rand	Other Provinces	Africa	Rest of World
Percentage (Add to 100%)								

5. Please indicate the mode of transport for procurement, distribution with reference to volume (% add to 100%).

ROAD %	RAIL %	AIR %	OTHER %

C. STATEMENTS/OPINIONS

1. Do you have any relationship with government

regarding freight, transport or movement of goods?

Yes	No

2. Can you please elaborate/explain your above mentioned answer?

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_____

3. What are the challenges of freight operations and possible solutions to overcome them in the Sedibeng District region?

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THANKS VERY MUCH FOR YOUR PARTICIPATION IN THIS SURVEY