Sustainable regional planning in a mining environment: Madibeng and Rustenburg municipalities

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Dissertation submitted in fulfillment of the requirements for the degree *Magister Artium et Scientiae* in Urban and Regional Planning at the Potchefstroom Campus of the North-West University

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November 2016

ABBREVIATION LIST

ANC	African National Congress
BIC	Bushveld Igneous Complex
BNG	Breaking New Ground
BPDM	Bojanala Platinum District Municipality
BPSDF	Bojanala Platinum District Spatial Development Framework
CRU	Community Residential Units
CSD	Commission on Sustainable Development
DFA	Development Facilitation Act
DME	Department of Mineral and Energy
EU SSD	European Union Strategy for Sustainable Development
FLISP	Financially Linked Subsidy Housing
GDP	Gross Domestic Product
GVA-R	Gross Value Add by Region
HDSA	Historically Disadvantage South Africans
ICMM	International Council of Mineral and Metals
IDP	Integrated Development Plan
IFC	International Finance Corporation
KPA	Key Performance Areas
LED	Local Economic Development
MCDC	Mabopane-Centurion Development Corridor
MIDP	Madibeng Integrated Development Plan
MLM	Madibeng Local Municipality
MPRDA	Mineral and Petroleum Resources Development Act
MPT	Municipal Planning Tribunals
MSDF	Madibeng Spatial Development Framework
NDP	National Development Plan
NEG	New Economic Geography
NEMA	National Environmental Management Act
NFSD	National Framework for Sustainable Development
NPC	National Planning Commission
NPDP	National Physical Development Plan

NSDF	National Spatial Development Framework
NSDP	National Spatial Development Perspective
NWDP	North West Development Plan
NW Province	North West Province
NWSDF	North West Spatial Development Framework
ODPM	Office of the Deputy Prime Minister
PGDM	Provincial Growth and Development Strategy
PGE	Platinum Group Element
PGM	Platinum Group Metals
RDP	Reconstruction and Development Plan
RIDP	Regional Industrial Development Programme
RLM	Rustenburg Local Municipality
RPM	Rustenburg Platinum Mine
RSDF	Rustenburg Spatial Development Framework
SAACP	South African Association of Consulting Professional Planners
SADC	South African Development Communities
SAPI	South African Planning Institute
SDC	Service Delivery Centres
SDF	Spatial Development Framework
SDM	Sustainable Development through Mining Programme
SIP	Strategic Integrated Project
SLP	Social and Labour Plan
SPLUMA	Spatial Planning and Land Use Management Act
UNCED	United Nations Conference on Environment and Development
WSSD	World Summit on Sustainable Development

EXECUTIVE SUMMARY

The study relates to a focused approach evaluating appropriate spatial planning in a mining environment. The 48km long Platinum Reef is situated between Brits and Rustenburg municipalities, located in the North West Province (South Africa). Hans Merensky discovered the Reef in the early 1900s. The North West Province has a definite comparative advantage in the mining sector. It is responsible for 94% of the platinum, 46% of the granite and 25% of the gold produced in South Africa. The mines within the Rustenburg and Brits municipalities produce more platinum than any other single platinum region in the world. The approximate distance between Brits and Rustenburg is 70km. The environmental impact within this region is significant due to the densely populated mining area which consists of 60 mining locations: 20 mineshafts and 40 opencast mines. Although the core development areas of Brits and Rustenburg reflect rapid economic growth, migration between mining activities contributes to the growth of numerous nodal points between the two municipalities.

The economic injection by the mining sector, and the developments associated with mining in the area (considered as temporary), have resulted in the rapid growth of development nodes along this platinum reef. The rate at which new nodal points develop, because of agglomeration benefits, hampers regional planning and infrastructure development. Research has shown that unsustainable development of mining towns directly link to the lifespan of the natural resources. As soon as the resource was discovered, the development's benefits (offered by mining) suddenly appear, and new informal settlements are experiencing poor social-infrastructure conditions. Consequently, this region demands the implementation of functional change in mining towns. Planning authorities cannot meet the demands required by the development caused by the mining activities. Furthermore, mining towns are not necessarily located in the vicinity of core development areas, but rather near mining locations (rural areas) without adequate infrastructure, resulting in unsustainable regional development. The central spatial focus of the proposed study is the change mining activities bring to the physical landscape, as well as in socio-economic relations, directly influencing the people involved and their activities. The challenge relates to "**unplanned regional development",** which causes change in the physical landscape and results in unsustainable socio-economic activities.

The problem statement links to the lack of co-operation between the private sector and municipalities, leading to the deficiency of policy implementation proposed to address sustainable regional development. Local authorities struggle to implement appropriate policy and legislation to support sustainable development and cannot administer the establishment to the necessary infrastructure for nodal expansion. Currently, the impact of the permanent migration to mining activities contributes to unsustainable regional growth. The essence of the problem comprises location, distribution and spatial organisation between core development areas and mining locations.

The proposals made in this study are based on the evaluation of the existing state of the identified mining region. As this study is based on qualitative research, the focus was to gain an understanding of underlying reasons, opinions and motivations for current observations. The primary goal is to identify and acknowledge the stakeholders that are responsible to facilitate the rapid growth in the study area, i.e. mining operations and specific role players. The study correlates the relationship between different sectors and their responsibilities, with regional development. The study interprets relevant policies of the role players contributing to sustainable regional development, in order to understand the relationship between regional theory about, and practical necessity for sustainable development. The new sustainable regional strategies establish opportunities to attract further investment in and around the region. In addition, determining the framework necessary for the appropriate integration of development programmes locally, will benefit the region and the nation.

Qualitative research assists in formulating a hypothesis for potential quantitative research. Therefore, the combination of theoretical tools (theoretical foundation), with the presence of specific parameter values (South African policymaking processes) in the economies modelled by new economic geography, explains the geographical disparity of the economic landscape as a disturbance of equilibrium. The application of theories is fundamental in policy making as it guides regional development. The central focus emphasises the importance of the policies' scope. It aims at planning in advance to establish socio-economic specialisation in diverse locations. The circumstances in every individual mining town are unique. Consequently, authentic proposals should be made in each mining region in order to establish sustainable regional development.

This study strives to contribute to the promotion and implementation of functional premises in the demarcated region of the survey. The proposals include the co-operation of the mining companies with the government spheres, to such an extent that it could be implemented at all levels of spatial planning. A basis is proposed to align national, provincial and local policies in the promotion of sustainable regional development. This dissertation represents the proposal to establish a sensible, sustainable regional development approach within a mining milieu.

KEYWORDS: *Sustainable development, mining environment, regional growth, policy and planning, regional planning, planning and development, public private partnership, planning theory.*

ACKNOWLEDGEMENTS

- I would like to extend my gratitude and appreciation to, Dr Ernst Drewes, for his excellent guidance and leadership.
- My assistant supervisor, Mrs Mariske van Aswegen, for her endless patience and continuous availability for consultation even in busy or "unofficial' periods of time.
- My Parents, who stood by me and offered their financial support throughout my studies
- My wonderful husband, for his continued love, moral and financial support .
- My children, always inspiring me to be a better mother
- Messrs Leon Koorrse (Lonmin Platinum mine), Amund Beneke (Platinum Town Planners) and Ian Janse van Rensburg for their academic input and valuable contributions towards my research.
- Messrs. Andreas du Preez and Kobus Lombard from Lombard du Preez Land Surveyors and Town Planners, for their endless patience and leadership
- Mrs. Venita de Kock, who assisted editing the text. Without her voluntary involvement, the completion of this dissertation would not have been possible.
- Mrs. Hannalie Kok who facilitated the format of the dissertation kept the list of sources and reference up to date tight through the process. Her cheerfulness was like a fresh breeze through difficult times.
- Mr. Willie Kok and Wilanda van Rooyen for their assistance for solving technical difficulties

Psalm 37 verse 4 says : "*Take delight in the Lord and He will give you the desires of your heart*."

My inspiration resides in GOD, because:

"I can do all this through Him who gives met strength." ~ Philippians 3:13

To my heavenly Father – "*Both riches and honour come from You and You reign over all. In Your hands is power and might; In Your hand it is to make great and to give strength to all. I thank You and praise Your glorious name...*"

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF MAPS AND ANNEXURES

LIST OF LEGISLATION

Infrastructure Development Act 23 of 2014

Minerals Act 50 of 1991

Mineral and Petroleum Resources Development Act of 20 of 2002

Mining Rights Act 20 of 1967

Municipal Systems Act 32 of 2000

National Environment Management Act 107 of 1998

Public Service Act 103 of 1994

Republic of South Africa Act 108 of 1996

Spatial Planning and Land Use Management Act 16 of 2013

The Development Facilitation Act 67 of 1995

CHAPTER 1: Introduction

1.1 Introduction: Research orientation

North West is known as the Platinum Province and is responsible for 58% of the world's Platinum (IPA, 2016:3). The province also produces, 46% of the granite and 25% of the gold in the c South Africa (Cawthorn, 2010:205). Located in the north-eastern parts of the North West Province (NW Province) between Rustenburg and Brits, is the richest platinum reserves (Cawthorn, 2010:205). This area is known as the Bushveld Igneous Complex (BIC) and runs parallel to the Magaliesberg mountain range, (Urban Dynamics, 2010:30). It stretches from the Pilanesberg in the North, past Rustenburg towards Marikana and ends East of Brits. 80% of South Africa's Platinum Group Metals (PGM) (Twelve mines) is situated in this area (Cawthorn, 2010:205; Schouwstra *et al.,* 2000:34). Mining is responsible for more than a third of the Gross Domestic Product (GDP) in this province (Cawthorn, 2010:205; Schouwstra *et al.,* 2000:34). The district between Rustenburg and Brits produce more platinum than any other single platinum production site in the world (Schouwstra *et al.,* 2000:34).

1.2 Problem statement

The study area contains an average of 60 mining locations, 20 mineshafts and 40 opencast mines (interview I. Janse van Rensburg Director of Miteck Wesrand 2011). The environmental impact is indescribable because of the densely populated mining locations situated within the 70km distance between Brits and Rustenburg (70km versus 60 mining locations). Many concerns (Department of Minerals and Energy, 2007; Urban Dynamics North West Incorporation. 2010; interview I. Janse van Rensburg Director of Miteck Wesrand 2011; interviewed Lombard du Preez Land Surveyors and Town Planners, 2015) regarding sustainable development arise, due to the fast developing and expansion of the number mining activities. The concerns regard that rapid development within Brits and Rustenburg are generating rapid population growth and economic development. Involved entities such as town planners, developers and mines identified the excessive rural-urban migration that occurs between the different mining locations and nodal points. This study argues that a single (or more) entity/entities need

to take responsibility for directing growth and to ensure sustainable regional development.

This study focuses on the locations where the mining industry changes the physical landscape as well as socio-economic relations pertaining to the people and their activities (Hansen, 1972:50-77). The problem identified is the **unplanned regional development** of changes in the physical landscape and unsustainable socio-economic activities in an unplanned manner (Steyn & Barnard, 1976:211-212. Two important role players were identified in the study area, namely the ***private sector*** (mining houses: which comprise primary producers such as Lomin, Anlgo American Platinum Limited, Impala Platinum mine; private developers and town planners) and the ***government sector*** (local, provincial and national state authority).The government hierarchy for this study area encloses:

- The North West Province: The NW Province selects development priorities and principles in line with national development priorities in order to address national problems on local level (North West Development Plan, 2012:xvi).
- Bojanala Platinum District Municipality (BPDM): The BPDM is responsible to coordinate, facilitate and support local municipalities. ,
- The two dominant municipalities included in the study , are Rustenburg Local Municipality (RLM) and Madibeng Local Municipality (MLM). The study also includes the two major towns Rustenburg and Brits.

The mentioned sectors have different planning and development policies and strategies. These policies and strategies are supposed to contribute towards the sustainable regional development of this geographical area. Ideally, the different stakeholders and their tactics should collaborate. The empirical survey recognised that the role-players currently act as different entities and do not use their joint powers to ensure that existing policies are effectively implemented (See Section 4.6 for further discussion). In the act of governing the areas, each role-player only considers the municipal policies or provincial policies that fall under their jurisdiction.

The encompassing problem of **unplanned regional development** results:

- The rapid regional growth complicates sector co-operation, because they contradict their responsibilities that affect sustainable regional

development negatively. Municipalities and mining operations do not seem to integrate their development efforts.

- The encompassing problem is the wrong interpretation of all the relevant policies regarding planning theory and legislation to address unsustainable regional development.
- There is no regional plan that appropriately integrates planning theory and policies applicable to this study area benefiting the region and the nation towards economic opportunities and investment.

The overarching problem to be addressed by this study is to identify the stakeholders that are responsible to facilitate a cohesive team with the same approach towards sustainable regional development within a mining environment. The mining region between Brits and Rustenburg is a good example of how unsustainable development influences the sustainable future of regional development and how its direct impact affects socio-economic activities. These influences might be inversely positive where each economic entity could play a separate role, but still replenish each other.

1.3 Objectives and aims

The aim of the study is to define a system where the different stakeholders in this region could join powers, in order to stimulate economic activities in the appropriate locations.It is important for these sectors to understand that they are interrelated. Understanding the boundaries will contribute to the comprehension of each region and their responsibilities towards such regions.

The objectives are:

- To understand the relationship between the different sectors, in order to acknowledge their responsibilities towards regional planning and facilitate the rapid growth in the focus area of this study, i.e. mining operations and local municipalities.
- To propose a regional plan that contributes towards improved opportunities for further investment in this region and interpreting relevant policies regarding planning theory that might contribute to sustainable regional development.
- To define an applicable integrated framework, benefiting the region and nation towards economic opportunities for further investment.

It is concerning that the region's continued economic growth is primarily dependent on mining activities, Dependency on one economic entity is risky. Several economic entities are needed to ensure the future development of the region. If the depended economic entity fails, the region should be able to recover through other economic entities to ensure further development. Mining activities attract other economic entities. Therefore, mining companies must participate in and be accountable for sustainable growth, based only on their immense contribution towards the region. After the devastating strikes and political turmoil since the Marikana massacre on 16 August 2012 (IOL, 2012. Date accessed 13 August 2013), it is essential for mining companies to join forces with other economic entities to ensure the sustainable development of the area. It is necessary in order to create an attractive economic environment for foreign investors If the sectors could act cohesively to develop the region in a sustainable manner, the overall investment possibilities and economic prosperity of the region will improve.

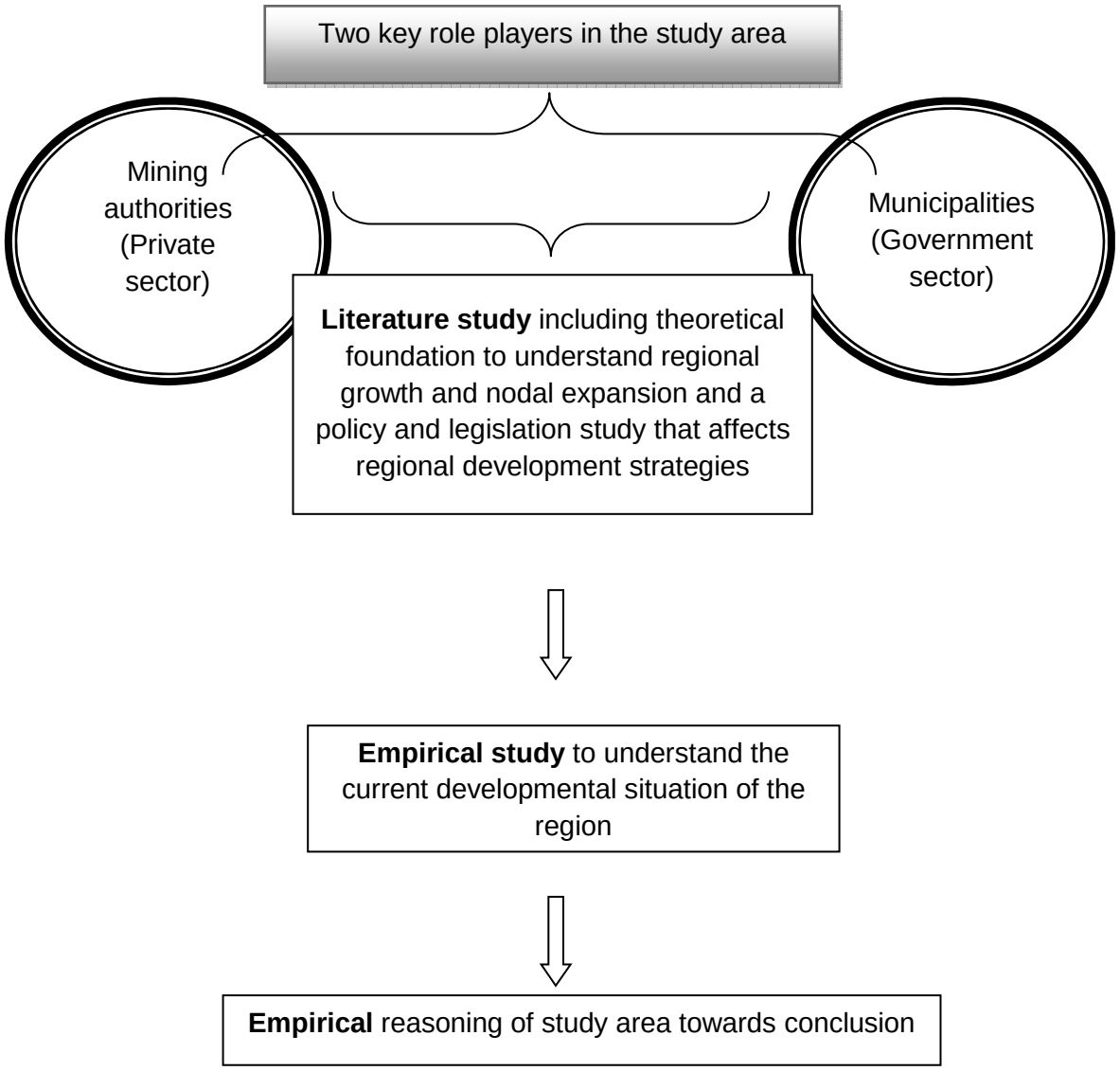
1.4 Methodology

A graphical explanation follows to illustrate how the literature and empirical study link. Figure 1.1 shows a visual account on how the discussion in this dissertation focuses on:

- the responsibility of the two key role players: Private and Government sectors;
- the clarification of the influence of the literature study;
- the comprehension of regional growth and nodal expansion;
- the empowerment of the different stakeholders accepting the involved consequences.

The study aims to steer the research in the direction of developing sustainable policy strategies. To address the current situation and prevent repetition of previous mistakes, the overall motivation is to establish a mode of progressive planning. A field study might reveal that the private sector, with specialised knowledge, is directly involved in the region compared to the municipalities, which are stagnant, based in their offices and removed from the regions.

Figure 1.1: Two key role players in the region



Source: Own compilation

The methodology approach describes data and its context based compiled as a combination of qualitative and quantitative data. Qualitatively refers to literature and policy analysis and quantitative refers to the field study statistics done during the research (discussion follows in chapter 4).

1.4.1 Literature study

Chapter 2 deals with the theoretical foundation of regional development and nodal expansion. The first part of Chapter 2 focuses on regional space explaining the regional geographic approach, central and non-central places, geographic and economic spaces and the interaction within the region. This division primarily concentrates on the central and non-central places (nodal points) within the region. In the second part of Chapter 2, an explanation of regional effect on regional growth, the all-encompassing spatial system, and finally, the growth pole theory follow respectively. This division concludes with the interaction between nodal points and their influence on the total regional system, better known as the core-periphery theory. Part 2 concludes chapter 2 with the effect of the new economic geography theory. Chapter 3 focuses on South African policy making and planning principles. It is critical to study and understand the theories, which are associated with regional development policies. These policies are applied to the development of nodal points in a region and used by the private and government sectors to manage the regional space. Explanations regarding the mining towns (Rustenburg and Brits), as well as the different mining activities, generating informal and formal economic activities, and developing informal settlements, follow.

Chapters 3 and 4 of this research pay attention to related national, local, regional and mining policy evaluation. Given that this study aims at sustainable regional development in a mining environment, the focus is on policy as a spatial instrument, and policy documents that influence regional development. The policy evaluation compares planning principles with planning theories. It is important to find the gap between the implementation of policy documents and the cohesive operation of the identified role-players. Ideally, the policy and strategies of the different sectors should be aligned to identify the different approaches and misconceptions regarding development. These theories need to be studied to understand what fundamentals are necessary to achieve a well-structured development plan. Together with these policies, it is important to take into account the new economic effects on development as well as complications experienced in the different sectors. It is of great significance that the *theoretical knowledge* and *implementation in practice* should be linked and support each other reciprocally.

Chapter 5 discusses international and local case studies to investigate strategies used before successfully on regional development Finally, Chapter 6 follows with recommendations and synthesis applicable for the study area.

1.4.2 Empirical study

The empirical research focuses on the Bojanala Platinum District, the Rustenburg Local Municipality and Madibeng Local Municipality, situated between the two capital towns of the municipalities: Brits and Rustenburg. A study of the national planning system followed the provincial spatial perspective before any predominantly empirical study of the Bojanala Platinum District was done.

Qualitative data applied by studying the existing policy documents, evaluation of the current state of the mining region and the evaluation thereof. The data collection methods involved direct interaction through structured interviews by questionnaires to focused entities, such as individuals working for entities involved within the mining area (such as employees of Lomin, Anglo American Platinum, municipal town planners, private town planners, land surveyors and private developers), that are directly involved in the study area. The benefits of the qualitative approach are that the information is richer and has a deeper insight into the understanding of the study. The qualitative data helped to clarify the quantitative evaluation findings. Quantitative methods include consultation of all involved policy documents and regional planning theories. Theoretical tools and the occurrence of specific policymaking process help to understand the model of New Economic Geography (NEG). The empirical research includes the primary exploratory research phase for capturing qualitative research, because regional space and its interaction are difficult to measure, but could be easily characterised and described. The study aims at revealing the current sustainability of the region regarding policy effectiveness and implementation, as well as economic growth and developmental success.

In essence, the empirical evidence could identify sectors with a comparative advantage, which in turn could guide proposals for development in the region. Mining benefits could potentially be utilized to promote and kick-start functional change in associated mining towns and regions. The empirical study could potentially recognise the need for the development of a policy that will support sustainable development and the modification of regional development to achieve functional change in the mining region. The study also takes into account how the mining

companies in the region currently offer support regarding the implementation of policies, and especially towards the co-operation between mining authorities and municipalities.

1.5 Conclusion

Prosperous development in platinum mining quickly followed the discovery of the BIC. Other companies whose experience had been limited to the mining of platinum, its market and fixed price brought it into considerable repute, and consequently drew many companies – big and small – to the Merensky Reef. In addition, these companies gave little or no thought to the means of extracting the complex minerals (Mc Donald & Hunt, 1982:413).

This dissertation represents the proposal to establish a sensible sustainable regional development approach within a mining milieu. The municipality is constitutionally obliged to plan and regulate the use of land in its jurisdiction. It follows that a mining company is obliged to align its initiatives accordingly, taking into account the unique characteristics which is peculiar to "mining" as a land use i.e. being source dependent (one cannot mine anywhere other than where the mineral resource is).

A unique "partnership" between the municipality and the private sector must be established. This will enable them to form a cohesive team with the same approach towards sustainable regional development that firmly roots within planning theory practice and the nature of the study area.

CHAPTER 2: Regional Growth in Regional Space: a Theoretical Foundation

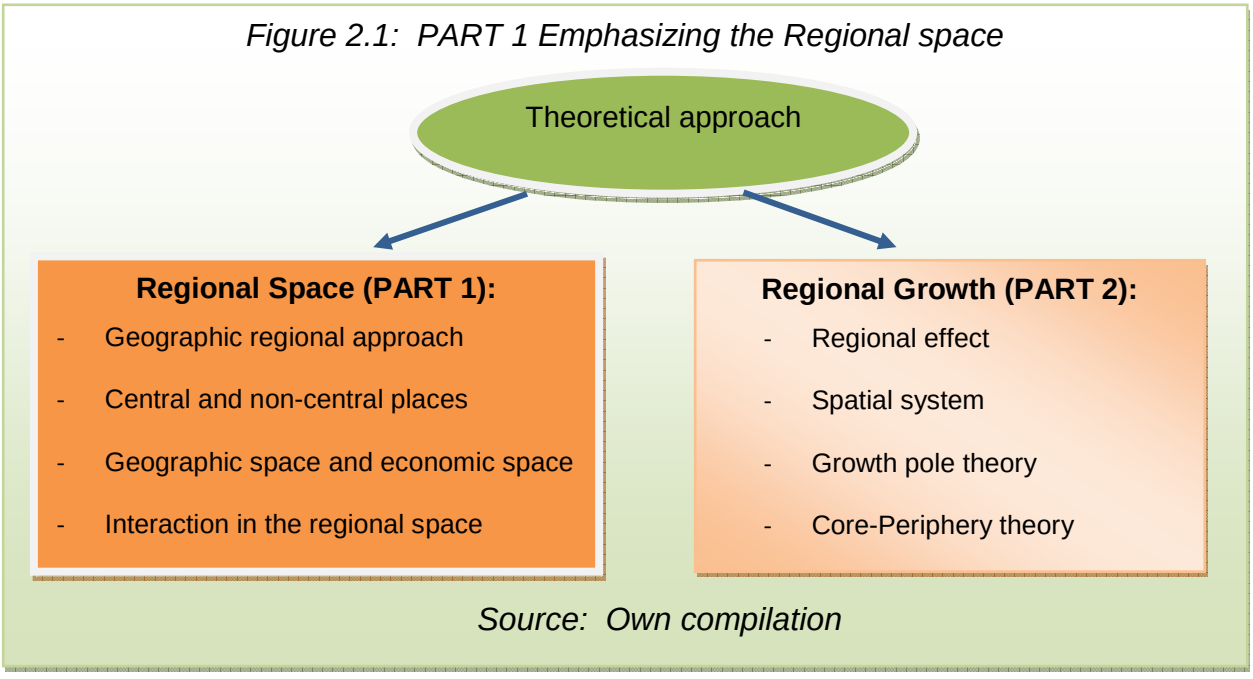
2.1 Introduction to regional space

The theoretical foundation chapter includes a discussion of theory related to the nature of the study. The discussion refers to the explanation and graphical representation of regional growth theory applicable to this study. Theory related to this study, namely regional space and regional growth, is divided into two parts, i.e.:

- *Part 1* discusses Regional Space (section 2.2 - 2.6.2), that presents a study on central places (section 2.3) and non-central places (section 2.4). This forms the economical and geographical space (section 2.5), within the regional space system, where interaction occurs (section 2.5). According to the theory, this result in regional growth;
- *Part 2* (section 2.7 – 2.7.5) discusses the entire regional growth with regard to regional development and interaction between nodes. A more detailed, complex explanation of how regional growth ensues. The following theories are regarded as central to regional growth: regional effect, spatial system, growth pole theory and core-periphery theory.

Figure 2.1 below demonstrate the Theoretical foundation, emphasizing the Regional Space (section 1).

Figure 2.1: PART 1 Emphasizing the Regional space



Source: Own compilation

2.2 Geographic regional approach

According to James (1952:197-201), various geographic phenomena that are the result of processes, are found on the surface of the earth. People and goods are not static, they move around and cause these processes. He defines these processes as "sequence of change systematically related as in a chain of cause and effect" (James, 1952:197) and he defines a geographic phenomenon as "any event not uniformly distributed over the face of the earth" (James, 1962:197). It is important to study processes that occur geographically. The causes of the process and the driving force behind the process can be perceived. In studying the process, it is of cardinal importance to demarcate an area in which the process occurs. Geyer (1979:91) describes the demarcation of areas as a valuable aid to arrange an area to study it. The above-mentioned aspects are crucial to study in the case of mining regions. Minerals are not consistently distributed and it is important to identify the driving forces that result in the underdevelopment of the mining region.

Core (1984:8) says that an important characteristic of regional science, regional economy and theoretical geography is that each of them represents a discipline and that each of them relates to a space in which a region can be demarcated or in which each occur. Core also refers to Isard's approach towards regional science, which he identifies as "an extreme degree of abstraction, which, nonetheless, furnishes one fruitful approach to the development of the concept of the region" (Isard, 1956:18). In addition, Isard (1956:19) describes the process to an interaction between the various commodities and activities among the development nodes within a space. Accordingly, this interaction of commodities and activities (processes) between nodes within a space is the stimulating factor that causes development within the space. Thus, a space is demarcated to improve understanding of the interaction that causes development.

As mentioned earlier, different commodities and activities interact. Steyn and Barnard (1976:55) refers to components that link with one another and that this linkage gives expression to the interaction that takes place between localities. The interaction can be ascribed to the flow of people and goods between various localities (Christaller, 1966:14) on the surface of the earth. According to them, it occurs on all levels of the geographic space – locally, regionally or internationally. This interaction can be observed visually or non-visually. Thus, it causes localities to be linked to one another.

The route along which interaction takes place will be discussed in detail in Section 2.3 and 2.6.

2.3 Central place theory

Christaller developed the central place theory in 1933. His theory defines a number of concepts; the concept *centralisation* forms the cornerstone of his theory: “The crystallization of mass around a nucleus is an inorganic as well as an organic nature, an elementary form of order of things which belong together – a centralistic order” (Christaller, 1966:14). He identifies four types of places: central places, area-bound settlements, place-bound settlements and settlements that are not place or area bound but can be distinguished from central places (Christaller, 1966:16). He states that the ideal locality of a town is to establish itself in the middle of a region and he describes it as centrality of a central place “the functions of a centre at the geometrical location of the settlement” (Christaller, 1966:17). Minerals are area bound and their mining locations could be classified as localized central to the mining area. He regards central goods and services as the goods that are produced centrally and the services are rendered centrally. In that way, service areas around a central place commence, which he regards as the definition of *range*. Thus, range is the distance of the town in which services can be rendered as measured by operating costs, time, inconvenience and other factors.

Accordingly, consumption of central goods depends on the following aspects (Christaller, 1966:18; Lösch, 1954:94):

- Distribution of the population in the complimentary region;
- The extent of agglomeration (which is discussed in detail later) of people in the central place;
- The professional and social structure of the population;
- The wealth or income of the population;
- The supply and demand of goods;
- The price of goods.

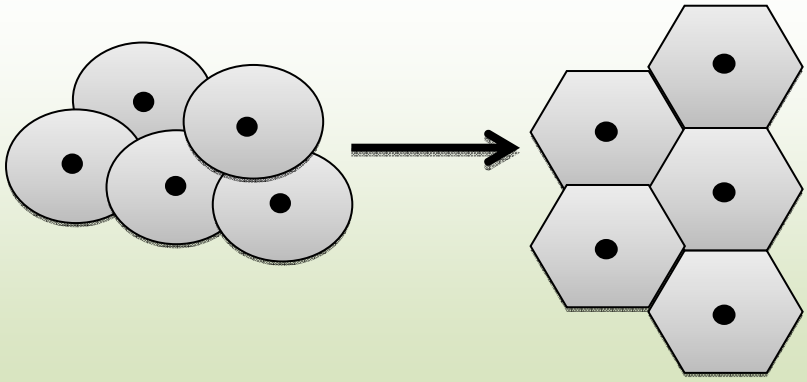
The above-mentioned factors play an important role in determining the range. Furthermore, he distinguishes between the following (Christaller, 1966:34) (see figure 2.2):

- *Lower limit:* Refers to the limit around a central place that includes just enough people to make the supply of a central commodity or service possible. This can also be described as the threshold population.
- *Top limit:* Refers to the operational area being equal to the total range of the goods/services and originates from the maximum distance people are prepared to travel to acquire goods/services.

Mining regions do not only surpass local or regional boundaries, but also extend across national boundaries towards international trade. Consequently, the influences of mining regions are difficult to describe as it affects a large range.

Subsequently, he defines economic distance as “determined by the cost of freight, insurance and storage; time and loss of weight or space in transit and as regards passenger travel, the cost of transportation, the time required and the discomfort of travel” (Christaller, 1966:22). He bases his entire theory on a homogeneous area of nodal points each with their own range. These ranges intersect and form hexagons.

Figure 2.2: Ranges start intersecting at a point and then form hexagons



Source: Adapted from Christaller (1966:22)

2.4 Non-central places

This theory is more applicable to the study area. Geyer (1989:36) defines non-central places as young, under-developed central places. According to Hoover (1948:3, 4) the most obvious basis for the distribution of industries and people is the placement of *natural resources*. The reason is that economic interrelations between different locations play such an important part in shaping the patterns of location holistically. Even in the absence of any initial differentiation at all, (if natural resources were

distributed consistently over the globe) patterns of specialization and concentration of activities would inevitably appear in response to economic, social and political principles.

Botha (2011:49) summarized and compares the difference between central and non-central places (refer to table 2.1).

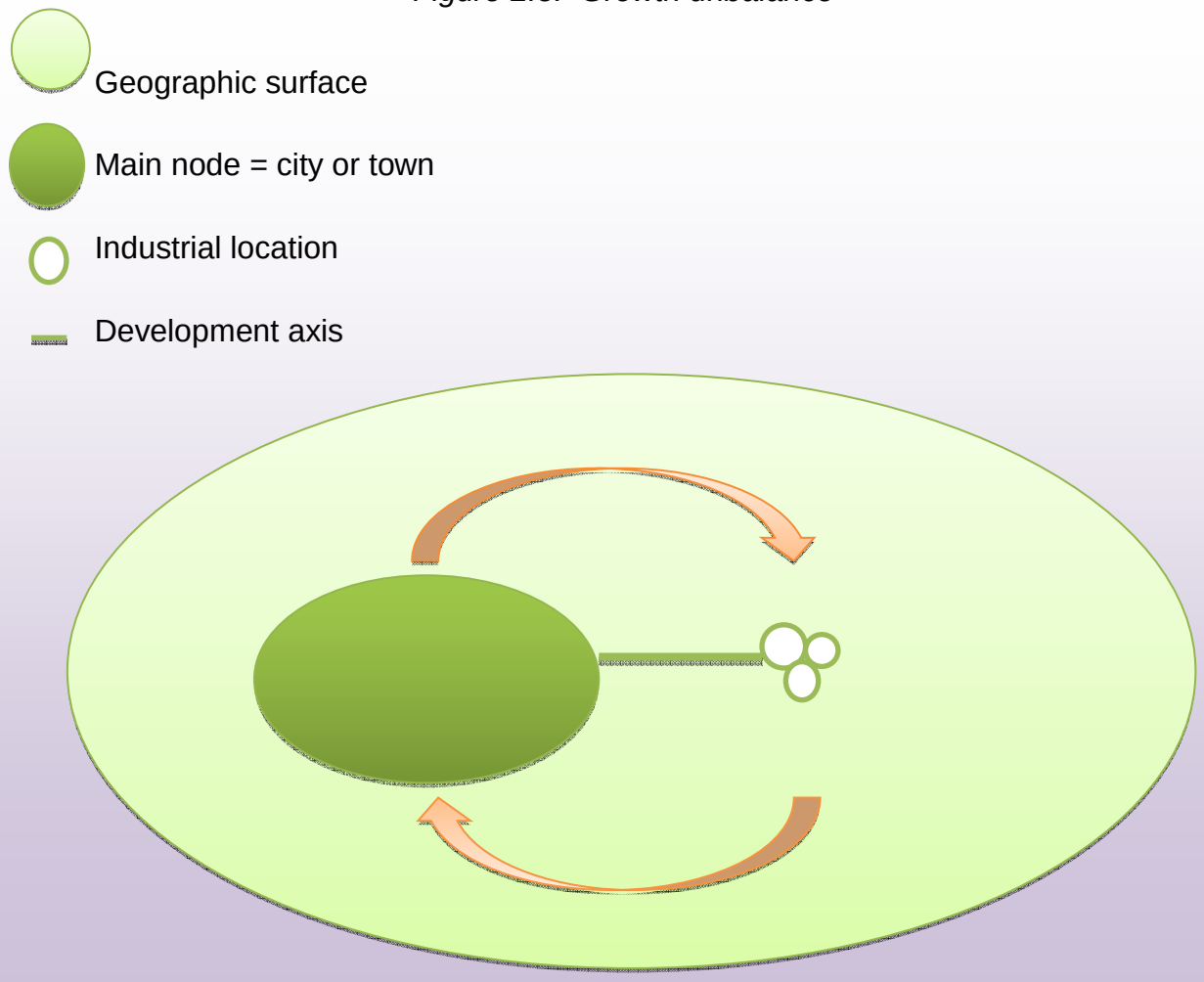
Table 2.1: Comparison between central and non-central places

	Central place	vs.	Non-central place
Hierarchy	Normally in the top of the hierarchy in the district.		Lower in the hierarchy in the district. (Central place are in top)
Services	Many services and functions in the city.		Limited services and functions. (Often one function)
Service Area	Big service area (people travel from far to come to this place).		Small service area (people prefer to go to central places)
Population Size	Population normally larger than non-central place.		Population size smaller than central place (due to more available works).
Social Structure	Social structure more professional.		Social structure less professional.
Supply and Demand	Supply and demand of goods and services bigger.		Supply and demand not as big as in central places.

Source: Adapted from Botha (2011:49)

Mining towns are considered as non-central places (Christaller, 1966:38; Botha, 2011:49) because of the uneven placement of natural resources. As for non-central places, growth imbalance occurs in the region (Hansen, 1972:50-77). Natural resources are unevenly distributed, leading to uneven distribution of industrial/mining activities. The activities that attract settlements and businesses form economic nodal expansion a distance away, which causes unbalanced growth. The expansion of the economic node creates growth, prompting migration from the city/town (main nodal point) to the industrial node (figure 2.3). This economic interrelation between core and nodal points occur due to various reasons such as strong corridor (axis) development, the effect of distance on the extent of interaction and forces of attraction that in turn stimulate growth.

Figure 2.3: Growth unbalance



Source: Own compilation

The forces of mutual attraction and repulsion that shape the complete geographic structure are examined respectively as this affect the individual's choice of location. Location preference should be viewed from the stance of the producer. The environment (including the location of settlements and other structuring elements) is regarded as fixed for that stage of development. In the following section, an attempt is made to explain how the economic interrelations of numerous producers and consumers create location patterns.

2.5 Geographic space and economic space

Perroux (1950:96) writes about the nature of economic space in *Economic space theory and application*, explaining that he wants to move away from geographic isolation of regions. He believes that people, objects and forces are wrongly represented as the

same space. According to him, human beings, objects and forces must not be put in the same geographic container because real life, especially with regard to the economy, contradicts the concept of the container of geographic content. He presents three ideas (1950:91):

- The concept of abstract space can be extended to economic sciences like those used in mathematics and physics;
- A new view of economic space, even in its most elementary form, where people move freely across the geographic container of economic processes;
- This extension is necessary for the radical transformation of some fundamental economic theories.

He also refers to spaces with two or three dimensions in which points, lines, surfaces and volumes can be determined, like those applied in mathematics by means of coordinates. It provides a definition for an abstract space. Thus, the abstract space can be applied to economic space (Perroux, 1950:93). Perroux`s theory (1950:92) also identifies that there are just as many economic spaces in an economic system, as there are structures of economically interactive processes. It cannot be determined as accurately in the economy though. Thus, one can move from geographic space to economic space and from an artificial perimeter to a real economic perimeter.

Pred (1977) (sited by Storper, 2011:335) discusses the way in which the structure of information flows between economic agents affecting the economic development of a city system. A central principle of the work is that “spatial biases” in the flow of information tend to give incumbent urban centres an advantage in economic growth (Storper, 2011:339). Furthermore, the flow of information across the landscape happens primarily among the system of large metropolitan centres and so reinforcing the stability of the system of cities. Pred (1977) (Storper, 2011:335) relies on the basic idea to account for the historical development of urban areas. When urban centres emerged primarily to facilitate trade, the spatial bias was most pronounced due to the importance of face-to-face communication within cities and among large trading centres. Due to spatial biases, trading centres were more likely to become the sites of initial industrialization. Once established, multiplied effects gave these initial industrial centres a cumulative advantage in economic growth as innovation in production technologies diffused. Pred concludes that the inter- and intra-organizational linkages between the administrative hubs found in large metropolitan areas are self-reinforcing and not likely

to result in a “spread” of growth into lower-level urban centres or surrounding hinterlands (Storper, 2011:337).

2.6 Regional interaction

Interaction between areas relates to *supply* and *demand* between respective nodal points (areas). Ullman (1956:55) and Hurst’s (1974:2) approach to spatial interaction is that “the overcoming of distance is so basic to geography that spatial differentiation cannot develop without movement”. Interaction is based on the movement of people and goods as well as the relationship between supply and demand and all the mentioned aspects occur between localities (Hurst, 1974:3).

Mumford (1975:13) describes interaction as “human life swinging between two poles: movement and settlement” and as the balance between movement and settlement which leads to the forming of cities. Therefore, the movements must possess accessibility to cause the movement. Various methods of movement are found and the most common occurs by means of transport media: water transport, railways, roads and air transport. Various other methods of movement can also occur by means of communication lines, power lines and pipelines. These are described as development axes (Steyn & Barnard, 1973:55).

Friedmann (1966: xv) defines a development axis as “a type of upward traditional area connecting two or more core regions”. In this regard, we refer to the mining locations and mining towns, “The intensity of corridor development tends to be directly proportional to the product of the core economy region and inversely proportional to the distance separating them”. According to Geyer (1986:5), the following three aspects concerning development axes are clear:

- The first aspect is the functional interaction between the cores/nodes (force of attraction of cores or cities) between localities;
- The second aspect is the influence that distance exerts on the extent of interaction;
- The final aspect is the extent of agglomeration benefits in the cores/cities and localities as a measure with which to determine the weight (centrality) of the places.

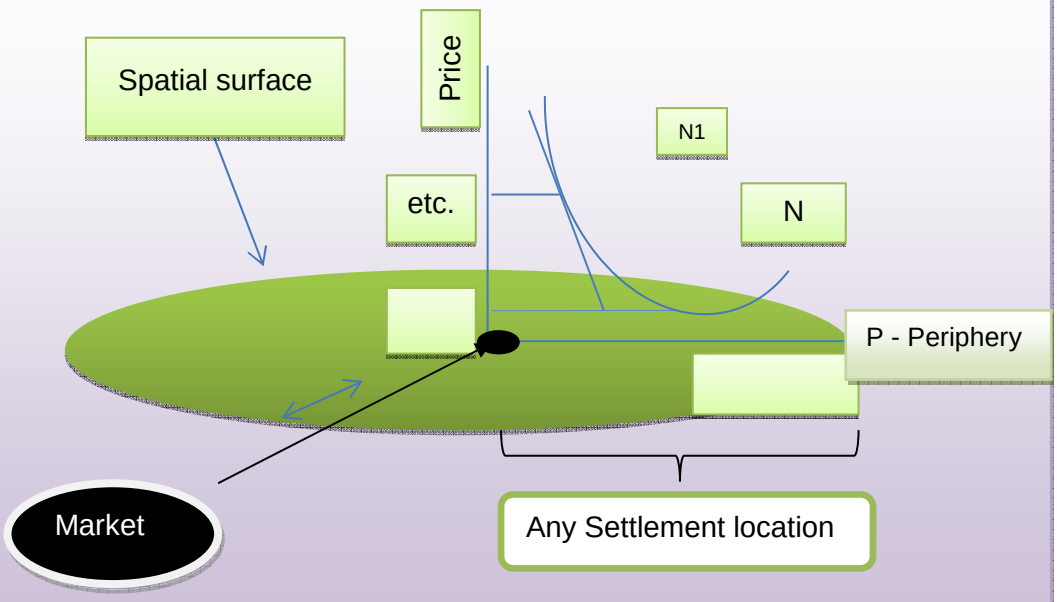
The three aspects will be elaborated to understand the concept and influencing role of development axes: forces of attraction of cores, effect of distance on the extent of interactions, agglomeration advantages. Meyer (1969:9) states the first concepts that influence the role of development axis. He approaches the *forces* of development axes as follows:

> *"The attraction of any given city and hence its growth, is dependent upon not only its own mass – the demands of its own population – but also interact with every establishment outside the city with which it interacts. The importance of such external interactions, along routes of transportation and communication, may also be measured in terms of the total attractiveness (mass) of each of these external places (establishment clusters) and inversely as the distance of each in turn from the city. The latter, an extension of the gravity model, is called the potential model".*

It can be explained by means of Parris (Parris *et al*., 1936:10) power of attraction and the of mass of bodies together with their distances, impart on one another. It amounts to cities and localities attracting one another across a geographic space. The same goes for economic spaces. The larger the node with all its local benefits, the stronger its force of attraction (the same goes for localities).

Secondly, Friedmann and Alonso (1964:38) explained the effect of distance on the extent of interactions. During interaction, the activity needs a starting point and a destination. Alonso (Friedmann & Alonso, 1964:38) makes it clear that we forget that every activity needs an optimal locality to establish itself. Local benefits like low friction of distances (transport costs); good production factors with low production costs and good markets play an important role when it comes to optimal settlement location. Lösch (Friedmann & Alonso, 1964:97-105) states that the *nature of economic regions theory* explains the optimal settlement locations of economic activities that form economic regions in themselves. It is ascribed to the value of land and transport cost as originally formulated by Von Thünen. He illustrates it in a diagram (figure 2.4) where the y-axis represents the price and the x-axis the quantity.

Figure 2.4: Settlement location and market in economic space



Source: Adapted from Friedmann and Alonso, 1964:104

The spatial surface represents the geographic surface across which all interaction and movement of goods and people take place. The x-axis is the most optimal location close to the market (can also be seen as the central business core of a city/town).

P represents the periphery of the city. Between the market and the periphery on the spatial geographic space, a locality can be established so that interactive activities can take place. Thus, the closer the settlement occurs to, the higher the land value is and the lower the transport cost to the market. The further from M settlement occurs, the cheaper the value of land and the higher transport cost become. At point N, products are manufactured or natural resources are produced/mined that bring about high transport cost because they are far from the market, but they have a low land value. At point N1, the opposite of point N applies. Products are manufactured here or natural resources are produced/mined here that brings about low transport cost, but they have high land values. Therefore, distance is a factor affecting the type of activity that occurs geographically.

Different from agriculture, which is more mobile, mining activities must be established where the natural resource is. Agricultural activities can be relocated to a location that is more cost effective. Mining activities cannot move a resource and must mine it where it

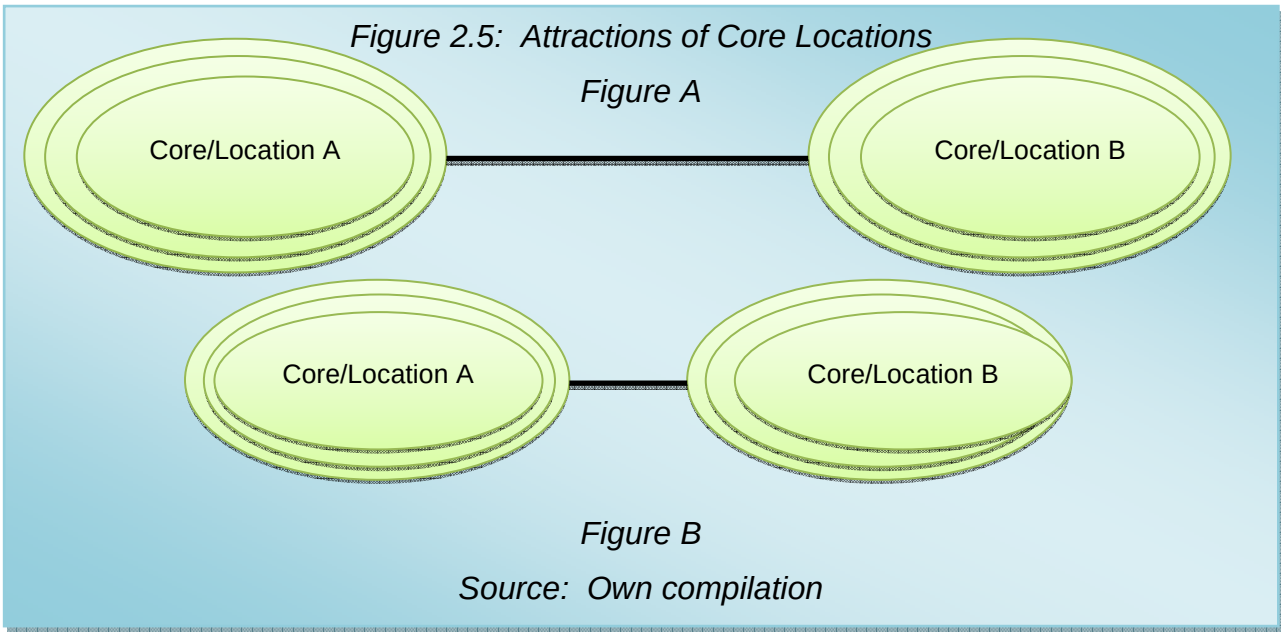
is found. Arguably, Lösch's theory cannot be applied fully when it comes to mining, because minerals are spread unevenly on the surface of the earth. Mines will still aim to place mining shafts as strategically as possible so that they are most cost effective to get the source material to the market. A definite observation is that mines are usually situated further from the central business core on the outskirts of the periphery (it interlinks with non-central places figure 2.4 and refer to table 2.1) (Botha, 2011:49). Thus, they have low land value but high transport cost. Because mines have considerable profit margins and exceed them, they can effectively carry the high transport cost.

The following conclusions can be drawn from Lösch's theory:

- Activities that carry high friction cost will be established further from the market;
- Activities that involve high land values will be established near the market and therefore balance the high land value with low transport cost.

The distance from the market is not the only settlement factor. It is important with regard to the location advantage, but it can also be a factor of interactive forces. The closer nodes are to each other, the stronger the interactive force between them is (see figure 2.5). Meyer (1969:9) refers to the forces of attraction of cores and locations.

Figure 2.5: Attractions of Core Locations



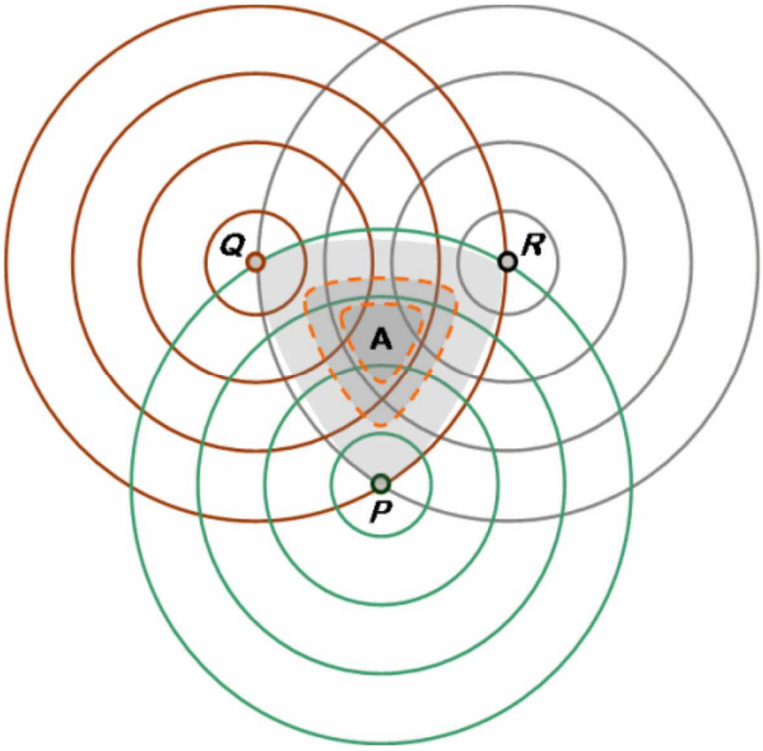
Source: Own compilation

In Figure 2.5A, the interactive force between nodes A and B is not as strong as the interactive force in Figure 2.5B. Therefore, the two nodes in Figure 2.5B attract each other stronger than those in Figure 2.5A do. The reason is the shorter distance between them and their size.

2.6.1 Agglomeration advantages

Weber regards agglomeration as the most important degree to which enterprises can lower their production costs by attempting to establish associations with other enterprises (Weber, 1909:10). The agglomeration effects encourage the decision of where to locate in an area. Weber regards it as a modifying force that comes into play in the broad location framework that is created by transport cost.

Figure 2.6: Agglomeration benefits



Source: Weber (1929:133)

Figure 2.6 illustrates how agglomeration benefits can influence the decision of location. Points Q, P and R are locations where production already takes place. The concentric circles illustrate the increasing costs of each of the already established industries. Area A illustrates the area, which will gain the optimum benefits from all three industries. This area will be the optimal location for the establishment of a new industry due to

agglomeration benefits (transport, labour, etc.) (Isard, 1972:86). According to Steyn (1976:201), the concepts of *economy of scale* and *agglomeration* are inseparable from each other. Steyn (1976:202) refers to Hansen (1972:3) stating where agglomeration refers to the advantages of economy of scale that are achieved by concentration of production.

Generally, it can be assumed that mines hold mutual agglomeration advantages for other industries (Isard, 1972:83). Mines are involved in establishing infrastructure that is very expensive (mostly due to their secluded localities), for example railway infrastructure. In order to lower high transport cost, a mining operation could choose to invest in railway infrastructure. Other infrastructure investments will also follow, amongst others electricity plants, water provision, sewerage and most important, roads (Hansen, 1972:6). Consequently, it will be an advantage for other large industries to set up in close proximity. It will most probably include industries that can also benefit from these advantages, e.g. transport heavy waste products over long distances, but do not have the capital to create expensive infrastructure. According to Hirchman, development in the early stages should concentrate in “growth points” so that resources can be applied to build up infrastructure in the underdeveloped regions in the hope of attracting industrial development (Hansen, 1972:35). Agglomeration can be subdivided into *internal* and *external agglomeration* (Steyn & Barnard, 1976:201-210). Internal agglomeration is typically characterised by efficient utilization of machinery, large-scale specialization and comprehensive purchasing, research and market capacity. Advantages of external agglomeration include good connection between factories, raw materials, markets, labour and infrastructure.

Within geographical regions, localities (central and non-central places) are mainly established due to agglomeration benefits. These localities interact with each other within the economic space (within geographic space, economic space is created) (Boudeville, 1972:19, 23). The interactions take place because of push and pull factors along a strong axis, i.e. development corridor (refers to section 2.6.2 and figure 2.5). This leads to the formation of a spatial system due to the interactions that take place in the region (result as regional effect), which, in turn, leads to regional growth. This creates forces of balanced and unbalanced growth, which in turn stimulates growth in the mining region (Hirchman, 1958:63). Perroux argues that economic space as an abstract field of forces leads to the notion of a vector of economic forces and hence to

the concept of growth poles (Hansen, 1972:20). A detailed description of these theories will be discussed further on in the study (section 2.7.1).

2.6.2 Unbalanced and balanced growth

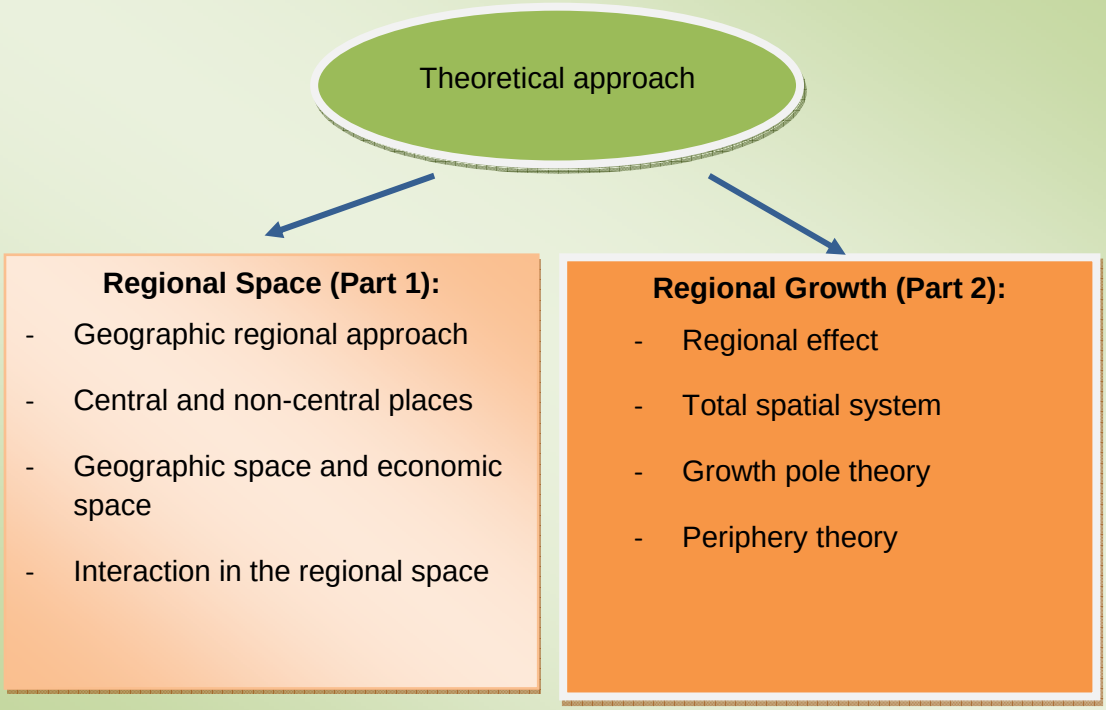
The process of economic and urban development takes place where growth poles – mostly urban areas or resource development locations – are located. It consists of agglomeration advantages, as previously discussed, laying the foundation for development to take place. The state of *economic space* is significant to the overall economic development of the region (Steyn, 1976:201). Economic space is not bound to geographic space, but acts upon geographic space. Richardson (1973:62) states that industrialization in a region always takes place in an unbalanced manner. This argument correlates with what Hirchman anticipated conncerning growth poles need geographical polarization (Hirchman, 1958:63; Hansen, 1972:35). When the region becomes industrialized, polarization at the core begins to take place at the core. This causes a spill over from one growth pole to another, which is referred to as unbalanced growth.

According to Hansen (1972:39) these growth poles expand cumulatively, and are concentrated geographically in the developed areas. They are however relatively absent in the outskirts. This discussion refers to Figure 2.3, *Growth imbalance*. Centralization automatically starts due to agglomeration benefits that are formed at the core of the polarization effect (figure 2.3 illustrated growth imbalance: main node equals the city or town). Other industries and businesses benefit from this imbalance by drawn to the core. This means that mobile resources are brought to the core (Richardson, 1973:73). On the contrary, natural resources are stagnant and cannot be brought to the main core of development. The polarization effect starts to change as periphery takes the dominant role in development. A new growth pole is established around the production location of the specific natural resources. The backwards effect takes place (Mydral, 1957:28) along a strong development route, according to development axis and forces of attraction as discussed in Section 2.6. A force against the concentration arises, which may lure new development into the periphery, due to the expansion of the market. This demotion effect results in the periphery growth to which Richardson refers as unbalanced growth (Richardson, 1973:64). This results in the regional effect, where regional development takes place.

2.7 Regional growth

Within the regional space, regional growths arise (Hansen, 1972:21; Isard, 1972:24-27). This is due to the interaction between nodes, which establishes development. The regional growth forms the second leg (figure 2.7) of the theoretical study. In this section, the theoretical study expands into the growth pole theory of Perroux, which originates from growth imbalance (section 2.6.2). The growth pole theory forms the manifesto of what is going to happen in the region and how the periphery of the growth pole is changed.

Figure 2.7: PART 2 the emphasis on Regional Growth



Source: Own compilation

2.7.1 Regional effect

According to Hirschman (1958:53), balanced growth is based on the development of different sectors in the developing economy in order to supply enough stimuli to meet demand problems. Isolated nodal points in balance, which do not interact with each other, are an idealistic concept and therefore we prefer unbalanced growth. A nodal points performance depends on many factors such as natural resources, human resources, capital stock. Technologies, innovation and economic choices are made both

individually and collectively (Abel *et al*., 2009:9). Because of the impracticality of balanced but isolated nodal points Hirschman suggests that unbalanced growth should be encouraged as it lures new investment and stimulates the spirit of enterprising (Hirchman, 1958:63). Above mentioned will be discussed in detail in the following sections as it affects the region.

Thus far, three important concepts have been discussed briefly: forces of attraction between cores/localities, agglomeration factors and distance. Factors leading to interaction between various localities and the optimal locations where localities are established have also been considered. Therefore, the question arises: What is the total regional effect of the activities, taking place geographically?

Steyn and Barnard (1976:211-212) carried out an extensive study about the regional effect and concluded that the market mechanism strives to eliminate economic imbalances, for two reasons:

- As a locality draws labour to the periphery, labour becomes scarcer and more expensive in the main node so that wage levels escalate in the course of time. This not only prevents the outward movement of labourers, but also precipitates a movement back.
- The node is dependent on raw material inputs from the periphery of the mining activities for which capital is invested in the periphery.

Steyn and Barnard (1976:212) concluded that the result is economic growth, which is evenly spread from the node across the whole periphery so that production and wealth is eventually spread evenly across the area. A brief discussion on location of industry will follow in Section 2.7.2. According to Mydral (1957:27), this *spreading effect* in economic growth is particularly sensitive to distance and is geographically not evenly distributed in an outward manner geographically, but according to the urban hierarchy in a progressively diminishing sequence. Thus, growth is limited to the immediate environment of the main node and can here be concentrated so strong that the periphery is forced into economic decline that resembles the depopulation of countryside. Mydral (1957:28) refers to this as the *backward effect* (refer to section 2.6.2).

Moreover, demographic change and economic stagnation set in. Similarly, investment in the periphery is usually focused on some or other primary activity, since greater investment in processing and handling occurs. Eventually, the node benefits more by such development than the periphery does and the entire process of economic growth in the latter is thrown into reverse gear (example of balanced and unbalanced forces leading to economic growth). Usually, the regional contrast in economic growth between node and periphery is augmented.

2.7.2 Spatial system

The geographic regional approach, the central place theory, the interaction between localities and the regional effect are summarised in Figure 2.8. In the geographic region, central places stimulating economic activities (economic space interaction) exist and these central places lead to the development of corridors along which these central places are found. These interactions cause that contraction and eviction occur due to spreading and backward effects (Mydral, 1957:28). This effect is captured within a regional system (Boudeville, 1972:21).

It must be kept in mind that the interaction between various components such as movement of people and goods and the forces between nodes/localities, leads to growth amid the nodes/localities. The establishment of a locality is determined mainly by the situational advantages of that particular point. Situational advantages are factors like distance and agglomeration advantages.

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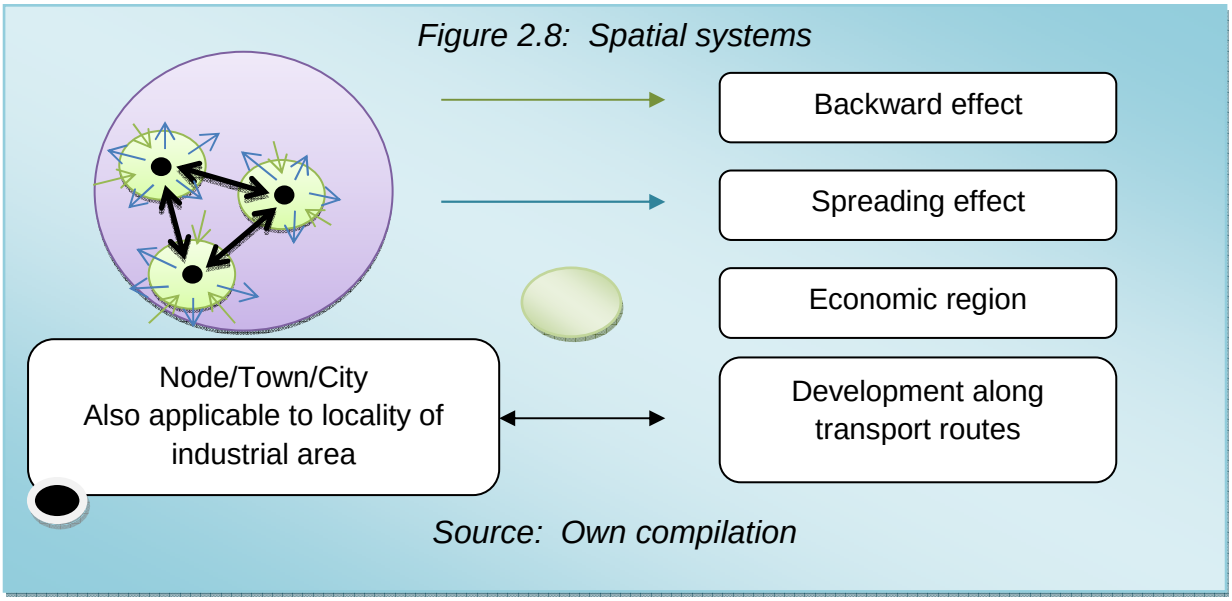
Figure 2.8: Spatial systems



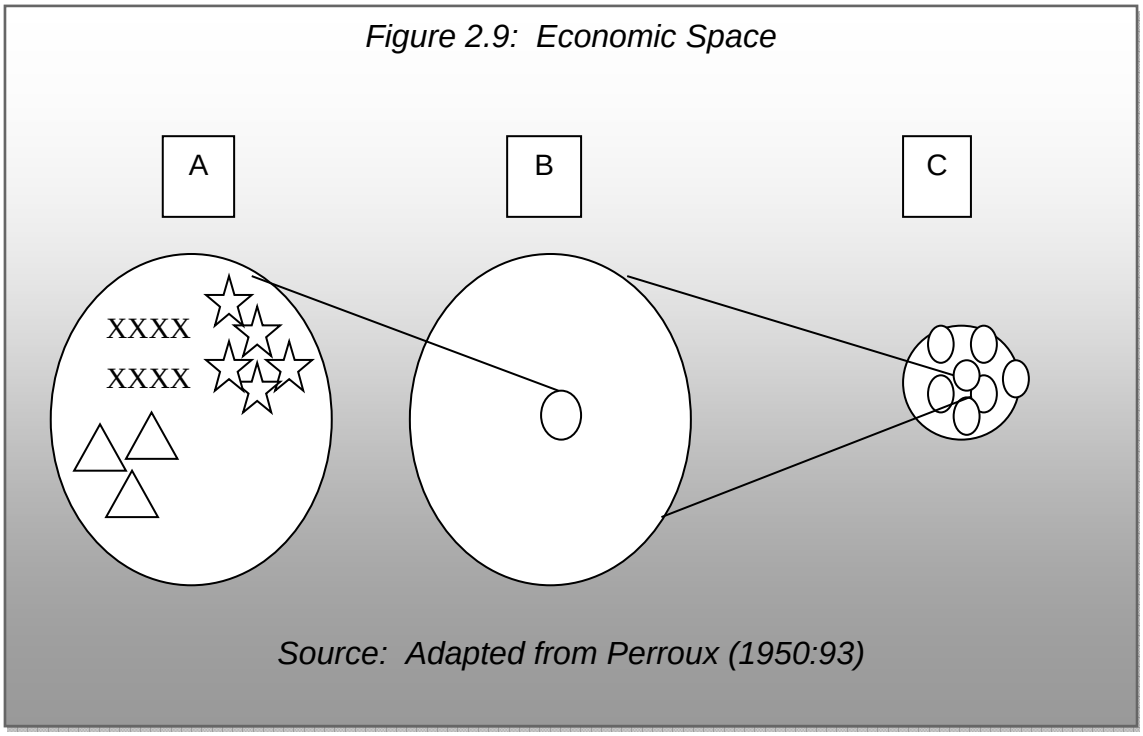
Source: Own compilation

2.7.3 Growth pole theory

According to Perroux (1950:92, 93) economic growth commences at particular locations and occurs along communication axes, until another node is reached. He distinguishes between *geonomic space* and *economic space* (1950:92). Geonomic space is a term used to define geonomic relations between points, lines and volumes. He also views a *growth poles* as an important single entity in the *economic space: defined, as relations, which exist between economic elements* (Perroux, 1950:94). The economic space is conveniently reduced to three spatial concepts (figure 2.9):

- A - Relations defined by a plan of a unit;
- B - Economic space as a field of forces, which rises from a unit;
- C - Economic space as a homogeneous aggregate, relations of homogeneity, relative to the units and to relations between these units. He describes centripetal forces (pull) and centrifugal forces (push) that occur at a point.

Figure 2.9: Economic Space



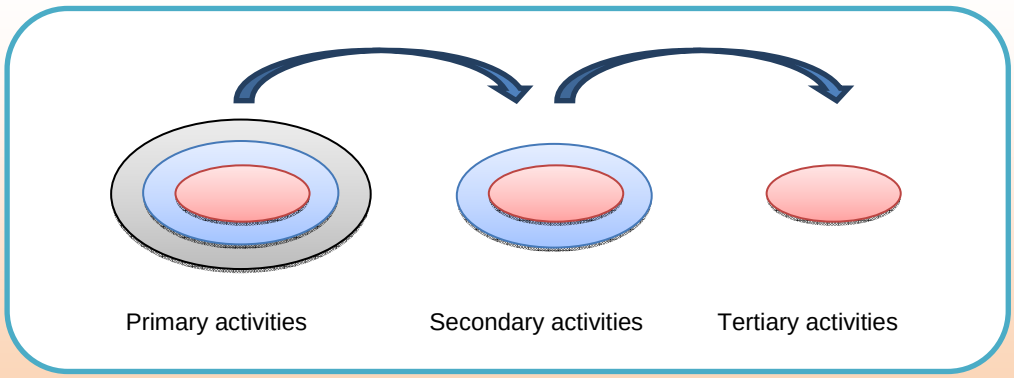
Source: Adapted from Perroux (1950:93)

Furthermore, he links key industries to leading industries that spatially associate strongly with one another. It forms a nodal point, growth pole in the economy or core of the growth pole. It connects functionally with other industries, which hold agglomeration advantages. Leading industries are not limited to specific geographic spaces and where they are situated, a growth pole is established.

According to Todd (1974:204-306), central places move through four classical phases during the regional growth process:

1. During the initial stage, a central place has a service area that corresponds with the threshold limit of the goods and services it provides. During this period, goods and services are directed mainly at rendering services to the agricultural sector.
2. Expansion of the service areas will take place when manufacturing in the secondary sector in the centre increases. In the beginning, the sector specialises in processing primary products. Next, the central place moves upward in order of rank in the system of central places. This happens when secondary manufacturing industries increase, expand and consequently cause specialised service industries to originate.
3. The third stage begins where the tertiary sector becomes the largest urban provider of employment.
4. The final phase is entered when interaction between cores increases substantially with the emphasis on financial and administrative activities.

Figure 2.10: Impulse of activities



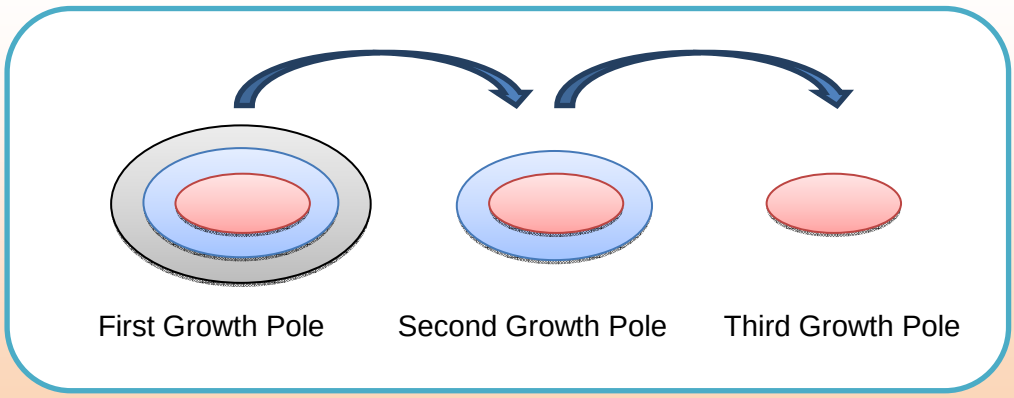
Source: Own compilation

Impulses rarely spread to lower-order places but occur between higher-order centres, i.e. where a planned growth pole is established at an intermediary city, only a few growth impulses will spread to sub-cores in the region (figure 2.10).

The above-mentioned process determines economic growth and as mentioned previously in Section 2.5, economy is not limited to geographic space. It provides forces of attraction for other economic activities. Agglomeration does not only hold advantages, but also disadvantages defined by technology, infrastructure, competitiveness, production cost and friction of distance (see section 2.6).

He predicts that, if one growth pole grows too fast, it will jump to a smaller growth pole in the same way as in Figure 2.11. However, it jumps from one location to another location instead of one activity to another activity.

Figure 2.11: Hierarchy of growth poles



Source: Own compilation

As the first growth pole experiences rapid growth, centrifugal forces start to act in upon the first growth pole. This pole experiences infrastructural pressure and economic flood and consequently starts to expand to the second growth pole (Friedmann, 1966:17, 18). Because of the rapid development, the first growth pole starts losing control to meet all the demand and supply requirements. The requirements are influenced by the scale and intensity of competitiveness between core and periphery, as the periphery of the first growth pole intersects the periphery of the second growth pole.

2.7.4 Core-periphery theory

Friedmann's (1966:17) core-periphery theory is one of the fundamental theories to explain regional growth and interaction. The concept of competitiveness and interaction, influenced by the type, scale and intensity of interaction, forms the foundation of this theory (Friedmann, 1966:17).

Figure 2.11 illustrates the interaction between core and periphery where the economy region consists of two components (Friedmann, 1966:22):

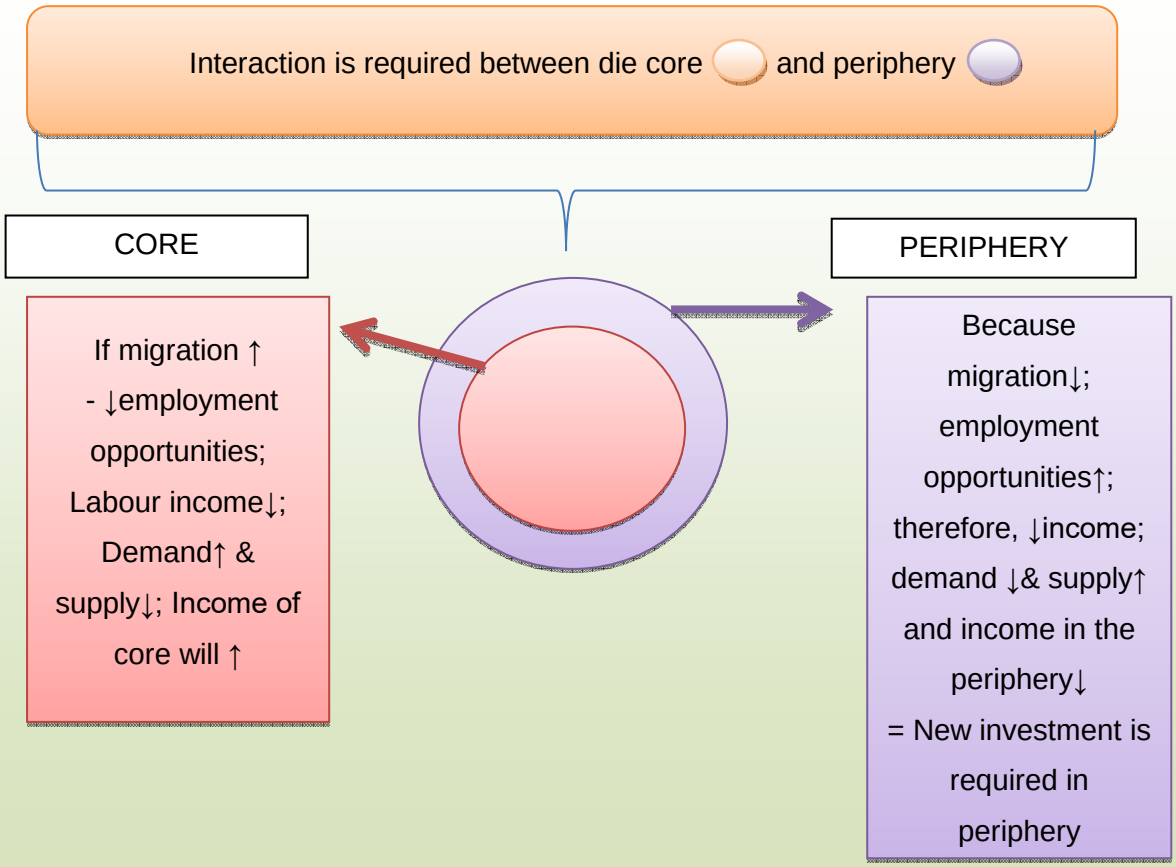
- The demand from outside;
- The demand from within.

The two most important interactive processes Friedmann suggests are the function of each inner system of regions and a city with a hinterland (rural surrounding area). The smaller and more open regions depend on the support and influence from the other surrounding more developed regions. The smaller regions do not always have the amount of natural and human resources to afford a closed economy (Friedmann, 1966:18). They serve a bridging purpose between regions on the periphery to the core of the region, which draws benefits due to the location. As explained in Section 2.6.1, the core offers agglomeration advantages to the immediate surrounding regions (Steyn & Barnard, 1976:201-210). The regions on the periphery interact with the core of the greater region. People and products from the region on the periphery travel through the immediate region of the core and more often than expected; these trips include interaction in the core and its surroundings. These multi-objective trips to the core also convey benefits to the immediate surroundings. Therefore, the economic development originates from outside the surrounding regions as they experience spatial organisation.

This organisation brings about development when the region starts to utilize the abundant resources and the excess of these resources is exported to other regions. He states that spatial organisation goes through change when economic growth takes place (Friedmann, 1966:21). Friedmann mentions one important concept that is usually neglected by the governmental sector: the natural resource alone cannot initialize economic development; it needs to be utilized through developed infrastructure before economic development. Natural resource development emanates from infrastructure development. The development also depends on development of technology (Friedmann, 1966:21).

According to Friedmann, factors that bring about regional and economic growth are migration, income/employment opportunities, followed by demand and supply. One may assume that the reasons for people and products to migrate between core and periphery are income and employment. People travel and goods are transported from one location to another for consumption. Figure 2.12 illustrates the migration increase from the core to periphery, because of employment opportunities developing in the periphery.

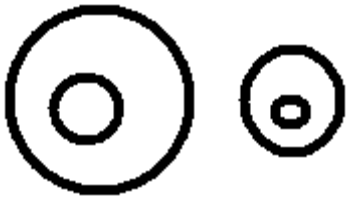
Figure 2.12: Interactions between Core and Periphery



Source: Own compilation adapted from Geyer (1986:61)

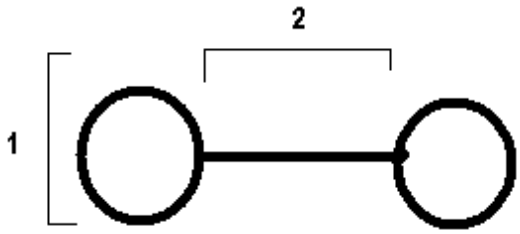
This will result in a decrease in income (in the periphery) as the people flock to mining locations. The pouring in of too many labourers seeking these opportunities results in a decrease of income. The initial employment opportunities attract the labour (pull factor) which results in a push factor because of new investment that is required in the periphery (Perroux, 1950:97, 98). When the focus is concentrated on regional investment and economic growth, regional development occurs. Further discussion on regional development theory will follow in Section 2.7.4. Friedmann (1966:24) postulates that the population and population distribution are constant at a particular point in time:

- Firstly, it indicates the sphere of influence of the size of the population.



- Secondly, it illustrates economic growth is directly inversely proportional to the increasing distance from the core.

- Thirdly, the growth pole potential of central places on an axis between two central places is equal to the intensity of interaction. That is, the more intense, the more interaction and growth take place in the central places. Ranking orders are important to keep in mind, because the greater the ranking order of a growth pole, the faster it will grow and draw activities.



- Finally, it mentions that economic growth impulses carry the most weight.

Core regions are defined as economic centres with the greatest potential for change (1966:24). According to Friedmann, the centres dominate the peripheries as they locate in places of strong influence. The size of the centre also affects the impact on the region. The Core is dependents on the sphere of influence. Economic activities intensify closer to the core, which have a great impact on the core development.

2.7.5 Relationship between core-periphery theory and regional development

Friedmann's theory has been formulated because of the reality that careful planning is not taken into consideration in the growth of regions (Friedmann & Alonso, 1975:712). According to him, national growth is regarded as taking place within regions but, in reality, regional growth is not national growth, although it forms an important part thereof. Therefore, he refers to national growth rather than regional growth in the modern world.

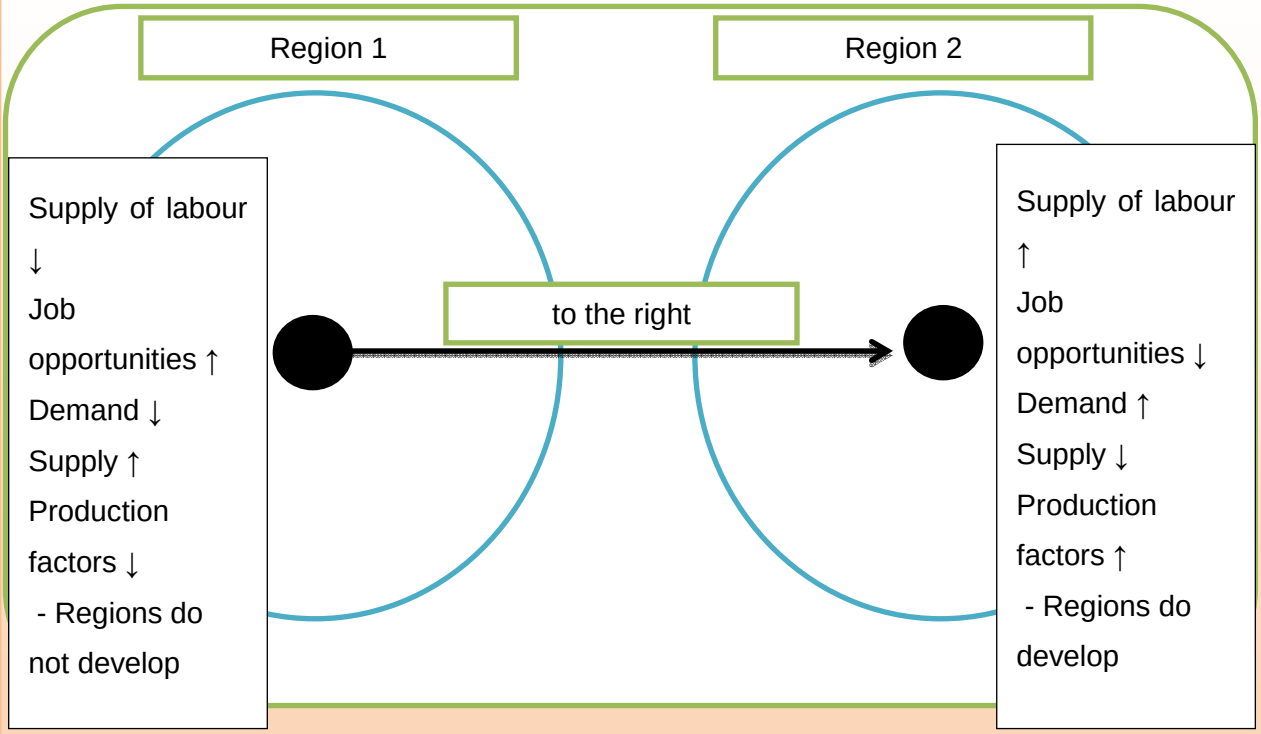
First of all, he regards the export basis as the result of the growth rate of a region, which is equal to the export achievements (regional economics and the influence from external factors) of the region.

- f (growth rate in region) = regions export achievement

He considers production factors between regions as the most important factor.

The following diagram illustrates that single regions in a country does not necessarily lead to national growth. It indicates only the import, export and interaction between these regions.

Figure 2.13: Regional growth



Source: Own compilation adapted from Friedmann (1966:56, 67)

Friedmann includes the following in his study (Friedmann, 1966:56):

- Demand and supply through determination of prices;
- Distribution of economic activities is found all over the country;
- Distance considerations limit competing abilities;
- Agglomeration savings;
- Friction of distance;
- Technological growth possibilities.

These important aspects are not brought into consideration when industries are established. Industries want to settle close to each other, but not too close due to competition. Where they settle they will also contribute to the determination of prices of products, therefore demand and supply are not the only price-determining factors (Friedmann & Alonso, 1975:712).

Friedmann (1966:70) honours market strengths that lead to the accumulation of activities, which deliver higher production in certain areas of the economy. Later on, these accumulated activities result in self-sustainability due to increasing internal and external savings lead to further agglomeration benefits. One can almost refer to specialization in the region. This specialization is needed in order to ensure the future of the region. Specialization brings about other economic activities that ensure that the region does not depend solely on the natural resource.

These benefits limit previously disadvantaged regions. He speaks of distribution effects and recurring effects. Thus, labour, capital, goods and services that is in favour of richer regions flow to a richer region (circumstances of imbalance).

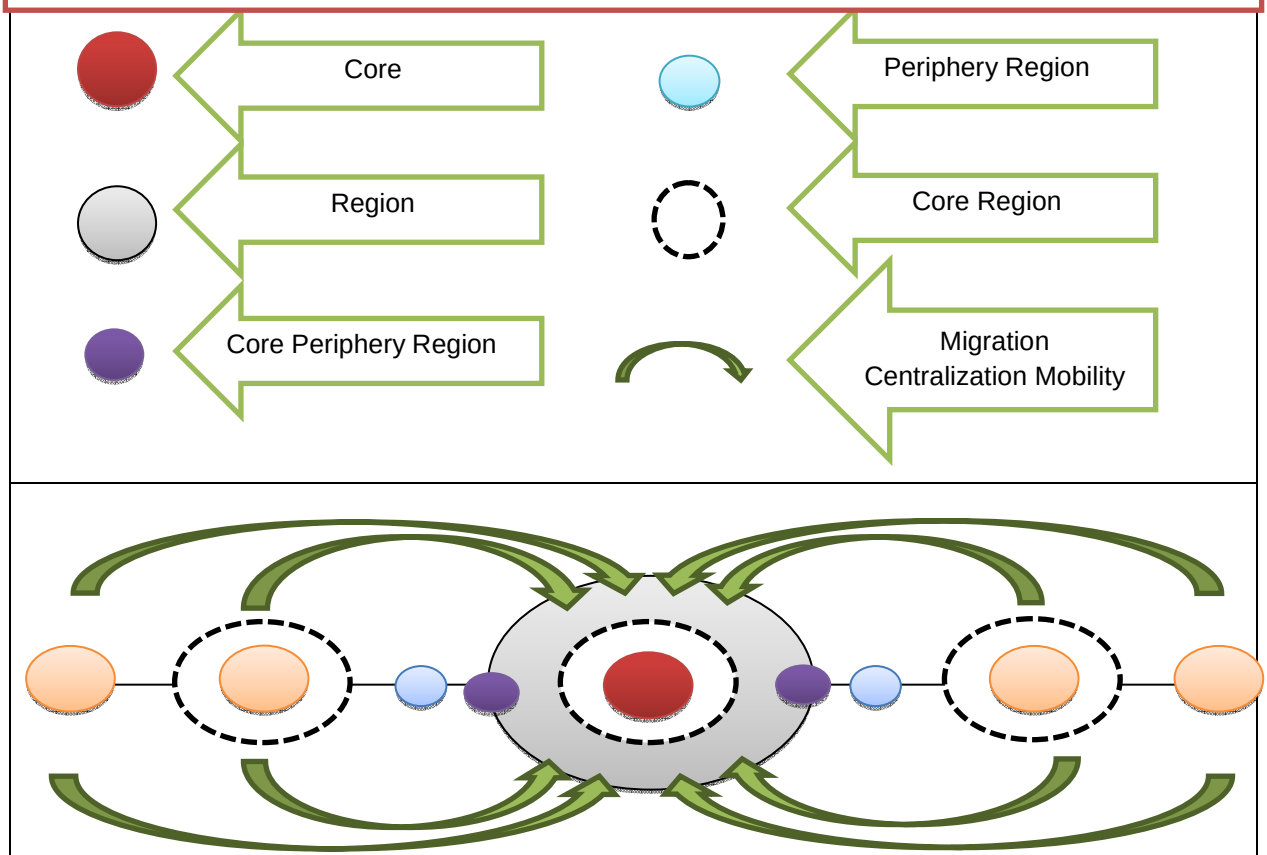
Finally, in his development hypothesis, Friedmann states that economic growth of a city plays an important role in the economic development of regions, because:

- Cities serve as connection points of regional interaction;
- Regional development is dependent on capital accumulations, production-flow factors and technological advantages; and
- Cities serve as development poles with agglomeration benefits.

Friedmann's (1966:70) core-periphery hypothesis comes to the following conclusions about industrial and economic growth:

- National economic growth goes hand in hand with economic development;
- Spatial concentration with high levels of dependency between industries, is found;
- Industrialization always occurs in a geographically unbalanced (dualistic) manner.

Figure 2.14: Core periphery of Friedmann



In the region: - Population growth rate increase↑ - Production factors decrease ↑ - Capital ↑ - Imports ↑ - Technology innovation ↑	Core = agglomeration benefits due to industrialization

Source: Adapted from Friedmann (1966:67)

The above-mentioned diagram reflects a situation that constantly contributes to the development of regions due to natural resources. The original core centre was located well. Therefore, it also holds location advantages and interrupts agglomeration benefits, namely housing, social and business advantages.

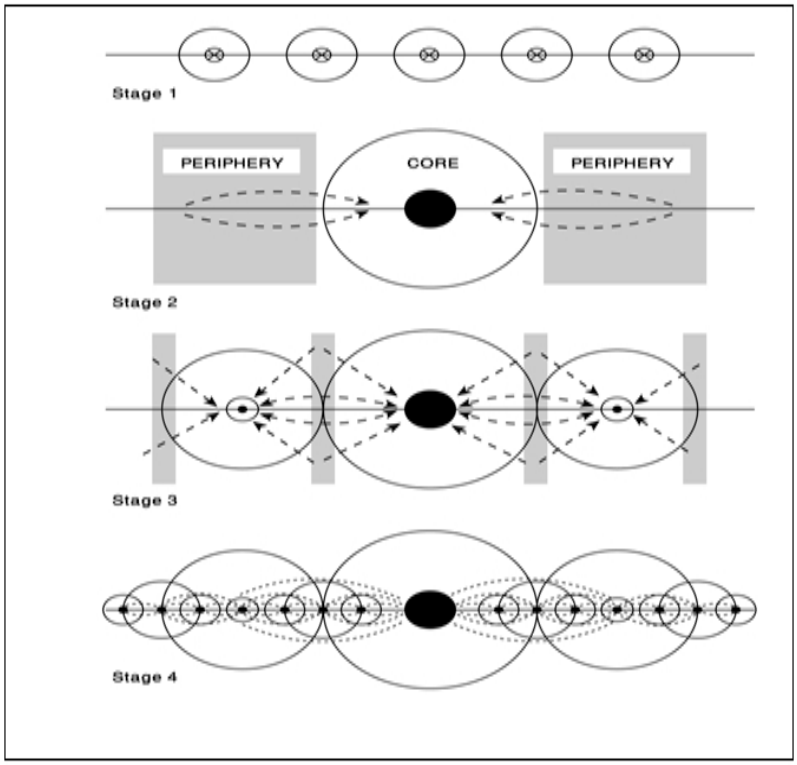
2.7.6 Long term economic growth model

The development model previously discussed in section 2.7.4 (refer to figure 2.14) is a reconsidered long-term economic growth model. Rostow (1952) has taken a historical approach in suggesting that developed countries tended to pass through 4 stages to reach their current degree of economic development. These are:

1. *Traditional society:* This is an agricultural economy of mainly subsistence farming, where no or only few products are traded. The size of the capital stock is limited and of low quality. It results in very low labour productivity and little surplus output is left to be sold in domestic and overseas markets.
2. *Pre-conditions for take-off:* Agriculture becomes more mechanized and more output is traded. Savings and investment grow although these elements still contribute poorly to the national income (Gross Domestic Product) (GDP).
3. *Take-off:* Manufacturing industry assumes greater importance, although the number of industries remains low. Political and social institutions start to develop - external finance may still be required. Savings and investment grow, perhaps to 15% of GDP. Agriculture assumes lesser importance in relative terms although the majority of people may remain employed in the farming sector. Often a dual economy becomes apparent with rising productivity and wealth in manufacturing and other industries contrasted to stubbornly low productivity and real incomes in rural agriculture.
4. *Drive to maturity:* Industry becomes more diverse. Growth should spread to different parts of the country as the level of technology improves - the economy moves from being dependent on factor inputs for growth towards making better use of innovation to bring about increases in real income per capita.

Once again, in order for any region to go through these four development stages, core development areas need interaction among themselves and agglomeration benefits need to be put into action. Friedmann refers to development cores of different hierarchies, which leads towards a functional interdependent urban system and hierarchy. Friedmann has divided the urban system into four stages, has divided regarding industrial development in urban areas, as illustrated by Figure 2.15. The same theory could be applied to the extraction of mineral resources.

Figure 2.15: Theory of development



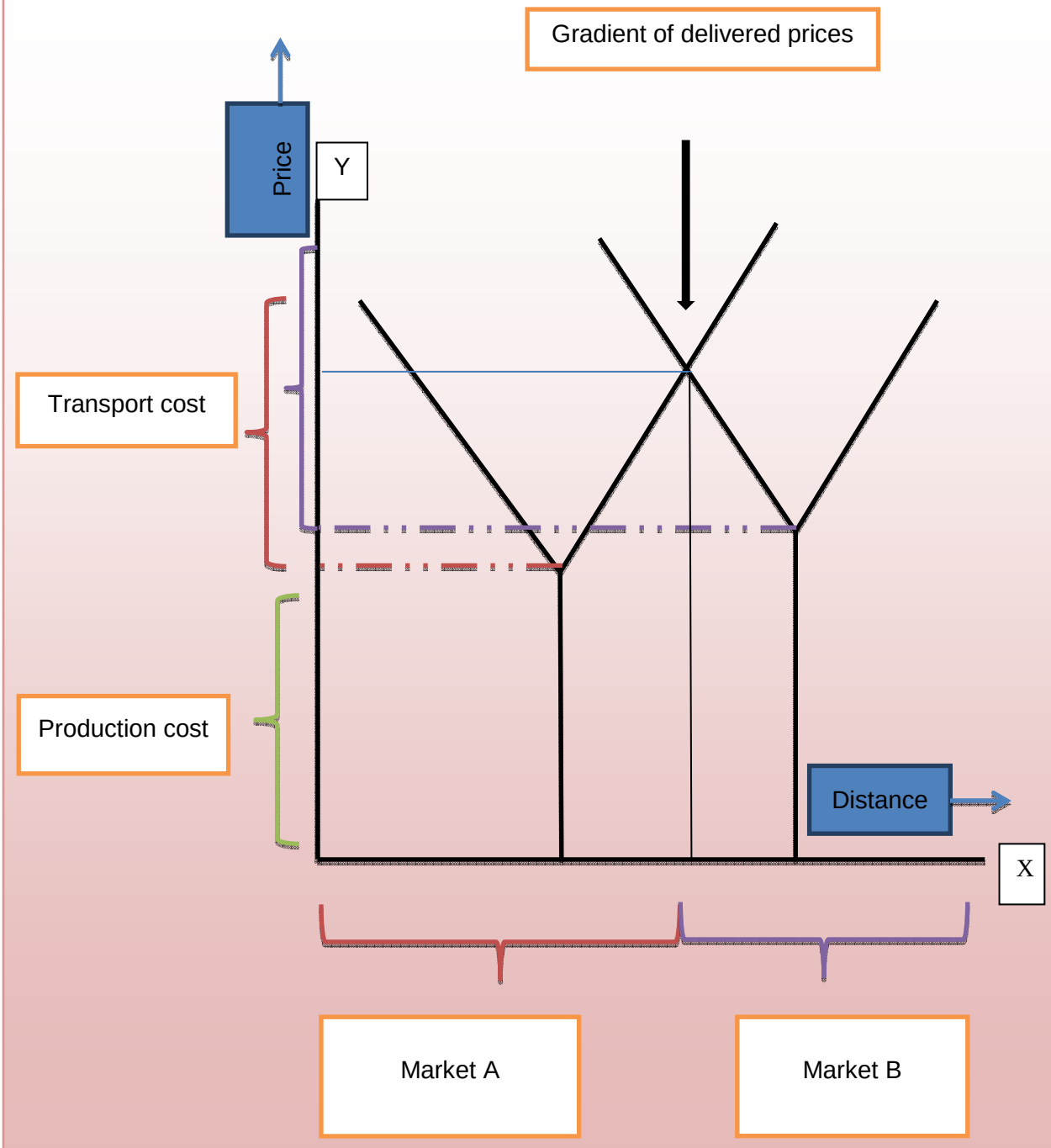
Source: Friedmann (1966:67)

- *Stage 1:* Pre-industrial phase – Cores are isolated and not dependent on each other.
- *Stage 2:* Industrial inception phase (simple core periphery structure) – one of these cores develops into a main city due to agglomeration benefits or the discovery and utilization of other resources. The peripheral regions in contrast do not develop as significantly as the main core.
- *Stage 3:* Industrial maturity phase – Transition takes place from the simple core periphery structure to a multi-core structure with peripheries forming between the regions.
- *Stage 4:* Functional interdependent urban system and hierarchy: Further development takes place where a larger extent of integration between cores and peripheries are established. During this stage, markets start to specialize and new initiatives are established. During this stage, the core with its regions does not only depend on the resource that has been the cause of the development originally.

Previously mentioned competition drives industries, especially when it comes to natural resources, as they compete and contribute to the determination of prices and products (Friedmann & Alonso, 1975:59).

Figure 2.16 refers to the industrial urbanization theory explained by Walter Isard (1972:95-97). In this analysis of location, two locations of raw material are displayed on the horizontal line: X-axis, showing the distance. The vertical Y-axis indicates cost. Production cost is firstly considered and transport cost are considered secondly as the product should be transported to another location for further production processes or consumption. This is a logical illustration of location of industries and of course, in many cases the decision is made based on efficient location considering the point of view, the planned case and the projects that need to take place (Friedmann & Alonso, 1975:59). It is about the “survival of the fittest”. It is especially kept in mind that natural resources are not consistently distributed and is area bound (see section 2.2) The industries take the markets and the origins of the raw materials into account and then decide on the most favourable spot to locate. Careful and comparative investigation of the variables is undertaken. *Transport costs, frequency of schedules, labour availability, rates, quality and organization, power costs, local, taxes and prospects, available sites, climate, availability of finances local regulations* and many more are all factors of importance (Friedmann & Alonso, 1975:59, 60). A well-contemplated decision-making process is needed before any industry can locate.
It takes months of investigation and preparations (Hoover, 1948:4; Isard, 1972:95). Industries that are dependent on raw materials, consider their distance and location away from the main growth pole (town/city). Hypothetically, they establish the core-periphery in practice (Friedmann & Alonso, 1975:45; Hoover, 1948:4-9).

Figure 2.16: Industrial urbanization



Source: Friedmann & Alonso (1975:52-53) and Smit (1971:126)

2.8 New Economic Geography

The core-periphery theory is based on the notion that, as one region or state expands due to economic prosperity; regions in the surrounding area should be incorporated to ensure on-going economic growth and political success. The area of high growth or

former high growth becomes known as the core and the neighbouring area is the periphery. Cores and peripheries can be towns, cities, states or nations.

As a city grows in popularity, it must expand its borders to continue to supply the population with a proper standard of living. The inner city core will first expand and then the suburban area will expand into the periphery when the geographic periphery becomes exhausted of economic space. This expansion will lead to intersecting of regions; stimulation of balanced and unbalanced growth factors and growth poles that link to each other creating regional development. This is where the so-called “processes” (see section 2.5) operate in the abstract economic space. Objects, people and their economic activities cannot be limited. This theoretical foundation transforms the spatial concept to move spatial thinking from geographic space to economic space.

Krugman calls his application of spatial thinking “the New Economic Geography" (NEG)(Fujita & Krugman, 2004:140; Krugman, 1991:483). This new term contains three fundamental aspects of economic growth:

1. Location (discussed in section 2.2 - 2.4): goods are produced centrally and services are rendered centrally (Christaller, 1966:17);
2. Distribution (see section 2.2, 2.5 and 2.6): People and goods move between central localities due to supply and demand (Ullman, 1956:55; Friedmann, 1966, xv; Hurst, 1874:2, 3);
3. Spatial organization (see section 2.6 and 2.7): Agglomeration effects decision of where to locate in an area with regarding forces that come into play (Weber, 1909:10). It is however important that economic space is not geographic space bound, but acts upon geographic space (Richardson, 1972:35).

This theory relates to spatial effect on geography and economy, which include: economy of agglomeration, transportation of any kind and for any kind (products or people), international trade, development, gentrification, ethnic economies, gendered economies, core-periphery theory, economies of urban form, relationship between environment and the economy (natural resources which influence development) and globalization.

The theory refers to the transformation of “manufacturing based economies” (industrial) to “service based economies” (technology) (Ascani *et al.*, 2012:2). Krugman has

developed a simple model that shows how a country could become differentiated into an industrialized “core” and an agricultural “periphery”. In order to realize scale economies (see section 2.5) while minimizing transport costs (refer to section 2.4 and 2.6), manufacturing firms tend to locate in the region with larger demand, but the location of the demand itself depends on the distribution of manufacturing (Krugman, 1991:483). Emergence of a core-periphery pattern depends on transportation cost, economics of scale and the share of manufacturing in national income.

According to Ascani *et al.,* (2012:3) the process of NEG is based on a number of fundamental elements that provide a reasonable theorization of why self-reinforcing centripetal forces (see section 2.4 the discussion on centripetal forces) that pull economic activity into a location occur and persist over time (see section 2.7.2 and 2.7.4). More particularly, increasing returns to scale, monopolistic competition, transaction costs and the occurrence of external economies collectively reinforce the general functioning of NEG models and thus shape firms’ and workers’ location behaviour (refer to section 2.7.2 - 2.7.4). New Economic Geography are similar to the core-periphery theory as location within an agglomeration advantage drive migration across regions, which influences the core with the most development advantage (Fujita & Krugman, 2004:140).

2.9 Conclusion

Chapter 2 has given a clear explanation that resources are *“ not uniformly distributed”* (James, 1962:197) and that processes with geographical impact are caused. The processes are the interaction of commodities and activities between nodes within space causing development within space and therefore the space is demarcated to understand the interaction that causes development.

The interaction concentrates around central places and causes *“the crystallization of mass around a nucleus“* (Christaller, 1966:14). Natural resources are area bound. Therefore, as in the case of natural resources, one rather refers to non-central places. Economic relation between these non-central mining activities plays such an important part in shaping the patterns of locations generally. This uneven distribution of resources leads to uneven distribution of industrial and mining activities, which in turn establish growth imbalance. Growth imbalance is another approach to spatial interaction where distance overcomes geographic spatial differentiation, which cannot develop without

movement. Imbalance establishes movement from one central node to another (see section 2.6 and 2.7). The route, along which the movement takes place, is referred to as the development axis (Friedmann, 1966: xv). According to Friedmann *"the attractions of any city, its growth"* (1966:9). *Nature of economic regions theory* explains the optimal settlement location of economic activities that form economic regions in themselves. Distance from markets or economic activities are not the only settlement factor and Meyer refers to the forces of attraction of cores and locations (Meyer, 1969:9).

Agglomeration advantages as well as balanced and unbalanced growth factors, is essential. Mines hold mutual agglomeration advantages for other industries are involved in establishing support to other growth development factors such as infrastructure. This new centralization caused by agglomeration advantages leads to interaction of localities within the economic space. This interaction takes place because of push and pulls factors along the development axis. In turn, it leads to regional growth. Forces of balanced and unbalanced growth are established, which in turn stimulates growth in the mining regions (Hirchman, 1958:63).

Regional growth occurs within regional space (Hansen, 1972:21; Isard, 1972:24-27). The growth pole theory of Perroux originates from growth imbalance. The interaction between core and periphery consists of two components, demand from outside and demand within. This interaction establishes development when utilization of abundant resources takes place and the excess of these resources is exported to other regions. Friedmann (1966:21) mentions an important concept that is usually neglected by the government that natural resource alone cannot initiate economic development. The resource needs to be utilized through development of infrastructure ahead of economic development; if not, problems occur such as in the case of the study area, as explained in the problem statement (section 1.2). Friedmann also states that factors that bring about regional economic growth are migration, income and employment opportunities, followed by demand and supply. The migration of people and products between core and periphery can be assumed to be based on income and employment (see figure 2.14). Careful planning is not taken into consideration in the growth of regions (Friedmann & Alonso, 1975:712) and consequently long term economic growth cannot take effect. Careful planning involves understanding of the different types of development taking place in a region (see section 2.7.5) (Friedmann, 1966:56). Perrouxs core-periphery theory is based on the notion that as one region expands due

to economic prosperity; other surrounding regions should be incorporated to ensure on-going economic growth. A new theory, New Economic Geography, emerges which is the study of the location, distribution and spatial organization of economic activities across the world. It represents a traditional subfield of the discipline of geography containing all previous discussed theories as a whole. Geographic space and economic space are placed in the same realm in order to understand the occurrence of specific parameter values in the economies modelled by NEG. Thus, the geographical unevenness of the economic landscape as a situation of equilibrium is explained (see section 2.4 and 2.6).

In Chapter 3 South African policies will be evaluated based on what has been discussed in Chapter 2. Application of theories is fundamental in policymaking as it guides regional development. These theories all relate to mining regions.

CHAPTER 3: South African policy and planning

3.1 Introduction

The Cambridge Dictionary define the word “Policy” as “*a set of ideas or a plan of what to do in a particular situation that has been agreed to officially by a group of people, government, or organization*” (Cooke & Leydesdorff, 2006:2). Dye (1995:4) phrases the definition simply, as “*public policy is whatever governments choose to do or not to do*”. The definition by Anderson (1997:9) is “*a proposed course of action of a person, group, or government within a given environment providing obstacles and opportunities which the policy was proposed to utilize and overcome in an effort to reach a goal or realize an objective*”.

Public policy, indeed, is also an authoritative statement on what government chooses to do or not to do and incorporates, or implies, the authoritative allocation of values for the whole society (Roux, 2002:425). Policy documents play a huge role in spatial management and regional growth. It aims to provide a framework, which will enable one to work with discretion (Kitzinger *et al.,* 1945:70,140). Any spatial development is fixed and cannot be changed easily only the use may change over time. According to Roux (2002:425) it is however import that policy can never be static. It should always relate to current issues and society. Governments constantly need to adapt variable and influent factors changing the country. Therefore, as soon as the policy is established it should be fixed, for a period of time as the policy frameworks guides the discretion one uses to manage and govern regional spatial development. The policy principles are more often phrased as recommendations (“should”) rather than imperatives (“must”).

The South African Government News Agency (2014) regards policy planning as the road to policy frameworks. Policy planning is concerned with preparing and implementing plans to help the country to deciding where and when development should take place. It also sets the framework for decisions on planning applications.

Planning theory plays a significant role in the guidance of policymaking processes. Planning theory is an elusive subject of study. Theory helps us to organize our

perceptions of the world into something coherent and understandable without the expectation of prediction (Alexander, 2002:227). A combination on Faludi (1973:3), Hendler (1995:50) and Friedmann, (1987:28) explanation on planning theory helps to distinguish between definitional theory, procedural theory and subject-oriented theory. Definitional theory defines what planning theory actually is and how it fits into the social context of theory. Procedural theory deals with the process of planning to determine the best approaches for transferring knowledge into action. Subject-oriented theory is what provides knowledge. It covers theory relating to the subjects that are relevant to any particular planning situation. This chapter aims to understand the theoretical foundation of policies, types of policies and the impacts they have on the application of South Africa's development.

3.2 Policy overview in South Africa

No administrative action can take place if specific goals and objectives have not been set. In South African practice, this implies that an objective is to be set for each government institution (Roux, 2002:421) by each provincial government. This will enable each municipal institution to become aware of government service they have to render. The intention should be to find out how to accomplish the objective and by what means (i.e. resources and capital needed to achieve the objective).

3.2.1 Formulation process

After the policy has been set, it needs to be authorized. The policy only becomes important for the purpose of public administration after legislation has been passed (Roux, 2002:421,422). Roux (2002:422-424) set out the process as follow:

- *Step 1:* Management and administration of policies by government department and public executive institutions. They became aware of discrepancies, which need assessment. They analyse the discrepancies of policies and formulate a new policy. By new formulation, they have to gather relevant information regarding the main issues. From this point forward, they can investigate the problems.
- *Step 2:* Policy option generation. Senior public officials examine the policy and consider value issues that might affect future governance and development. This is followed by preparations and draft legislation, regulation and proclamations.

- *Step 3:* Finally, the draft is sent to the Legislative authority for approval.

Friedmann and Weaver (1979:152) divide regional policy into two main levels:

(i) *Lower level* - to address the provision and coordination of regional infrastructure, regional development priorities and the guidance of spatial regional development;

(ii) *Higher level* - is based on "national coordination and management of the spatial expression of growth and development at the regional scale within the country as a holistically" (Urban Foundation, 1993:5). Glasson (1989:195,249) distinguish between inter (*lower level policy*) and intra-regional policies (*higher-level policy*).

Based on the South African context, inter- and intra-regional policies play their own role participates in different parts of government sectors. South Africa's divides their different levels of regions are almost divided like nested measuring cups that fit perfectly into one another. The upper region is the national sphere, managed and coordinated by the presidency. The second level is the provincial sphere. These two levels are managed by intra-regional policies. The district and municipal sphere are guided by all inter-regional policies. In Section 3.2.2, a short overview will follow on the last 40 years' intra-regional policies that have changed South Africa drastically and effected paradigm shifts. Sections 3.3 - 3.7 will integrate the theoretical significance of these policies, which brought paradigm shifts.

3.2.2 National Spatial Development policies since 1975

Regional planning and development has had a significant impact on the development of regions and ultimately South Africa. Despite of political driven paradigm shifts, planning theory and policies continuously developed South Africa. The spatial planning scene in South Africa has changed extremely over the past 40 years. From the first spatial policy initiative, the National Physical Development Plan (1975) (NPDP) radical changes have occurred in the approach to national planning. Since 1975, South Africa has set the Good Hope Plan (1981), the Regional Industrial Development Plan (1991), the Reconstruction and Development Plan (RDP) (1994), Urban and Rural Development Frameworks (1997) and two National Spatial Development Perspectives (2002 and 2006). The most recent spatial planning dictate in South Africa was the National Development Plan, 2012 (National Planning Commission). The most recent initiative is the NDP, 2030. (See application of theories on development policy and legislation in South Africa later discussed in section 4.3).

3.2.3 Mining policies and legislation

In terms of the previous mining legislation in South Africa, mineral rights were held privately and in some instances by the state. The Mineral and Petroleum Resources Development Act 28 of 2002 (MPRDA) declares that all mineral rights are monopolized by the government. Through the transitional provisions included in the MPRDA, mining companies can convert their existing 'old order' rights to prospect and/or mine (previously granted under the now repealed Minerals Act) to the 'new order' rights introduced by the MPRDA. The purpose of the MPRDA is to ensure the sustainable utilization of South Africa's mineral and petroleum resources within a national environmental framework policy that primarily protects sensitive environments and the interests of affected communities, organizations and individuals, while promoting socio-economic development. The Act state: "To make provision for equitable access to and sustainable development of the nation's mineral and petroleum resources; and to provide for matters connected therewith". The government is accredited for all sustainable development. Although the government has no control over mining activities, they do have an influence on the decision-making proses of mines. It is crucial that the state implement the right policies in order to support legislative.

The history of South African mining law has been to reward and protect the interest of private enterprise in the exploitation of minerals. However, this does not justify that government had no engagement in mining activities. Historically, the government has always retained control over mining operations and under the Mining Rights Act (Act 20 of 1967). The state even held the exclusive authority to confer mineral rights in respect of precious metals. The Minerals Act passed in 1991 (Act 50 of 1991) reorganized the mineral laws of South Africa.

Part two of Act 28 of 2002 prescribes social and labour plans. According to Regulation 42 in terms of the Act, an application for a mining or production right must be accompanied by a Social and Labour Plan (SLP) with objectives that involve the following:

- Promoting economic growth together with mineral and petroleum resources development in the Republic of South Africa(section 2 (e) of the MPRDA);
- Promoting employment and advance the social and economic welfare of all South Africans (section 2 (f) of the MPRDA);

- Ensuring that holders of mining or production rights contribute towards the socio-economic development of the areas in which they are operating as well as the areas from which the majority of the workforce is sourced (section 2 (i) of the MPRDA); and
- Utilizing and expanding the existing skills' base for the empowerment of Historically Disadvantaged South Africans (HDSA) and consequently serving the community.

Besides the SLPs, the White paper for Mineral and Mining Policy of South Africa (1998) acknowledges that the diversified resources form the cornerstones of the South African economy and the employment sector (1998:3). This policy takes the problems and opportunities facing the mining industry into consideration. The main objectives are (1998:4):

- Business Climate and Mineral Development, which looks at the continuation of policy conducive to investment and includes a section on Mineral Rights and Prospecting Information which presents changes to the system of access to and mobility of, mineral rights;
- Participation in Ownership and Management, which examines racial and other imbalances in the industry;
- People Issues, which looks at health and safety, housing needs, migrant labour, industrial relations and downscaling;
- Environmental Management; Regional co-operation; and
- Governance.

According to this policy, sustainable development in South Africa depends on sustainable reconstruction and development in southern Africa holistically. The region has considerable mining potential and the mining sector has a particular significant contribution to make to the economic development of not only South Africa, but all South African Development Communities (SADC) and the world (1998:61). Mining regions attract labour form as far as central Africa and influence economic activities internationally. This document encourages government to participate in the coordination of the policies so that the region can benefit optimally from its mineral wealth (1998:62). It holds the Department of Minerals and Energy responsible for needs of stakeholders and transformation as well as the incorporation of community based involvement (1998:63).

3.3 Planning Legislation in South Africa

Together with the MPRDA, specific legislation was put in place to establish implementation. The Constitution of the Republic of South Africa, 1996, (Act 108 of 1996), has paved the way for the democratic dispensation of the new government. It has stated the values of one sovereign, democratic state. Hardly any functional area of government has not been affected by the new generation of policy and decision makers. The Development Facilitation Act, 1995 (DFA) (Act 67 of 1995), was written in order to have one piece of legislation that would facilitate development, while apartheid development laws were being repealed. The DFA was employed to address a range of different types of developments and was intended to be a transitional legislation (Act 108 of 1996:1).

The DFA had been created in order to try to initiate the RDP, 1994. It has also influenced discussions of various issues that encouraged the formulation of Act No. 16 of 2013, the Spatial Planning and Land Use Management Act, 2013. (SPLUMA). The implementation of SPLUMA, the DFA of 1995 were repealed. Other development laws still in action:

- National Environmental Management Act, 1998 (Act No. 107 of 1998:1) (NEMA): "*To provide for the co-operative, environmental governance by establishing principles for decision-making on matter affecting the environment*". It insists that institutions involved in environmental matters should govern procedures for co-ordinating environmental functions. Therefore Environmental Impact Assessment is required in order to:

  > *"Regulate procedures and criteria relating to the preparation, evaluation, submission, processing and consideration ofand decision on, applications for environmental authorisations for the commencement of activities, subjected to environmental impact assessment, in order to avoid or mitigate detrimental impacts on the environment and to optimise positive environmental impacts and for matters pertaining thereto".*

- Local Government: Municipal Systems Act, 2000 (Act 32 of 2000) – This Act defines the legal nature of municipalities. It insists that local governments (municipalities) establish frameworks for municipal planning, performances and

use of resource. They should include community participation in order to take the needs of the poor into account. They should clarify their executive and legislative framework for municipal planning.

The DFA of 1995 has influenced the discussion of various issues, which SPLUMA aims to address. The DFA has provided facilitation in spatial planning and development while it has led to other helpful development laws in order to establish the implementation of development. The newly formulated SPLUMA (Act No. 16 of 2013) provides a framework for spatial planning and land use management. It is considered as framework legislation, rather than a comprehensive overhaul. It relates with "*pre-1990s thinking*" of planning and management of *geo-space* and the *economic space,* while it continues on the opinion of integrated planning processes with public participation. The role is to (Act No. 16 of 2013:1):

- Specify the relationship between the spatial planning and the land use management system and other kinds of planning;
- Provide for the inclusive, development, equitable and efficient spatial planning at the different spheres of government;
- Provide a framework for the monitoring, coordination and review of the spatial planning and land use management system;
- Provide a framework for policies, principles, norms and standards for spatial development planning and land use management;
- Address past spatial and regulatory imbalances;
- Promote greater consistency and uniformity in the application procedures and decision-making by authorities responsible for land use decision and development applications;
- Provide for the establishment, function and operations of Municipal Planning Tribunals (MPTs);
- Provide for the facilitation and enforcement of land use and development measures;
- Provide for the matters connected therewith.

Key words describing the DFA are to speed up the implementation, reconstruction, advising the different governmental spheres, formulation of relevant land development policy and legislation. The Spatial Planning and Land Use Management Act 2013 has

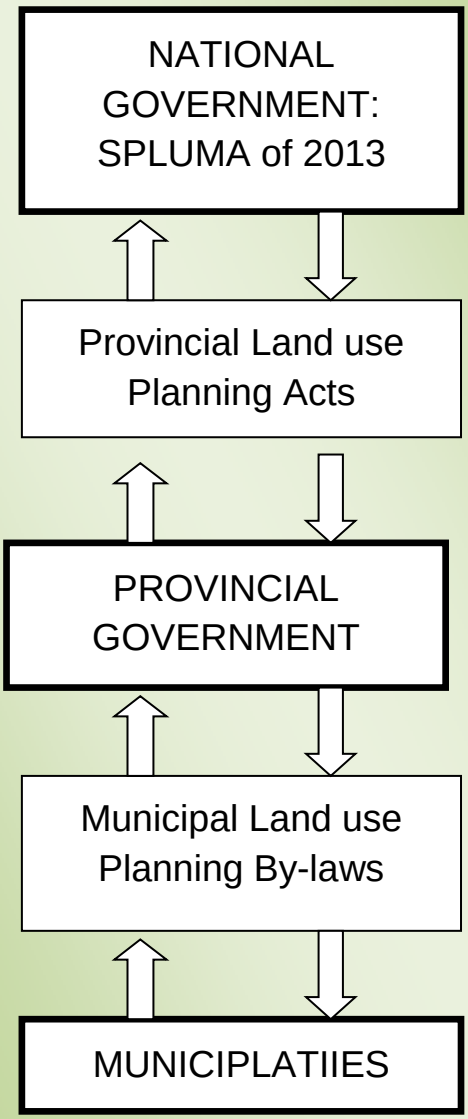
adapted principles of the DFA but has taken it further by specifying the relationship between spatial planning and land use management. This specification makes it easier for the involved governmental sphere to regulate, guide, monitor and coordinate spatial planning. It stipulates clear decision-making and application procedures, providing a framework with six objectives (section 3 of Act No. 16 of 2013):

- Uniformity;
- Effective, comprehensive system of spatial planning and land use management, promoting social and economic inclusion;
- Set principles, norms and standards;
- Sustainable and efficient use of land;
- Cooperative government and intergovernmental relations;
- Redress the imbalances of the past.

One can regard SPLUMA as a three-sphere system that operates parallel to other laws that was previously mentioned. SPLUMA adds to what the Municipal Systems Act (Act 32 of 2000) stipulates [(Act 32, Section 24(*1*), Chapter 5)] and [Act No. 16, Section 12(*1), Chapter 4)*] about Spatial Development Frameworks (SDF) and Integrated Development Plans (IDP). Each municipality must prepare a SDF and IDP, which align with provincial and national spatial development objectives. Municipalities must align with and complement the development plans and strategies of other affected municipalities and other organs of government to give effect to the principles of cooperative government.

The Spatial Planning and Land Use Management Act, 2013 emphasizes the importance of SDFs, (at National, Regional, Provincial and Municipal level) which run parallel with Land use Management Schemes. Municipal planning cannot contradict national and provincial laws, but national and provincial laws cannot compromise or obstruct municipal decision-making. Figure 3.1 illustrates the three-sphere system.

Figure 3.1: Three-sphere System



Source: Own compilation

Each sphere of government requires a SDF with the potential for a Regional SDF, which does not keep to provincial boundaries. The provincial government writes a Provincial Regional SDF. The municipal SDFs should align their SDF objectives with those of the Province as the Province aligns their SDF objectives with those of the National Spatial Development Framework (NSDF), known as the NDP, 2030. SPLUMA adds to existing requirements on SDFs from the Municipal Systems Act of 2000, along with further additions made by Provincial Acts and Municipal By-laws.

National Environmental Management Act and SPLUMA look methods to a more integrated process of authorization (chapter 3 of Act 107, 1998) to coordinate and synchronize environmental policies. The Infrastructure Development Act, 2014 (Act No. 23 of 2014), coincides with the Strategic Integrated Project (SIP), being a National interest in SPLUMA. It facilitates and co-ordinates public infrastructure development which is of economic and social importance. It prioritizes the improvement, implementation and operations of infrastructure development. Section 3.4 examines the application of planning theory on previous applications of development in South Africa.

3.4 Application of theory on development policy and legislation in South Africa

Development has been dominated by political ideology of separate development by the NPDP, 1975. The NPDP endeavoured to achieve racial segregation to the designation of Black Homelands (Bantustans) (Drewes, 2000:125). Fair (site by Drewes & Van Aswegen, 2013:195) explains that the ideology aimed at arranging the physical development according to specific development and political ideals where the growth centre strategy was proposed in order to obtain more balanced spatial poles. Secondly, a framework that divided the country into 38 planning regions was proposed. According to Drewes and Van Aswegen (2013:195), industrial points were located in sparsely populated areas, as well as in the peripheral economic space of the country. Efforts to plant these growth centres were unsuccessful. The primary objective with the growth poles was to create work opportunities and industrial centralization was found to be the best alternative to stimulate growth points in order to create job opportunities, extended infrastructural development and economic development (Drewes & Van Aswegen, 2013:195).

3.4.1 Good Hope Plan, 1981

The Good Hope Plan (1981) moved from centre growth to decentralization points. According to Geyer (1986:381), the NPDP limited the industrial regions and did not differ from the decentralized points of the Good Hope Plan. This regional policy aimed to move development closer to homelands of the Bantustans and new growth centres had to “qualify” before they could receive governmental help (DFA, 1982:48). Forty-seven industrial development points and 11 decentralization points were designated to

develop simultaneously (Drewes, 2000:135), all part of the political ideology to implement Apartheid.

They had to meet the following criteria:

- They should be outside of the economic influence of the metropolis;
- They should be on the development axis between two or more economic centres;
- They should have their own existing infrastructure;
- A development core is necessary;
- There must be employment for the homeland residents.

“Industrial development points” were defined as “points where alternative agglomeration advantages could be created to counterbalance the existing metropolis and thus create employment opportunities in the specific regions” (Drewes, 2000:135). According to Drewes and Van Aswegen (2013:196) the impractical locations from an economic point of view, lead to a dispersed pattern of too many growth points, making it difficult to implement. They describe this approach as economically and spatially unbalanced.

3.4.2 Regional Industrial Development Plan, 1991

The Regional Industrial Development Plan, 1991 (Regional Industrial Development Plan, 1991) was proposed to implement self-sustaining economic growth centres in order to develop an integrated economy (Drewes & Van Aswegen., 2013:196). This plan formulated the idea of secondary industries near the metropolitan areas for entrepreneurs to settle. The Regional Industrial Development Plan was economically and spatially balanced (Botha, 2011:80). It was a priority to develop an integrated economy in the country. Each region’s development was important with respect to the country’s development (Drewes & Bos, 1995:250). This policy moved away from an only balanced or unbalanced growth approach. The aim was to keep a balance between balanced and unbalanced growth as it encouraged development in all sectors and people from all backgrounds were invited to join the development process (Geyer, 1989:390). More emphasis was on natural growth points than forced growth points, as secondary centres and development axes had more success. Infrastructure was developed and the Plan contributed towards an orderly urbanization process (Geyer, 1989:386). It also encouraged urbanization. Location freedom made the policy politically correct as it became a uniform spatial development process (Botha, 2011:81).

In Section 2.7.3, the discussion on how people and products travel through the immediate region of the core and the periphery, shows the success depending on growth and management rather than on economic growth (Drewes & Bos, 1995:251).

During the implementation phase of the Regional Industrial Development Plan, 1991, the primary policy instrument, posing its importance, is the Core Periphery theory. As the Core starts to interact with its region, production factors become mobile and production factors become accessible to all areas. The Regional Industrial Development Plan was a politically driven process, which focused on segregation. Nontheless, it established agglomeration benefits over the long term and did affect the regional development. Regions showed potential and investment opportunities were enhanced.

3.4.3 Reconstruction Development Plan, 1994

After the African National Congress (ANC) party won the elections in 1994, a turning point was reached in the South African history. It changed the outlook on development. They established the Reconstruction Development Plan (ANC, 1994:145). The RDP policy brought a paradigm shift to an integrated socio-economic policy framework that aimed at mobilizing all the people and the country's resources towards the final eradication of Apartheid and the building of democratic governance (Drewes & Van Aswegen, 2013:197).

The ANC has formulated six basic principles:

- Integration
- People driven
- Peace and security
- Building the nation
- Linking reconstruction and development
- Democratization

Two of the six principles contributed towards the spatial influence of transformation: Integration and joining of reconstruction and development. The DFA of 1995 was a quick way to bypass all Apartheid legislation, which resulted in more effective decision-making and processes of delivering services (SA, 1995).

Once again, new growth centres were identified. Industrial Development initiatives arose with the objective to stimulate growth and investment in the manufacturing sector (Drewes, 2000:99). The Regional Industrial Development Plan was replaced by the Governments Growth Employment and Redistribution Plan (Drewes, 2000:99). The scheme had a balanced growth approach where manufacturers who faced increased competition, could gain access to subsidized loans for plants and equipment in an effort to make them internationally competitive (Volschenk, 1996:3). The core-periphery and growth pole theory were integrated, but this policy implementation extended the core-periphery. The core-periphery theory was placed within economic space, as economic space is not bound to geographical space (section 2.7.2 & 2.7.3). Economic space crosses geographic borders as this policy strives towards international competition. The core and its interim region, as well as the interaction with other cores, extend geographical borders. Economic regions coincide with each other and create a complex regional development. One could assume that the government contemplated, not only on how development should happen locally, but also on the impact the outside border (regions of other countries) could have on our own development surface. Therefore, three spheres of development started to play a significant role in spatial development of South Africa: National, provincial and local governance.

Spatial development instruments and applications used since 1004 transformed the perception of spatial development in South Africa. Growth centres, core periphery theory and industrial localization formed the basis on which South African policies were formulated. Each policy had its own balanced and unbalanced growth effect within the *total spatial system* because of growth centres and their regional effect.

3.4.4 National Development Plan, 2030

The National Development Plan, 2030 is the national policy that serves as the origin of all policy documents is the National Development Plan, 2030. The National Planning Commission set the key policy document in 2011. This policy covers all other sector policy documents on provincial, municipal and other development policies issued by the private sector. They are predominantly based on the NDP in an attempt to align with the identified objectives and priorities as well as with the vision for 2030.

The NDP is a broad strategic plan, which sets out a coherent and holistic approach. The strategic perspective offers a long-term vision for South Africa. The plan's central goals are expanding employment, to attaining a decent standard of living and creating entrepreneurial opportunities on the back of a growing, more inclusive economy (National Planning Commission, 2011:2, 10, 11; SAGI-SoNA, 2013:1). To reach these goals the productive basis needs to improve, whether in agriculture, mining, manufacturing, or services. The aim is to have a more diversified economy by 2030, with a higher global share of dynamic products and a greater depth of domestic linkages (National Planning Commission, 2011:91). Intensifying the stimulation of local and foreign markets and strengthening conditions to promote labour-absorbing activities are suggested (National Planning Commission, 2011:92). According to the NDP (2011:107), traded activities will act as a spur to growth and will stimulate domestic opportunities and the linkages between the two.

Weak capabilities for spatial governance are highlighted in the NDP (National Planning Commission, 2011:274): "*Renewed effort is needed to ensure that national, provincial and local government work together in reshaping the built environment to achieve smarter and fairer development*". It states,

> "*South Africa's intergovernmental system of spatial planning has been slow to develop and coordination has been poor. The complex division of powers and functions between local, provincial and national government have contributed to the problem and, in addition, ambiguities in the Constitution about who is responsible for spatial planning have created uncertainty.*" (National Planning Commission, 2011:274).

However, it acknowledges the fact that sound spatial governance requires strong professional and mobilised communities, which result in the following realities (National Planning Commission, 2011:275):

- Many municipalities struggle to appoint qualified planners and urban designers, whom are in short supply and are often not considered a priority;
- As a result, quality standards are sometimes poor and because opportunities are limited, too few people study planning and urban design;
- Low capacity aggravates the lack of citizen engagement in neighbourhood planning and development.

3.4.4.1 Agglomeration advantages

Mining areas is to be one of the main labour-absorbing activities in South Africa, including global trade (National Planning Commission, 2011:207) which attract many people and economic activities to mining locations. In reference to section 3.4.4, it is one of the NDP development objectives to stimulate labour absorbing activities in South Africa. Zarenda (2013:12) quotes the following: "South Africa should act as a spur to regional growth, rather than relying on it" (National Planning Commission, 2011:109). Incentive-mining regions are crucial core development areas, which influences the implementation of the NDP 2030. Zarenda (2013:12) also states that the NDP has tried to oblige regional industrialization and supply chain linkages, shift trade balances, power-buying agreements and create a financial centre for Africa.

A financial centre will substantially create more financial resources devoted to funding projects in the region with linkages to South African companies. Furthermore, it will reduce the development load from the government sector and drive economic competitiveness among other mining related companies leading to economic growth (Zarenda, 2013:13). Economic growth stimulates the local economy, which leads to local development. The local economy will sustainably link to other economic development nodes and contribute towards regional development.

3.4.4.2 Geographic approach and economic development

In Section 2.2, we have already discussed the geographic regional approach, which links perfectly with nodal economic development: Interaction of commodities and activities (processes) between nodes within a space that causing development. We can clearly tie this to the theory of the NDP (2011:109). It was supposed to commit South Africa to regional industrialization and supplied linkages in order to develop economically (Isard, 1956:18). This could only be accomplishing if mining areas are demarcated to focus on the integrated mining and regional development. Processes interact between nodes within space, therefore the integration of different activities change the all over character of an area when it develops.

Part of the process of interaction (Steyn & Barnard, 1976:55) is that theory and practice meet each other. Section 2.2 referred to the flow of people and goods; locally, nationally

and internationally. Flow of people and goods amongst mining activities benefits the attraction of international investment. This flow occurs along an axis to (Perroux, 1950:50) like areas of interest to agglomerate such as roads or natural resources. The NDP identified the stimulation of domestically orientated activities that clustering around high employment components (National Planning Commission, 2011:107). Industries and human activities are distributed around central places with interactive forces (places of development interest) (Christaller, 1966:14-17). In Section 2.6 the discussion of supply and demand between respective locations, indicates the point where spatial interaction overcomes distance. Spatial development cannot develop without movement of people and goods (Ullman, 1956:55 & Hurst, 1974:2). The movement of people and goods causes the clustering around and along nodal points, natural resources and development axis. Nevertheless, a natural resource is not uniformly distributed and this fact causes growth imbalances (Hansen, 1972:52). Along natural resources or any other development axis, clustering does not only occur at nodal points. Disposition of natural resources, obscures the spatial aspect of localization and hampers the implementation of other development components. However, as development take place within the region, it does strengthen the region. For example: infrastructure, housing, education, transport routes cause a faster demand than supply on unforeseen localities requiring rehabilitation of non-central places in the region (Hansen, 1972:50-77), instead of in advance planning of new places. In addition, the NDP lacks to identify these obscurants in the spatial system, which hampers regional development. If the NDP does not acknowledge these obscurants, other development policies on different levels of government sphere will also lack to acknowledge these obscurants. The NDP states “Africa is richly endowed with natural resources” but “these natural resources are unable to support growing populations” (National Planning Commission, 2011:112). Therefore, this obscurants and theoretical concept forms part of a crucial point in practice to be discussed and acknowledge in policy documents.

3.5 Inter connective relationship between South African Policy making and planning theory

The broad discussion in Chapter 2 addressed regional space as the departure point right through towards regional growth with its position in regional space. All the relevant

theories were explained. However, the application of these theories should lie in the practice of regional development. The need to formulate theories originates from the need in practice to address certain spatial issues and therefore these theories are regarded as instruments in practice (Bourne, 1975:204). Three main instrumental tools, critical in policy formulation, stood out in the case of this study:

- ***Growth centres***: Central places and the contained agglomeration advantages (discussed in section 2.3 - 2.6.2) and the regional effect;
- ***Core periphery theory and industrial localization*** (section 2.7.2 - 2.8); and
- Balanced and unbalanced growth effects within the ***Total spatial system*** because of growth centres and their regional effect (section 2.6.2).

These planning theories used to be use as planning tools in South African policies for the past four decades. It constantly influences policy making in South Africa. In the following sections, these instrumental tools are discussed.

As discussed in Section 2.7.2, Perroux (1950:92, 93) distinguishes between *geonomic space* and *economic space*. Economic space is an abstract concept in the sense of economic elements, difficult to visualize and differentiate in the development world. *Geonomic space* is a concrete concept, which is visual on spatial surface with points, lines and volumes. Therefore, he provides a tool to describe and explain the anatomy of economic development in an abstract economic space (Hermansen, 1972:160). Perroux is not concerned with spatial aspects of development in its geographical sense, but the application of his growth pole theory focuses mainly on problems of inter- and intraregional planning (Hermansen, 1972:161). Economy of scale and agglomeration are inseparable. Agglomeration advantages of economy of scale are achieved by concentration of economic elements (Steyn, 1976:201, 202; Hansen, 1972:3). The growth centre policy usually involves the selection of a limited number of urban centres with potential for economic growth (Drewes, 2000:63), as economic growth acts upon the geographic space. During policymaking, abstract economic space hampers the concept of how geographic space should be managed in order to establish economic growth. Therefore, this theory was a valuable tool in many developing and developed countries like South Africa, to apply to their urban, regional and national development planning (Drewes, 2000:64).

Table 3.1 below summarizes the application of this theory in developing and developed countries policies (Drewes, 2000:49):

Table 3.1: Application of Growth Pole Theory in previous policies

Time line	Description	Source
1950s	New towns: Freestanding urban centres located outside the commuting distance of an existing city, example: London metropolitan area and its new towns.	Egan & Benick (1986:218); Richardson (1984:283)
1960s	France designated eight Metro growth poles. The growth poles in the inner and peripheral departments led to four outer departments being the fastest-growing areas in the whole Paris region between 1975 and 1982.	Friedmann & Weaver (1979:144)
1970s	The France *metropoles d'equilibre* was also adapted in Italy, Soviet Union, Venezuela, Korea, Netherlands and Sweden.	Drewes (2000:65); Minshull (1987:173); Pred (1977:191 - 19); Gokhman et al., (1981:261); Simmons (1981:95).

Source: Drewes (2000:49)

Hansen realizes that it is impossible to implement this application would not be possible to be implemented in a democratic society (Hansen *et al.*, 1990:285) and natural resources, as in the case of this study, is not uniformly distributed. This means that growth centres are influenced by democratic decision making of social imbalances, investment and other economic influences (Hansen, 1972:60).

Spatial interaction is unavoidable (Ullman, 1956:55; Hurst 1974:2, 3) as supply and demand causes movement between growth centres. In a democratic society "human life swing" as described by Mumford (1975:13), changes economic growth centres. Economic growth and business opportunities change "human life" and their decisions. It is a variable floating above geographic space and is one of the biggest obstacles that confront governments. Governments have tried to limit people and their economic activities by application of the growth centre policy, in order to try to manage spatial distortion, which causes the difficulties in providing proper infrastructure and economic development. This was a way of progressive planning in order to provide before occupation took place.

Seemingly the theory was misinterpreted. Perroux (1950:96) indicates that he wants to move away from geographic isolation of regions. In a democratic society, as in the case

of South Africa, growth centres are usually found where the resources and opportunities exist (agglomeration advantages). In Section 2.6.1 where Meyer (1969:9) introduces forces of attraction along development axes because of agglomeration advantages. Each growth centres attraction depends on its own mass, the demand of its own population, but interacts with areas outside its region along routes of transportation and communication. Thus, different growth centres attract one another across geographic space (Parris *et al*., 1936).

The politically based approach used in the past (1970s-1991s governments), focused on industrial concentration in order to maximize the extraction of natural resources, but with a political undertone (Drewes & Van Aswegen, 2013:195). It is worthwhile to present a short summary of South African policies that may contribute to this study.

3.6 Policy as spatial instrument

The focus was on growth centres and industrial development from 1970 to 1991 (Drewes & Van Aswegen, 2013:194). Certain locations were earmarked for development. This was an unbalanced development approach applied coming from a top-down tactic for area specific development by the government (Drewes & Van Aswegen, 2013:194). That implies that national governance has directed all spatial planning and development. On spatial level, these approaches have lead towards unbalanced growth causing unsustainable development implementation. Development implementation was one-sided the government made all the decisions, influenced by their political ideology. Politics intervened forcefully in South African governance, but that had very little government intervention as a result. After 1994 a great change occurred: as democracy came into action, a bottom-up approach was adopted and attention was focused on social and political issues. It resulted in a more balanced approach of “geographical expression” in spatial planning (Drewes & Van Aswegen, 2013:195).

Table 3.2 gives a chronological overview on South African Policy approaches over the last four decades.

Table 3.2: Chronological overview on South African Policy approaches		
POLICY	DEVELOPMENT INSTRUMENT	APPROACH
National Physical Development Plan (1975)	• Growth points identified and decentralized away from economic core areas. • Plans aimed to arrange physical development according to specific development and political ideals.	**Top-down**
Good Hope Plan (1981)	• Contains efforts to implement new decentralized industrial development points adjacent to metropolitan regions. • Growth centres are geographically dispersed and spatially unbalanced and have an economically unbalanced result. • Growth centre strategy was applied again.	
Regional Industrial Development Plan (1994)	• Core Periphery strategy replaces the growth centre strategy. • From core development, the RIDP applies an economic process, a spatially uniform approach. • The policy aims to establish self-sustaining economic growth, in order for that to happen, the core has to interact with its region. • Supply and demand (forces of attraction) leads towards natural centre development.	
Reconstruction Development Plan (1994)	• Economic/spatial programme that bridges the apartheid and post-apartheid era. • Contains new development objective of mobilization and accessibility of socio-economic resources, but with no physical spatial plan where development should take place. • Uniform development approach with little balanced development.	**Bottom-up**
Urban and Rural Development Framework (1997)	• This policy framework aims to address the physical development issue. • Development principles once again end up on macro-economic development with little or no physical development principles. • The Rural Development Framework provides a counterbalance to the Urban Development Framework. • The Rural Development Framework is a spatially unbalanced framework with its focus on rural areas and aiming to provide a more balanced rural economy. • Urban Development Framework aims to develop urban centres by providing economic and social opportunities. It focuses on four key principles: - Integrating spatial segregation and sprawled cities; - Improving housing and infrastructure; - Promoting urban economy; and - Delivery of basic services. All based on a spatial balanced spatial development approach.	

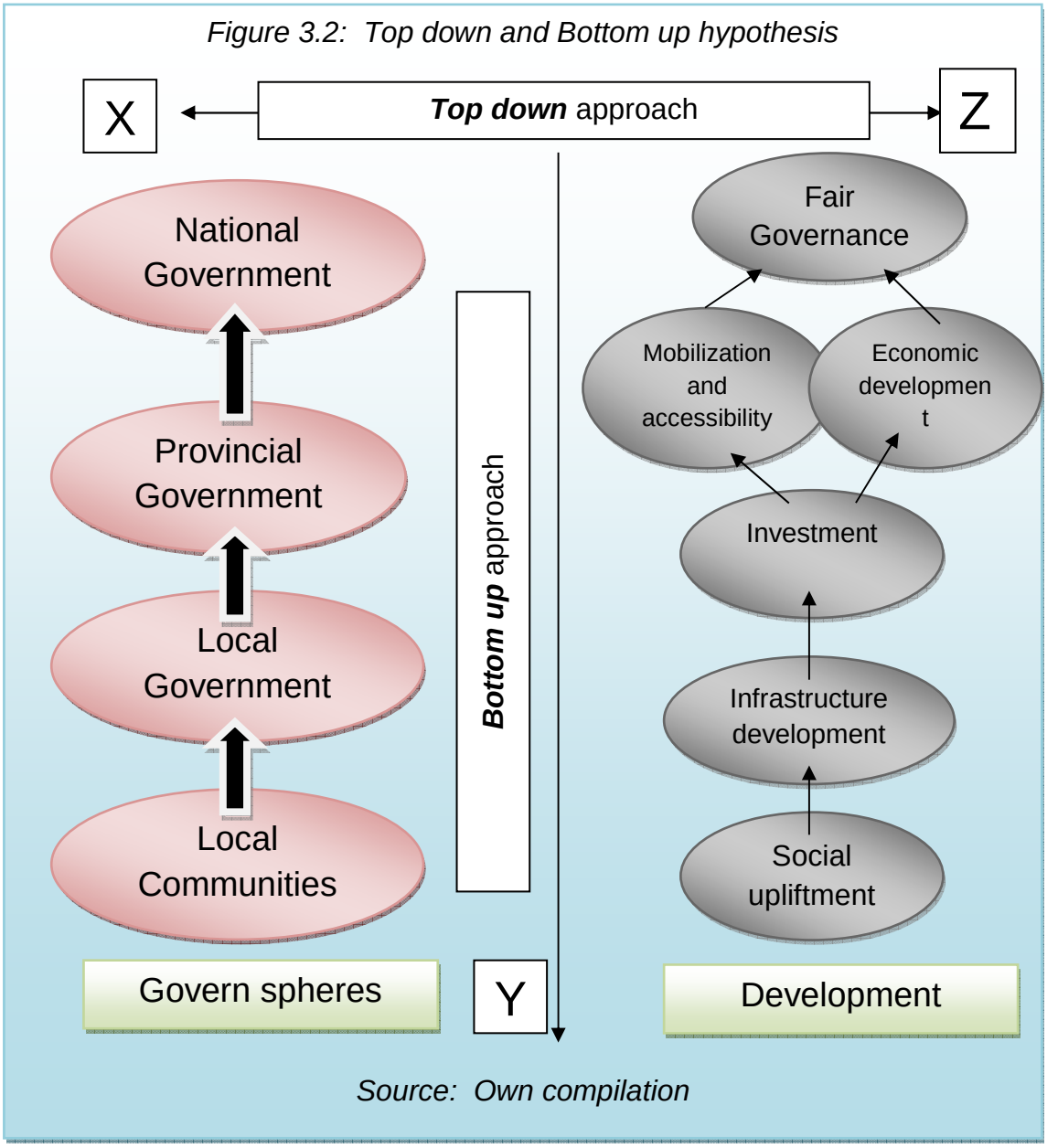
	• These two policies are separate entities and do not engage with each other. Thus, it results in little application of spatial development instruments.	
National Spatial Development Perspective (2002 & 2006)	• This policy provides guidelines for spatial planning and infrastructure development, but with the emphasis on "people" investment and not "places" (SA, 2003:2). • This policy refers to theoretical resources as Hirschmans "unbalanced" growth approach and comments that "unbalanced growth may actually promote development" (SA, 2003:31). • The policy focuses on resources and the efforts on these localities as continuation of unbalanced growth will contribute to long-term development (application of the core periphery theory and the industrial location theory). • It also makes suggestions on external economies to support the need for providing sufficient and adequate social capital in order to address the social economic infrastructure. • Thus, the end focus is on globalization and the space economy. • Macro-economic approach entails active monetary policy intervention to achieve growth. • This approach regards balanced growth, once again returns to political driven processes, this time by socio-policy and not economic policy.	
There is a clear understanding that since the early 1900s, when policy frameworks came into action, up to the early 2000s, policy-making was about the space where development should take place and identification of development location. During the period of the National Spatial Development Perspective, 2003 (NSDP), a paradigm shift happened from space area application to social development application: a movement away from geographical space influencing the physical planning.		
National Development Plan (2012)	• It follows the approach to become part of the "developed world" status. Focus on quality, improvement and equality (2012:136). • Balanced growth approach. • It appears that the government wants to regulate development and growth from a top-down perspective, but systematically involve public participation and socio-economic input during the development process (bottom-up). This statement could be investigated by future studies.	
Sources: Drewes (1993); Drewes (2000); Drewes & Van Aswegen (2013); SA. 2003; National Planning Commission SA (2011)		

A new assumption was formulated during the theoretical foundation of policymaking. As Table 3.2 divides the policies into top-down and bottom-up processes, one can hypothetically assume that:

- ***Top-down*** approach refers to the *geo-physical development* directed by national governance (intra-policy making);
- ***Bottom-up*** approach refers to the different governmental spheres, which influence the development of *socio-economic factors* (inter-regional policymaking).

Figure 3.2 illustrates the top-down and bottom-up hypothesis. The X-axis represents the geographic space on which physical development and planning have happened before the paradigm shift in 1994. This hypothesis adopts a new description of *geo-physical development*. The political ideology tactic was a vertical geographical practice with the focus on physical planning and development instruments such as growth centres and core-periphery development. The Y-axis represents the vertical movement between the different spheres of influence.

Figure 3.2: Top down and Bottom up hypothesis



Source: Own compilation

On the left, the different sectors of governmental influence are placed. The NDP has identified these three spheres as the fundamental role players in the development process. As policies were set, implementation was problematic because the objectives were not realized and remained docile in documents. Therefore, each sphere had its role to play and to achieve the overriding implementation objectives (SAGI-SoNA, 2013:1).

On the right hand side development spheres occur. These development spheres form part of development objectives listed below, starting from the bottom to the top (bottom-up):

- ***Social upliftment*** refers to the poverty improvement by job creation, racial integration and equality, education and provision in basic needs in order to address all social issues within the local communities. The NSDP was the first policy to acknowledge “People” and not “Places”. Public participation has become an important aspect during the development process (SA, 2003:2);
- ***Infrastructure development*** links directly with peoples basic rights. Adequate basic service delivery, better housing, road infrastructure etc.;
- ***Investment*** is crucial for local development and economic development. The NDP, 2012 (SAGI-SoNA, 2013:1);
- ***Mobilization and accessibility*** of natural resources have become important as it stimulates economic growth in the country and encourages South Africa to globalize;
- ***Economic development*** refers to all macro- and micro-economic development factors;
- Lastly a fair government without corruption.

3.7 Principles set for spatial development management

The Public Service Act (1994) and the Municipal Systems Act (2000) introduced requirements for departments and municipalities to prepare strategic plans. The National Planning Commission has set five spatial planning development principles:

- ***Spatial justice***: The policy refers to the confining of particular groups to limited spaces as *Ghettoization and segregation*. It is an unfair allocation of public resources and should be addressed rather first than last;
- ***Spatial sustainability***: “Sustainable patterns of consumption and production should be supported and ways of living promoted that do not damage the natural environment”. People and goods are not homogeneous and it should be keep in mind that they are variables that act upon regional space and influence the economic space;
- ***Spatial resilience***: “Vulnerability to environmental degradation, resource scarcity and climatic shocks must be reduced. Ecological systems should be protected and replenished”. With regard to the study area, the natural environment has not been considered. The environment is vulnerable to environmental degradation through “unplanned settlement sprawl” and mining activities; not to mention the impact on ecological systems, resource

scarcity and climate change. The consumption and pollution of water and ground resources are the most sensitive issues. This is a study on its own for environmental specialists;

- ***Spatial quality***: "The aesthetic and functional features of housing and the built environment need to be improved to create liveable, vibrant and valued places that allow for access and inclusion of people". The image of the informal settlements reflects the aesthetic problem in the study area. This confronts the feasibility of vibrant and beautiful living environments for people. Such circumstances can in no way be sustainable in the long term;
- ***Spatial efficiency***: "Productive activity and jobs should be supported and burdens on business minimised. Efficient commuting patterns and circulation of goods and services should be encouraged, with regulatory procedures that do not impose unnecessary costs on development".

The National Planning Commission is regarded as part of the foundation for building a developed state. This commission has cooperated in bringing a more long-term perspective by promoting discussion and more serious thinking on what we want the future to be like and what actions we need to take to achieve it. In order to achieve future planning the NPC proposed territorial plans.

3.7.1 Territorial plans

The National Panning Commission has proposed territorial plans in order to address spatial objectives. Most of these proposals form the most important part of the theoretical foundation. It is a good measure to see how theory and practice engage. However, the question remains on how it will be implemented. We align these plans with the current situation within the study area (National Planning Commission, 2011:279-281):

- ***National competitiveness corridor****:* We have dealt with this concept in section 4.2. It is important to "aim at a more diversified economy with a higher global share" (National Planning Commission, 2011:91). The study area can successfully contribute to this goal;
- ***Nodes of competitiveness****:* On this point, we refer to Sections 2.2 & 2.6. The NDP suggests that special attention should be given to efficient nodal

development. Gauteng with its high mining potential locations should be used for retaining economic value (2011:279);

- ***Rural restructuring zones****:* The NDP has confirmed that almost all the provinces contain areas, which have agricultural, tourism or mining potential. The zones can only be designated after careful consideration against a set of criteria. The situation in the study area is that the areas are occupied before careful consideration;
- ***Resource-critical regions****:* In this paragraph, the minister specifically refers to the "Platinum belt". He has listed critical regions of great importance and competition, which cannot be ignored. This confirms the essence of sustainability of the study area as it is necessary for economic feasibility;
- ***Transnational development corridors****:* The minister refers to corridors that are "critical for creating an integrated Southern African Economy" (2011:280). The study area is located within a national competitive corridor, which forms part of a motioned resource-critical zone and requires rural restructuring. It is indisputable that it is part of one of the transnational development corridors;
- Furthermore, this study area requires particular forms of support where, as part of a ***Special intervention area,*** it establishes job ***opportunities*** and ***requires growth management*** (rapid anticipated growth may require special planning and management).

The NDP insists that provincial and municipal authorities should designate areas for special attention (2011:282). In the following sections, the study unravels the NW Province and the two involved municipalities' policy frameworks, in order to evaluate if they understand the spatial principle set by the NDP, 2030.

3.8 Provincial policy

The NDP has become the cornerstone of governments policy in addressing objectives such as increasing employment, reducing poverty and inequality and improving living standards for the bulk of the population. According to the Spatial Planning and Land Use Management Act (Act 16 of 2013) the National government must *"in accordance with this Act and the Intergovernmental Relations Framework Act, develop mechanisms to support and strengthen the capacity of provinces and municipalities to adopt and implement an effective spatial planning and land use management system"* (Regulation

9(2)). Therefore, the important role of the NDP 2013 is to guide provincial spatial planning that contributes to and gives spatial expression to national development policy and plans. Likewise, SPLUMA also insists that each province and municipality must set their own policy that provides spatial representation of the land development policies, strategies and objectives of the province.

The development priorities of the North West Development Plan (NWDP) constitute eight priorities in line with NDP 2030 where the starting point is found in the acknowledgement of sustainable development. In the case of this study area, four of the eight priorities relate strongly to the study area:

- Integrated and inclusive rural economy (North West Planning Commission, 2013:126-140);
- Human settlement and spatial transformation (North West Planning Commission, 2013:143-165);
- Environmental sustainability (North West Planning Commission, 2013:201-216);
- Building a capable and development state (North West Planning Commission, 2013:268-282).

Above strongly relates to one another. In practice it needs to be addressed as a unit. Regular referral to Chapter 2, the theoretical background, will enable one to understand the complexity of the study area. Theoretical understanding could bring one closer to practical application in practice.

3.8.1 Central places clusters

The clustering of settlements near mining operations in rural areas (non-central places), roots in dysfunctional central places which are the result of unbalance growth (Hansen, 1972:60) (North West Planning Commission, 2013:143,279). The North West Spatial Development Framework (NWSDF) lines up with the NDP, 2030 where both emphasizing the “resource critical regions” with competition between development and environment (North West Planning Commission, 2013:134) (North West Planning Commission, 2013:279). Furthermore the NWSDF identifies the N4 development corridor (Platinum Corridor) which runs east to west through the BPDM via Brits and Rustenburg linking Maputo with Walvis Bay, to initiate new development opportunities, investors and labour (North West Planning Commission, 2013:146). This corridor

enables, as previously named, movement of people, goods, energy and information. It plays an enormous role in encouraging corridor and cluster development throughout the region. Especially concerning the clustering of informal rural settlement of people that takes advantage of the resource agglomeration advantages in this region (North West Planning Commission, 2013:143). An example follows in section 4.3 and Maps 4.2A and B serve as illustration, showing that even a small agglomeration advantage, such as a borehole, can change the borders of an informal settlement. The aim is to stimulate the economic potential of the region on the two primary development nodes: Brits and Rustenburg (North West Planning Commission, 2013:146). Unfortunately, it does not realize the impact on the non-central place development. This leads towards potential dysfunctionality of non-central places. For the residents of these non-central places, it is the most appropriate node to cluster, as it is central for them, because it is close to basic needs and their job opportunities near the mining operations.

Perroux's (1950) refers to spaces with two or three dimensions in which points, lines, surfaces and volumes can be determined, like those applied in mathematics by means of coordinates in his *Economic space theory and application* manuscript. It provides a definition for an abstract space. Abstract space can be applied to economic space. Perroux (1950:50) identifies many economic spaces in an economic system, as there are structures of economically interactive processes. Although it cannot determined as accurately in the economy. As previously mentioned in Section 6.2, processes such as movement of people and goods occur, which generate not only regional development, but also economic development. Thus, one can move from geographic space to economic space and from an artificial border to a real economic border.

Scattered, dispersed settlement patterns make the sustainable development challenging and hampers economic growth. Still the problem lies within the implementation on geographic space, because the problems origin lies within the economic movement horizontally above geographic space, which changes the character of the region constantly.

The NDP (2011:277) states spatial restructuring priorities but to say the least, these priorities remain words in hardcopy and never come to practice. The result is that these dysfunctions of non-central places lower the value of the primary, acknowledged central places (Friedmann & Alonso, 1964:38) namely Brits and Rustenburg. Hurd (1924)

states that the value of land is the most important single factor, determining the locality of land uses. A new question arises: Why does the value of land not increase, because of its optimality?

August Lösch (Friedmann & Alonso, 1964:97-105) states that the *nature of economic regions theory* explains the optimal settlement locations of economic activities that form an economic region in themselves. It is ascribed to the value of land and transport cost, formulated by Von Thünen (section 2.6.2). Although the transport costs are reduced, the land value is supposed to increase, but in this case, it does not. According to Von Thünens theory, the high value of land is supposed to attract investors that see the development potential in it. This argument will be discussed later in this document, but it results in unplanned nodal development followed by unsustainable development. Therefore, one can assume that land value will decrease and will not contribute to economic development.

These nodes are confronted with constant rehabilitation (as shown by the example in section 4.3) instead of advance planning and sufficient land use management methods by municipalities (North West Planning Commission, 2013:158). Unfortunately, the NWSDF does not acknowledge the involvement of mining authorities.

3.9 Conclusion

This chapter gives evidence that policy making over the past four decades was not static, but many of the policies were based on the same planning theories. One major shift took place after 1994 as social and economic factors became more important than the physical planning of South Africa. The relevant literature on planning theory literature has not been mentioned on the same level as socio-economical factors. It is argued that in terms of policy formulation, intra-regional planning (higher level of policymaking) overruled the inter-regional planning (lower level of policymaking). This hampers the policy making of municipalities, as it is where the implementation of the inter-regional planning becomes reality. In the next chapter, the involved municipality policies are explained in order to understand their policy status in practice. This will enable one to understand the current situation and problem statement of sustainable regional planning in the mining environment.

It is however critical to investigate the public-private partnership between governmental authorities, mining authorities and the public itself. A contractual arrangement between a public agency (e.g. local governments) and the private sector might contribute towards the overall advance planning within the regions. According to the SAIIA study on Corporate Social Responsibility in South Africa's Mining Industry, as assessed by Busisipho Syiobi (2015:1), policy makers increasingly see the corporate sector as an important partner in meeting development challenges. A study on the involved policies will evaluate the level of partnership between sectors in order to understand the current partnership situation. In addition, the study will clarify whether it may contribute towards the unsustainable approach of development in the mining environment.

CHAPTER 4: Delineation of study area

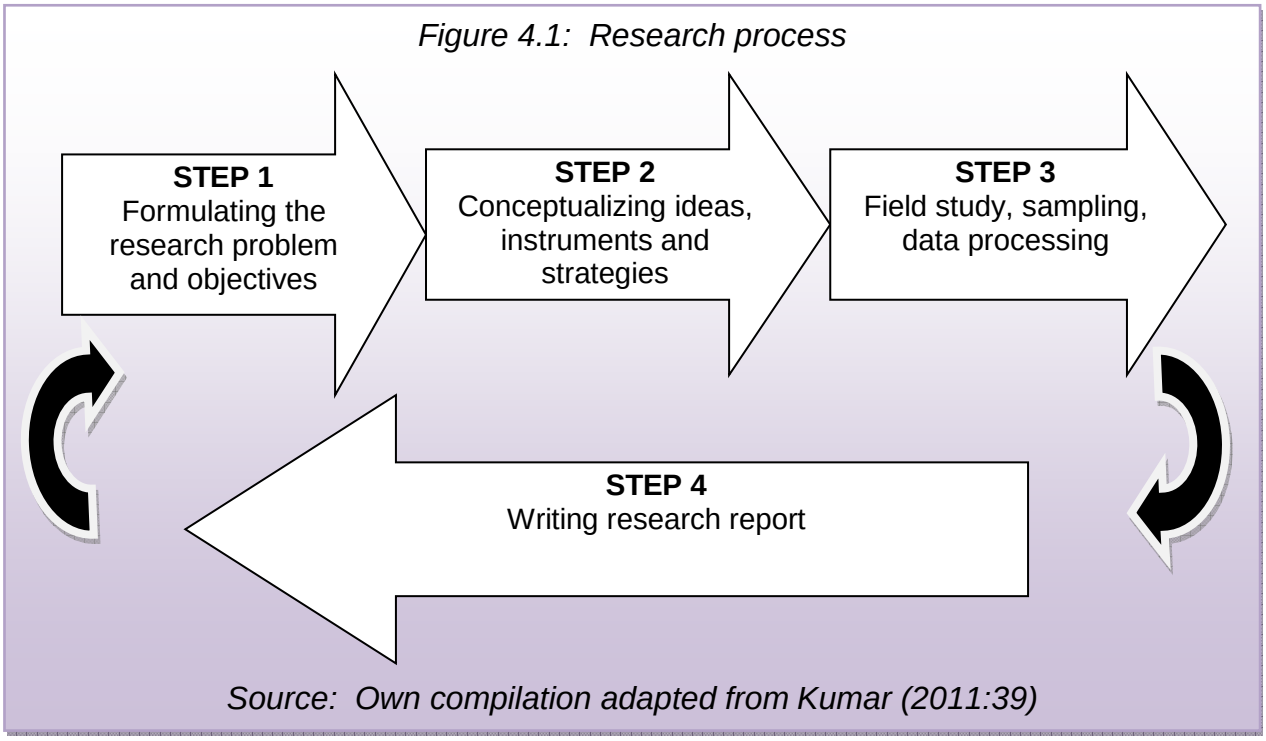
4.1 Introduction

Theories, discussed in chapter 2, applied to the field of study in Chapter 3, gives rise to a discussion in Chapter 4. The combination of theoretical tools (theoretical foundation) and the occurrence of specific parameter values (South African policymaking processes) in the economies modelled by NEG, explain the geographical unevenness of the economic landscape.

4.2 Research methodology

The research attempts to address the current situation of unsustainable regional development in a mining environment and it departure is based on a proposed example of Kumar's eight steps during the research process to follow (2011:39). The proposed research processes was adapted and adjust for the purpose of this study. Figure 4.1 illustrate the research process.

Figure 4.1: Research process



Source: Own compilation adapted from Kumar (2011:39)

Step 1: This step set the research orientation, and formulated the research problem, which identify its destination in Chapter 1. Three objectives were set that aims to develop sustainable policy strategies for a mining environment. The

approach describes data and context on a combination of qualitative and quantitative data.

Step 2: Step 2 conceptualize the applicable theory and policies that gather development strategies and instruments. Conducting literature involved (i) existing literature in the study area, (ii) reviewing selected literature, (iii) theoretical development frameworks and conceptual frameworks. Books, journals and the internet were very helpful. It contains two parts. Because the applicable theories are abstract and complex, this chapter were divided in to two parts: Regional space and regional growth in order to simplify the complexity. Each part was dealt with in detail and was scrupulous to ensure the content are relevant, appropriate and justified. Various theoretical components pertaining to regional growth and the regional space (Scott 1998:15) form the foundation of the study. This will subsequently be linked to the spatial impact on the study area in the empirical study. These theories aim to explain and simplify the complex mining environment. Relevant solutions to the study area could be formulated from similar case studies. The theoretical section links economic geography to the analysis of spatial aspects by means of economic analysis techniques and the study of the aspects of location and agglomeration. The study aims to develop further dynamic models according to which growth in certain locations could take place, by utilizing the growth effects of agglomeration and migration factors (Martin & Ottaviano, 1999:290). These models will link to policy frameworks as well as the objectives of the authorities involved. The conceptualizing origin in Chapter 2, focusing on relevant development theories and distinguish theory from the empirical set out in Chapter 3. Chapter 3 focused on policy evaluation in order to find relevant strategies and principles in place that might contribute to sustainable regional development. Regional analysis and regional planning cannot exist apart from the political process of decision-making; therefore, current regions' quantitative study and analysis of previous studies will help to prove the effectiveness of the regional development plans. The study explores the alignment of the Bojanala Platinum District Spatial Development Framework (2009/2010) (BPSDF) with the NDP of 2013 and how the Madibeng Municipality (Metro Plan Town and Regional Planners, 2009) and RSDF (Urban Dynamics North West, 2010:58) link to the NDP and BPSDF. The question will be raised of how the municipality addresses sustainable integrated regional development in

the mining environment. Through regulation of the regional plan, authorities promote the capability, technique and structure to accomplish projects and programs and inter-relationships among them. Study of regional theory provides the foundation of regional development and facilitates the choice of the optimal alternative to implement the policies in practice. Thus, the region emerges from the physical, economic, social and institutional environment in which development processes can interact. It is important to react upon both the development of “local economies” and “national development”. Consequently, this brings us to the qualitative approach that has been undertaken using questionnaires together with the empirical study to be discussed in later sections.

Step 3: Step 2 followed by the field study done (Chapter 4) and study relevant case studies (Chapter 5). Acquaintance with the study area not only involves the study of regional development in practice and policies, but also knowledge of the different key authorities. The most difficult part of the study was to do the empirical survey. This process was done over ‘n period or two years in order to ensure that all the best possible participants were elected for the study. They are the leading decision makers in the involved study area and their decision-making generates further nodal expansion from other sectors (public sector). The empirical study were based on actual and objective observation. There where two groups of participant elected. The one group has been the government sector: Town Planners Human settlement and planning departments from the Rustenburg and Madibeng Local Municipalities and the second group involved private sector: private town planners active and involved with town and regional planning in the area, developers, land surveyors and engineers. The survey include 51 participant, 20 percent of the 51 participants were form the government sector and the other 30 percent where from the private sector. Hence, questionnaires have been distributed to the different sectors to understand their current position in the study area and what their developmental objectives are (a detailed discussion follows in section 4.8). The study endeavours to align regional development policies with theory in practice. The statistics used in the policy document can contribute towards the understanding of the relevance of the information. It also explains how these different sectors interpret the information. Conclusions were drawn and based upon evidence

gathered from questionnaires, collected from practitioners that have experience and observed the study area on a daily basis.

Step 4: The research report deals with a proposed operational plan that obtains the methodology to address the regional situation. The study are predominantly qualitative that confirms the problems and limitations identified (see section 1.2) and propose a strategic precinct plan that might contribute to sustainable development.

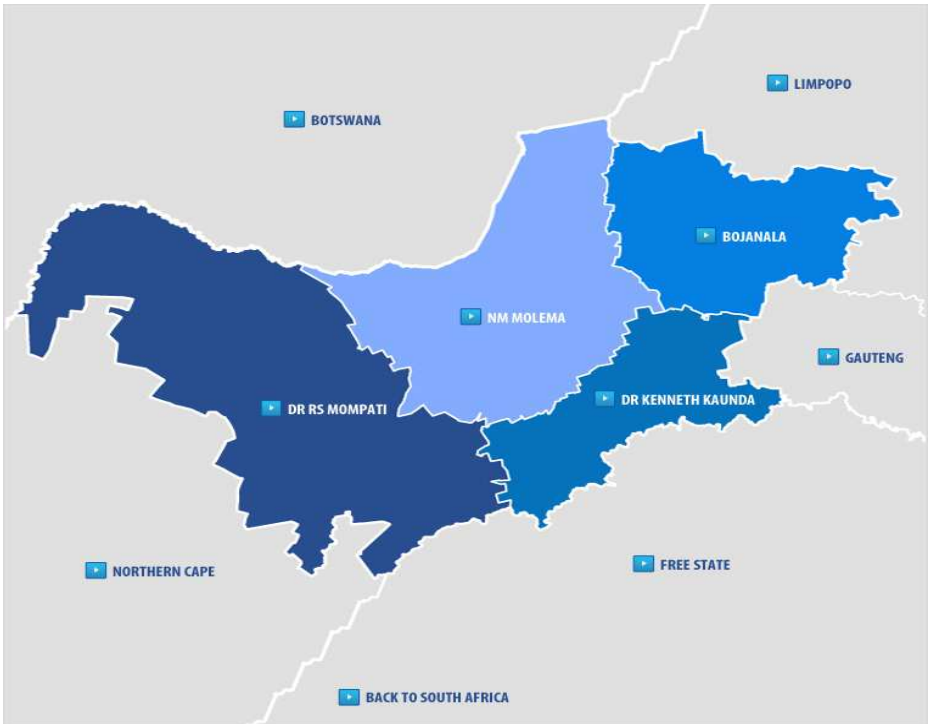
4.3 Study area orientation

Over the past decade, mining production in the NW Province has continued to reflect growth in the province, increasing its contribution to the overall mining output of the country (BPDM, Integrated Planning and Performance, 2012/17:44). The province consists of four district municipalities namely (North West Planning Commission, 2013:10):

- Bojanala Platinum District Municipality (BPDM)
- Ngaka Modiri-Molema District Municipality (NMMDM)
- Dr Segomotsi Mompati District Municipality (DRSMDM)
- Dr Kenneth Kaunda District Municipality (DKKDM)

See Map 4.1.

Map 4.1: Four North West District Municipalities



Source: North West Planning Commission (2013:10)

Differing from the North West Spatial Development Framework, the focus of the Bojanala Platinum District Integrated Development Plan is on five “Key Performance Areas” (KPA) of the Local Government Strategic Agenda 2005-2011 (BPDM, 2010:22). Each KPA indicates a status quo, challenges, objectives and issues relating to it. The KPAs are as follows:

- Basic service delivery and infrastructure investment;
- Municipal Transformation and Organization Development;
- Local Economic Development;
- Municipal Financial viability and Management;
- Good Governance and Public Participation;
- Spatial rationale.

  (BPDM, 2010:2, 3)

The integrated development plans, in line with NDP 2011, acknowledge the growing concern about state of the environment (BPDM, 2010:60). A whole section of the policy is set aside to discuss the infrastructural challenges on water, sanitation, roads and transport, housing, education, health and social development (BPDM, 2010:22-46) in the district, ultimately referring to the MLM and RLM as “vibrant economic development nodes” (BPDM, 2010:125) which influence the sustainability of development. The possibility that the government lacks to invest in infrastructural development, could be the reason why the value of land does not increase optimally. Informal development nodes (as discussed in Section 4.3.1) clearly present a challenge in this district.

The above policy document states that all departments at all levels of government realize the importance to prioritize these settlements and develop them towards formal development nodes in their planning and to ensure that their development is undertaken in a coordinated manner (BPDM, 2010:127). They should combine their resources of district and local municipalities, including the private sector to stimulate growth and development. This is the first policy that includes the participation of private sector (BPDM, 2010:127), but does not stipulate the criteria of their responsibilities towards the implementation on geographic space

It is generally recognized that the BPDM is the economic growth engine of the NW Province and contributes the vast majority of total production output and employment opportunities within the NW Province (BPDM, 2010:97). Therefore, advance

implementation of infrastructure is so important. We observed during our field study that infrastructural development is the basis that supports geographic space development. The mining sector is the dominant sector that provides employment opportunities and represents 30.3% of the total employment by 2001 (which increased since 1996 by 10.7%) and might have increased more from 2001 to 2013 (BPDM, 2010:98). To understand the essence of the agglomeration advantages this district has on the geographic space development of the Brits and Rustenburg nodes, we are going to consult the Madibeng and Rustenburg spatial development frameworks.

As mentioned in Section 1.1, the focus area lies within the Bojanala Platinum District where the study area is situated within the borders of Rustenburg and Madibeng local municipalities, offering natural resources with multiple opportunities to attract rural settlements. The NDP, 2030 (2013:126) defines these rural areas as “sparsely populated areas in which the majority of people cluster around the small towns, villages and settlements. These areas depend on natural resources. Rural areas also include the large settlements. Roughly 60% of North West can be classified as rural, the third highest proportional rural population in South Africa (North West Planning Commission, 2013:126). Revitalization and development of rural areas are the keys to alleviate poverty, create jobs and increase food security. (North West Planning Commission, 2013:134). The study area plays a significant role to achieve these goals. To revitalize the rural areas of this study area, we acknowledge one of the dimensions of sustainable development according to the NWDP (2013:5) and the NDP, 2030 (2013:107) development goals. Although these goals are clearly defined with regard to the geographic space, the problems of the locals living in the rural developments are not directly addressed.

People and businesses are not homogeneous and decide to settle and locate where they find appropriate (economic movement horizontally above geographic space, which changes the character of the region constantly). These decisions do not always correspond to the predictions of policies and government and errors are likely to occur.

During the empirical survey, an interview with Lomard du Preez Land surveyors (3 march 2015) revealed that they were part of a project to relocate a small group of informal settlers in Bapong along the N4 route to make way for new exits. During negotiations, the settlers insisted on adequate water in the area where they had been

relocated. After a borehole was sunk in that area to provide in their needs, new settlers were attracted in and around that area of Bapong, which led to the expansion of the informal settlement. Once again, improper water provision in this area became a challenge. Map 4.2 represents typical dysfunctional clustering which relates to Section 3.8.1.

The above phenomenon links to the objectives of this study:

- To understand the relationships between different sectors and what their responsibilities are;
- To suggest a regional plan that contributes towards the opportunities of the region gives evidence of planning in advance;
- To attract further investment and people to the best optimal nodal developments;
- To contribute to integrated local initiatives and national involvement.

By achieving these objectives, one can potentially address the sector relationship between governments and public, we would have better spatial management and finally we can obtain policy implementation that works effectively. Because above mentioned processes do not happen, we have observed the dysfunctional clustering of central places during our field study within this study area. The crown-mining district is situated in the BPDM. The BPDM integrated planning and performance policy (2012/17) has earmarked the district economy to be dominated by the mining sector. By 2010, this area contributed the most to the economic growth, especially from the Rustenburg area where more than 45% of the GVA-R (Gross Value Add by Region) is gained from mining activities (BPDM, 2012:44).

It is recognized that the BPDM is the economic growth engine of NW Province and contributes greatly to the total production output and employment opportunities within NW Province (BPDM, 2012/17:45). This study focuses on two of the five local municipalities within the BPDM District, namely Rustenburg Local Municipality (RLM) (Capital town: Rustenburg) and Madibeng Local Municipality (MLM) (Capital town: Brits). These municipalities are identified as two key development corridors within the NW Provinces primary development nodes (BPDM, 2012/17:15).

Map 4.4 shows that there is a definite contrast in the landscape (settlement pattern) of the north-eastern and the north-western areas: the latter containing scattered, low-

density settlement causing sprawl, whereas the south-western areas are characterized by compact concentration of settlements in strategic areas. Recognized urban areas are located in the southern side of the district. These include Rustenburg and Brits that are energetic economic nodes.

A study of the settlement pattern is made in this document to understand the location reasons of the settlements. The complexity of settlement patterns and mining locations need to be recognised to support the regional integration of certain nodal points in the study area. This correlates with the theoretical foundation to understand nodal expansion and interaction within a region.

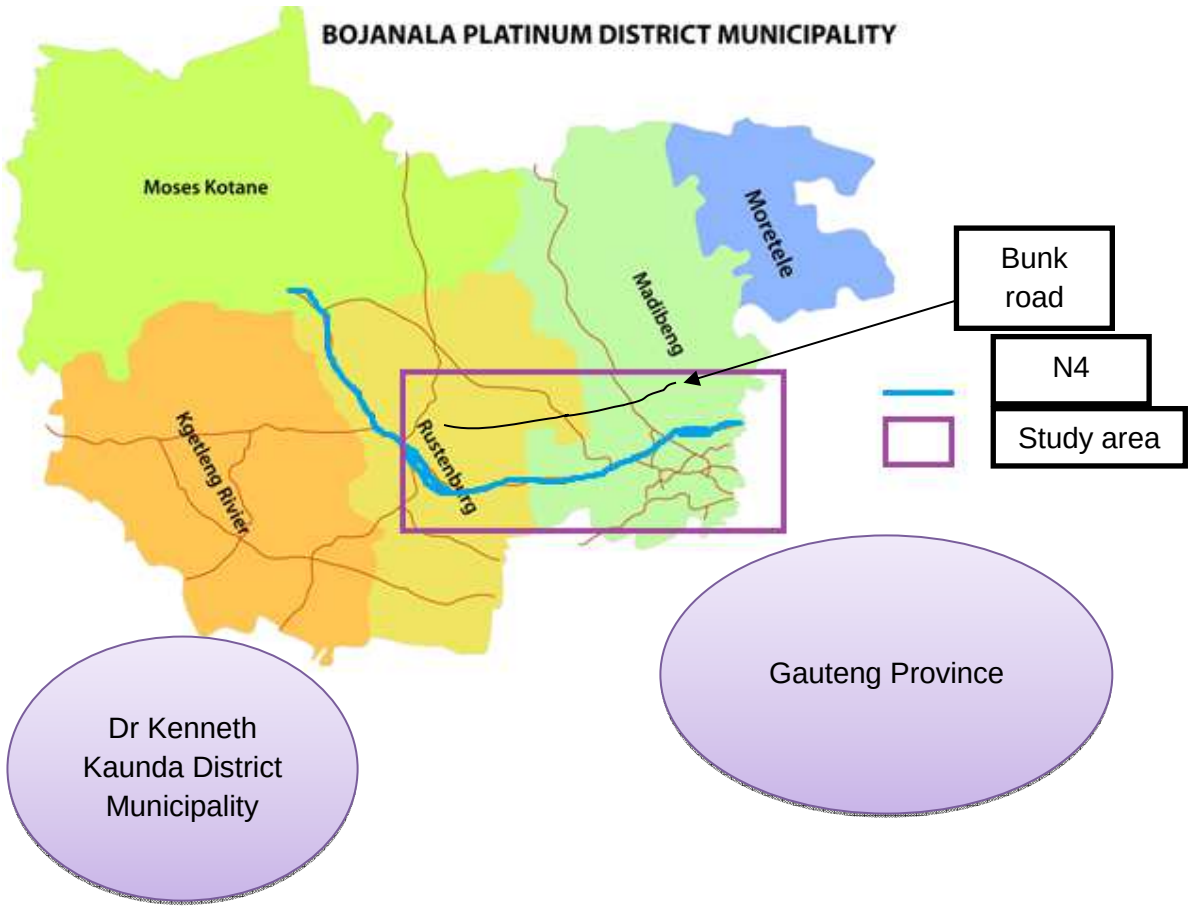
Map 4.5 (Cawthorn, 2010:206) shows the Bushveld Complex in South Africa. The three mining limbs include the Eastern limb (Dullstroom, Belfast and Middelburg area), the Western limb (Rustenburg and Brits) and the Northern limb (Mokopane). The Eastern limb (Rustenburg and Brits) falls within the boundaries of the study area.

4.4 Study area

The study area is positioned within the Bojanala Platinum District Municipality that contains five Local Municipalities: Moretele Local Municipality, Madibeng Local Municipality, Rustenburg Local Municipality, Kgetleng River Local Municipality and Moses Kotane Local Municipality. The study area is situated in the southern halve of Rustenburg and Madibeng Municipalities, north of the N4 road, which plays a significant role in the development of that region. Before the N4 was constructed, several mining companies had found it difficult to transport their resources between the different processing locations. Therefore they consulted among themselves and decided to build the “bunk” road, measuring approximately 50 km (Janse van Rensburg, 2011), which stretches from Rustenburg city to Bapong informal settlement (West of MLM, which the MLM attempts to formalize) (2015-03-03) (see map 7). Approximately 20 km from Brits, Bapong has started as one of the first big informal settlements that emerged in the study area. The bunk road made this area accessible for new residents to settle near employment opportunities. Theoretically this “bunk road” acts as a development axis (refer to section 2.6) in the region as it has done for many other settlements such as Majakaneng. It is also important to mention that the Merensky Reef runs parallel to the N4 (Bakwena highway) (See map 4.6). This plays a significant role in the global

connectivity of the Merensky Reef. The resources are transported from the “bunk road” via this highway to the different nodal points for further processing and from there to the break of bulk point from where exportation takes place (Janse van Rensburg, 2011).

Map 4.6: Bojanala Platinum District Municipality



Source: Adapted from the BPDM (2012/17)

4.4.1 Demarcation of the study area

Along the Merensky Reef (well known as the BIC) (Dube, 2010:13), the study area is reduced to a smaller portion, to allow for a more detailed study (discussed in section 2.2), along the N4/R104 road between Rustenburg and Brits. Within an area approximately extending to 60 000 km² the Rustenburg Layered Cluster of the Bushveld Complex comprises the world’s largest Platinum intrusion (Wilhelm *et al*., 1997:349). Almost 80% of the worlds reserves of Platinum-group Elements (PGEs) (Barry 1994:23-26) are concentrated in three distinct reefs, i.e. the Merensky Reef**,** UG-2reef (mined by all producers) and the Platreef (Potgietersrus Platinum only mined by Amplats) (Jones,

1999:526). These ores are quite different from each other and require different approaches to metallurgical processing. For example, the UG-2 ore has a much lower content of nickel and copper sulphides and contains much more chromate than the Merensky ore. The Merensky Reef and UG-2 seam run parallel to each other in the study area. Currently there are 12 active platinum mines in the Bushveld Complex, eleven exploiting the Merensky Reef and UG-2 chromite layer. Five dominant mines of the Merensky Reef are recognized, including the Brakspruit, Rustenburg Platinum Mine (RPM) and Western Platinum. Of these, Western Platinum takes up about 40%, Brakspruit about 20%and RPM about 10% of the Karee and Western Platinum mining lease (Davey, 1992:142), together with other mines. Amplats owns the RPM and well as the Bafokeng-Rasimone Mine. Impala Platinum is supplied by its own Impala Mine, as well as by Kroondal Mine (owned by Aquarius Platinum of Australia). Lonmin owns Western Platinum, Eastern Platinum and Karee mine (Dzvinamurungu *et al.,* 2013:75).

4.4.2 Historical overview and geology

The cumulate sequence reaches a thickness between seven and nine kilometres and has been described as the “largest repository of magmatic ore deposits in the world" (Willemse, 1969:966). Since the discovery of platinum in 1924 (Wagner, 1929:326), research on this intrusion has yielded a vast number of scientific contributions. It is therefore safe to say that the Bushveld Complex is one of the most intensely researched and explored geological entities in the world.

Since Hans Merensky identified the economic deposits of platinum in this region during 1920s, (Coetzee, 2012:2) a number of platinum mines have come and gone and some have merely changed identity or ownership. Currently there are five primary integrated platinum producers, namely Amplats (Anglo American Platinum Corporation Ltd, formerly Rustenburg Platinum Holdings Ltd), Impala Platinum, Lonmin Platinum (which includes Western Platinum-West Plats), Royal Bafokeng Platinum (Proprietary) Limited and Northam Platinum mine (Jones, 1999:525). However, Northam Platinum mine is situated outside the study area and does not form part of the research study. Some of these mining houses share mining interests in each other’s mining locations.

4.4.3 Mining operations

Amplats, Impala, Lonmin and Royal Bafokeng platinum mines are situated in the study area (map 4.7 indicate the location of each of these mines). The study area is situated in the Western limb of the Bushveld Complex. The study area is further divided into a western and eastern portion (see map 4.7), which illustrates the key mines located in the area.

Some of these mining companies have more than one mining activity in this study region. Each mine operation encompasses one or more opencast and underground mining sites (shafts), milling, flotation and drying, smelting, converting, refining and marketing components. As previously mentioned in Section 1.2, the study comprises approximately 60 mining locations between Brits and Rustenburg Municipalities (within a distance of 70km)(see map 5). There is a complexity of integrated mining activities. Most of these mining companies share the same production processes at the same private companies to save production costs.

4.5 Local Municipal analysis

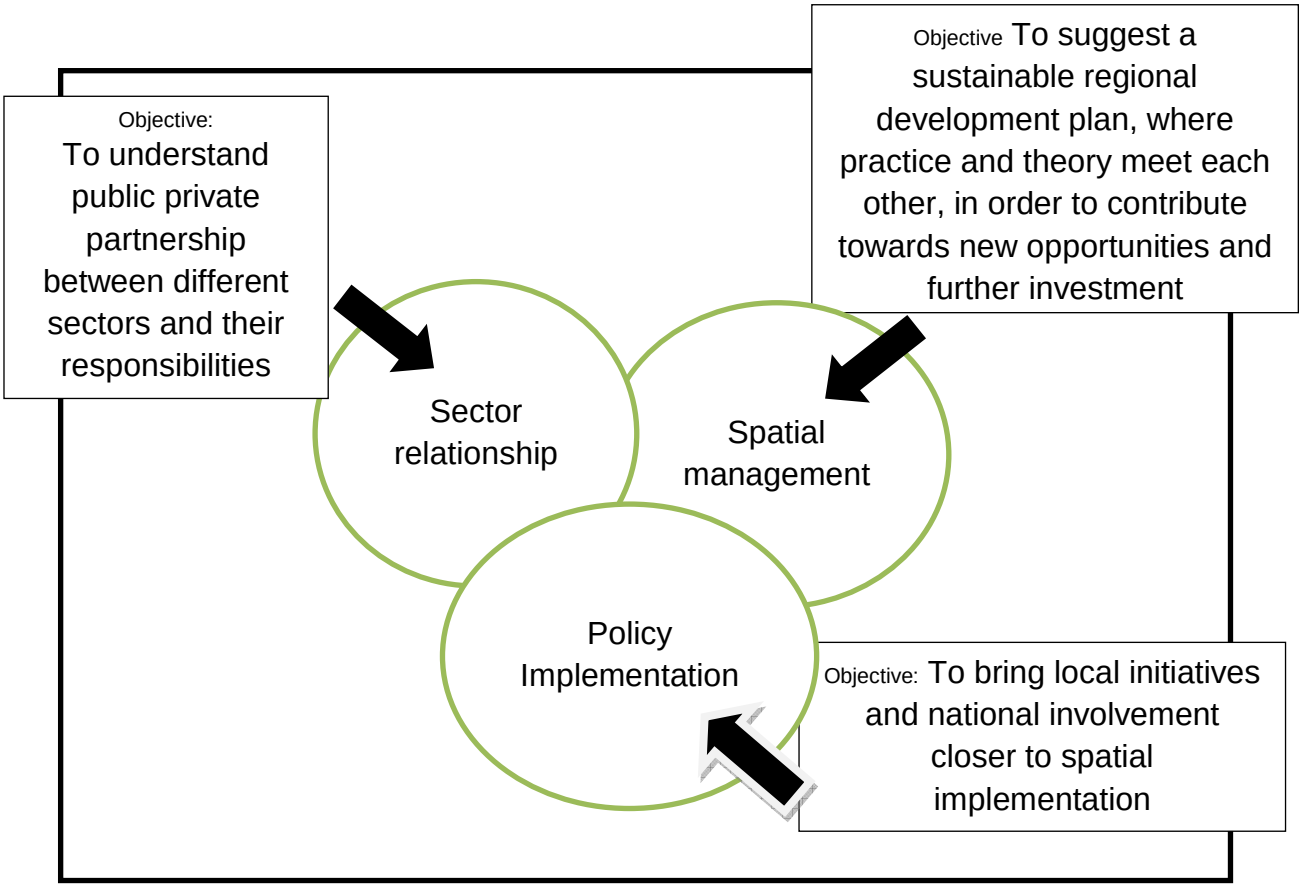
The involved municipalities are Brits (MLM) and Rustenburg (RLM). In this section, spatial management, sector relationship and policy implementation are discussed in depth in order to reach the objective for this research study mentioned in Chapter 1. The overall aim is to identify the gap between policymaking and practice and present a creative plan that will be visible. It should act as a useful tool for future sustainability.

4.5.1 Local Municipality policy analysis

It was of imperative necessity to consult local SDFs and IDPs to make this study. Figure 4.1 illustrates the objectives aiming to:

- understand the relationship between different sectors and their responsibilities,
- suggest a sustainable regional development plan, where practice and theory meet each other, in order to contribute towards new opportunities and further investment and
- bring local initiatives and national involvement closer to spatial implementation.

Figure 4.2: Policy structure



Source: Own compilation (Also see Chapter 1)

Both municipalities are category B municipalities (Madibeng Integrated Development Plan (2004:1) (MIDP); RIDP (2015/16:208)). Madibeng holds a very important central place as it connects Pretoria, Johannesburg, Rustenburg and Krugersdorp. Madibeng and Rustenburg are characterized by diverse economic sectors, i.e. agriculture, mining, manufacturing and tourism. However, mining is predominant with the world's third largest chrome producer, which also includes the richest Platinum Group metals (situated on the Merensky Reef). The significance of the municipalities can largely be attributed to the impact of the worlds four largest mines in the immediate vicinity of the municipalities' regions, namely Anglo Platinum, Impala Platinum, Xstrata and Lonmin (RIDP, 2015/16:32:24). As mentioned in Chapter 1, apparently 97% of the global platinum production takes place in Rustenburg, with the mining sector providing around 50% of all formal employment. Thus, these mining activities attract a large number of employees as the Madibeng population has increased from a total of 371 197 by approximately 33 000 since the last census in 2001 (MIDP, 5 year plan, 2012/17:30). Rustenburg's estimated population for 2016 are 654 834 (RIDP, 2015/16:32:30).

According to the Mining Employment Trends and Forecast to 2025 that was prepared for the Human Science Research Council in 2011 (2011:24), a total number of 311 900 will be employed by the Platinum sector. No statistical information is available to see what the number of people is that are employed in the platinum mining sector of Madibeng and Rustenburg. Such figures may give a clear understanding of the rate of employment in the mining sector in these two municipalities compared to the national figures. RLM however, has indicated in a pie graph that mining is their biggest sector of employment with approximately 98 956 employees (RIDP, 2015/16:30). Apart from the mining sector, the RLM is quite diversified in terms of the other sectors found in the area.

Both municipalities have a large rate of examples of informal housing and poor service delivery (MIDP, 5-year plan, 2012/17:47 adapted from the North West Human Settlements Development Annual Performance Plan; RIDP, 2015/16:54, 55). The main reason is the high rate of migration towards these employment opportunities of the mining sector, which attracts settlers to mining activities, located in rural areas. This phenomenon results in poor social-economic infrastructure with insufficient clinics, schools, businesses, clinics. It also implies poor accessibility to informal settlements regarding transport routes and transportation (MIDP, 5-year plan, 2012/17:98,114; RIDP, 2015/16:89/90/106).

4.5.2 Spatial management

The MIDP understands the development concept being the backbone of the SDF that entails a theoretical platform on which the desired spatial structure is developed (MIDP, 2004:30) (Madibeng Spatial Development Framework, 2009:1 (MSDF)). The MIDP (2004:30) considers the development concept by formulating proposals and solutions to address the communities' needs, objectives and strategies in the Madibeng region.
The spatial analysis of MIDP (2004:30) departs with corridor development where it identifies the N4 corridor, known as the Platinum corridor and the Mabopane-Centurion Development Corridor (MCDC) as the two primary development corridors that hold agglomeration advantages for Brits (MIDP, 2004:31). These corridors manifest the core periphery and industrial localization planning theory. The intersection of the Platinum Corridor and the MCDC feeds Brits with a labour force (MIDP, 2004:31).

Of significance to Madibeng is the fact that the Platinum Corridor will ultimately link Namibia, Botswana, Gauteng and Mozambique to Brits, thus becoming an international region due to its high profile namely, the mining resources along the Merensky Reef (MSDF, 2009:5); (National Planning Commission, 2011:280). From a land use point of view, one of the drawbacks of this corridor is its inaccessibility. This corridor is a freeway with limited intersections (MIDP, 2004:33). It is more a transportation corridor than a land use corridor. Employment opportunities provided by the mines attract new settlements not in favour of sustainable development (MIDP, 2004:33). Bapong is identified by the MIDP (2004:33) as one of the largest villages in Madibeng. It has developed at the foot of the Magaliesberg occupying valuable agricultural land as well as protected nature area to the detriment of Madibeng as a whole. Not only the value of land, but also the quality of land is affected. It also indicates that the majority of population lives in settlements located on the outskirts of Madibeng. Management is put under strain followed by the poor quality of service delivery in the region (MIDP, 2004:287).

The economic, social and physical characteristics of the Rustenburg Municipal Area are largely determined by the presence of mining activities within its boundaries (RIDP, 2015/16:100). Housing initiatives in this mining belt were launched along the well-known corridor N4 highway, which indicates advance planning and implementation of nodal development along this corridor, e.g. Marikana Ext 2 Housing Development (RIDP, 2015/16:105). It proves that good sector cooperation can be achieved.

RLM has a total population of almost 582 000 (2013) people which represents 37% of the population living in the Bojanala District Municipality (RIDP, 2015/16:208). As expected, the mining sector is also the largest employer with 84 000 workers which amounts to 48.7% of formal employment within the municipality and contributes more than 50% to the local economy (RIDP, 2015/16:208). The impact of mining on Rustenburg is greater than in Brits; consequently, the spatial impact is larger. Because Rustenburg is a bigger city than Brits, its attraction force will be greater than Brits (Mayer, 1969:9). The RLM employed public transport planning in order to manage the core, Rustenburg city, spatially. The Rustenburg Rapid Transport system, with a new consumer brand identity and name, YARONA, has been developed as the new public transport system and was launched in October 2014 (RIDP, 2015/16:126). Unfortunately, the essence of how they are going to integrate settlements along the

mining belt through this transport system is not clear. Only the lay-out and phasing of the transport system have been discussed.

The Platinum corridor is regarded as an important connection to international regions (Urban Dynamics North West Inc., 2010:5, 7). The Platinum Corridor (N4) is acknowledged as a major communication axis and it should be considered a priority development zone. Rustenburg city is a designated primary regional centre and an industrial development node (Urban Dynamics North West Inc., 2010:14). Along this corridor development towards the node of Rustenburg, the rural areas are divided into 4 main groups: settlements, open space, mining and agriculture. Mining and settlement areas fragmented urban development by creating barriers consisting of fences, transport facilities, pipelines, power lines, railway lines, roads and other infrastructure types between Rustenburg town and the settlements located along the mining belt (RSDF, 2010:30).

The Rustenburg SDF acknowledges the predominance of mining activities, which run along the Merensky Reef, north of and parallel to the Magaliesberg. The SDF finds it important that development for future, informal settlements around the activities should be controlled and managed in a sustainable manner.

4.5.3 Sectoral relationship

The MSDF, 2009 was set when the NSDP, 2006 had still been valid. The focus of the NSDP was primarily on social matters rather than fixed capital investment (MSDF, 2009:5). International and local trends have shown that most people ultimately move to localities where jobs and other livelihoods area available. However, the MSDF does not address the fact that the Platinum Corridor entails these agglomeration advantages for settlers, but ironically, they want to fight poverty and unemployment, as well as improve the low level of expertise (MSDF, 2009:5). It is as if they base their municipal responsibilities on spatial planning; instead of on the social needs in geographic space, that could improve sustainable nodal development. It is difficult to identify peoples preferences in advance. This is one of the first identified problems: Local Government does not realize the settlement requirements and needs of their local citizens, a clear indication of the absence of public participation and involvement.

Furthermore, it acknowledges two other important municipal responsibilities:

- Firstly, that the municipality should ensure that all municipal departments align their planning with the spatial development framework (2009:42);
- Secondly, that decisions made by the municipality, are according to the principles and guidelines of the SDF (2009:42).

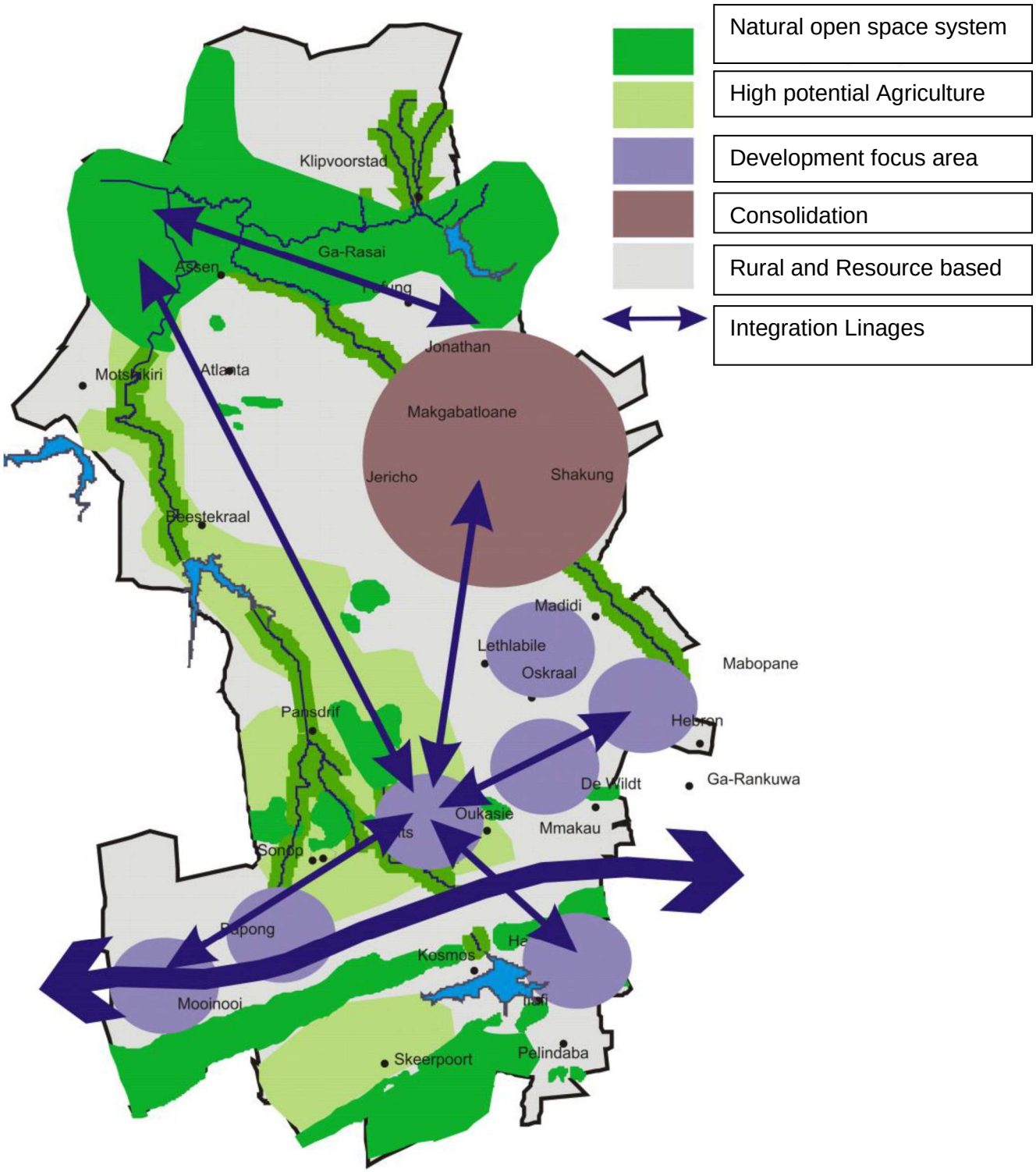
It is clear that Madibeng is driven by municipal matters without taking into account the influence of mining authorities in their development region.

4.5.4 Policy implementation

Madibeng Municipality recapitulates the importance to understand the gap between the development objectives and the current situation in their region, but ultimately it is again only summarized in their policy framework (MSDF, 2009:15), instead of visibly implemented in practice. Nothing more is said to note previously implemented strategies that have made a difference in the region.

The SDF aims to translate the strategies into spatial development concepts (map 4.7), in order to provide strategic guidance to the spatial restructuring of the municipal area (MSDF, 2009:17, 18). Two of the seven development focus areas fall within the study area, Bapong and Mooinooi. These development focus areas will be compared to Rustenburg development areas.

Map 4.8: Spatial development concept MLM



Source Madibeng Spatial Development Framework (2009:18)

The strategy looks at "*focused development in areas with inherent development potential and consolidation of existing scattered settlement*". This concept aims to link the focus development areas to main centres in the region for efficient movement. These development centres should be attractive. Agglomeration advantages should be

enhanced, for example better infrastructure, socio-economic factors such as housing, employment opportunities, education. These agglomeration advantages establish forces of attraction (this refers to previously discussed planning theory in sections 2.6.1-2.6.2: interactions along corridors, forces of attraction and agglomeration advantages). If the forces of attraction cannot act upon the development focus area, it is needless to mention focus on development areas(See Section 2.7.1). This SDF fails to point out the benefits of the development focus areas, therefore the scattered settlement patterns will not be addressed in order to consolidate. Development regulations are not in place to regulate the movement of people and production factors; therefore, the delivery of infrastructure is complicated. [1]

For the first time, the essence of spatial management issues that puts a strain on the sustainable spatial management of this region has been addressed. A few of the mining houses that facilitate some of these settlements are mentioned. A clear settlement hierarchy is emerging within the Rustenburg Municipality area. The hierarchy is determined according to the population size within each cluster (2010:31):

- 1st order settlement cluster: > 70 000 population (Classified ad urban);
- 2nd order cluster: 30 000 – 70 000 population (Classified ad urban);
- 3rd order cluster: 10 000 – 30 000 population (Classified ad rural)
- 4th order cluster: 2 000 -10 000 population (Classified ad rural).

Settlements that are listed included in the study area are Boitekong, Thekwane, Wonderkoppies, Marikana, Makolokwe and Tlapa. Settlements that are not listed but are also included in the study area are Bokamoso, Nkaneng and Elandsdrif. They are very small settlements, but certainly have an impact on the region if the total number of residents is calculated.

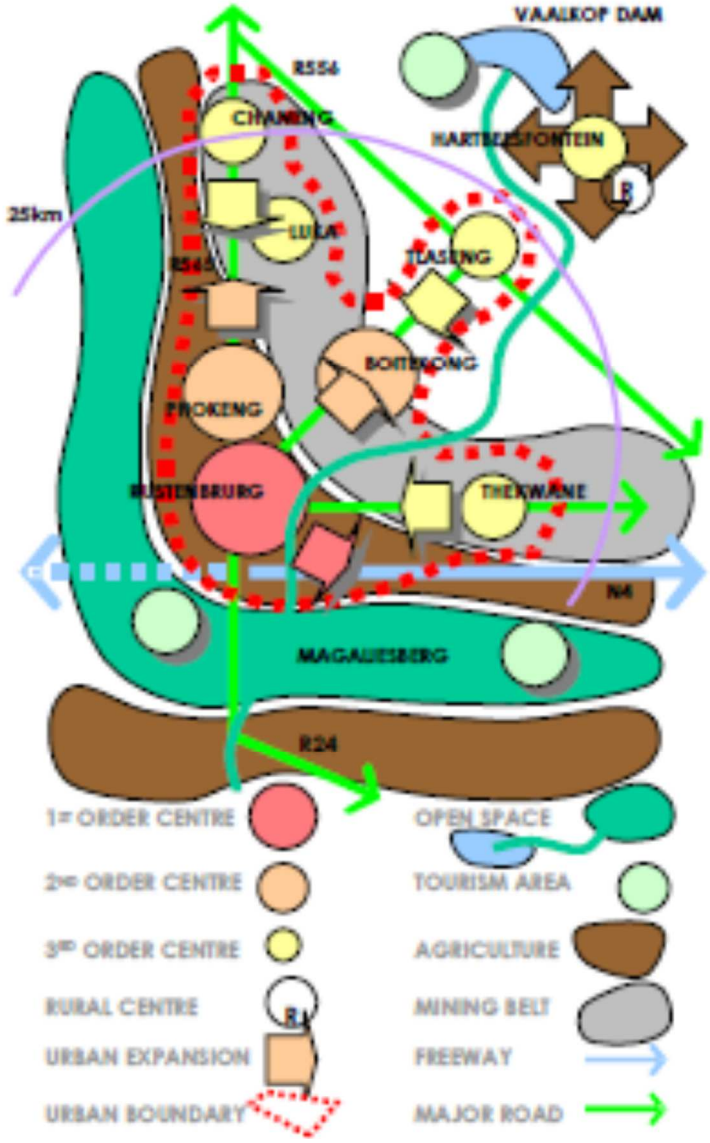
Table 4.1 below illustrates the total number of residents located in these mining regions, primarily dependent on mining activities for an income.

1. *However, Madibeng is busy to formalize their 2015 SDF and it could be implemented by the end of 2016. This new SDF could change all the resulting comments.*

Table 4.1: Rustenburg Settlement Hierarchy		
SDF settlement hierarchy	**SDF settlement**	**Census population estimate (2001)**
2	Boitekong	69 712
3	Thekwane	19 777
4	Wonderkoppies	8011
4	Marikana	3669
5	Makolokwe	1664
5	Tlapa	1239
TOTAL		**104 072**
Source: Urban Dynamics North West . (2010:32)		

The total number of residents living in the study area, 104 072 residents (table 4.1), gives us an indication that there are agglomeration advantages in this region, which attract this large number of residents. Large sections of the population live in settlements located on the outskirts of the Municipal Area, far from the Rustenburg Core area (Urban Dynamics North West., 2010:63). This is an urban sprawl on a scale inappropriate to the population size of the Municipal Area. This urban sprawl pattern has distinctive drawbacks, which influence the efficiency and cost-effectiveness with which municipal planners can manage the spatial and services aspects of the region. For example, bulk services have to be constructed over large distances to supply remote settlements with relatively small population numbers. It also increases the cost of living of residents including expensive transport costs and shopping in the Core Rustenburg area. Therefore, the Policy implies “spatial reconstruction: that is to require addressing these critical spatial issues and imbalances (Urban Dynamics North West., 2010:63).

Map 4.9: Rustenburg Development Concept



Source: RIDP (2015/16:70)

Map 4.9 represents the Rustenburg Development Concept. This concept also contributes toward spatial management of Rustenburg. This concept aims to correct spatial distortion and predict core and corridor development actions. They divided the Capital town, Rustenburg, in to 3-order centres: 1st order – Rustenburg CBD, 2nd order – Boitekong and Phokeng, 3rd order – Changeng, Luka, Tlaseng, Hartbeesfontein and Thekwane (refer to section 2.3 central place theory of Christaller).

For the purpose of the SDF the Magaliesberg mountain range acts as a buffer, to block urban expansion towards the south, south-west and west of Rustenburg. Urban expansion is encouraged towards the north, along the Rustenburg-Ribera Corridor

(RIDP, 2015/16:73), north-east along the Rustenburg-Kanana Corridor (RIDP, 2015/16:72) and towards the east along the Rustenburg-Thekwane Corridor towards the Brits Development Focus areas of Mooinooi and Bapong. The corridors tie the majority of settlements into an integrated urban spatial structure. The SDF makes it clear that these order centres along development corridors, should not be viewed as development areas or axes. These settlements should only accommodate the growth of its existing growth (RIDP, 2015/16:74). The SDF uses corridor development as a planning instrument in order to integrate fragmented urban structures. Isolated open space, surrounded by urban settlements, has little chance of sustaining it original biodiversity, therefore, it is ideal to use these open space for urban development rather than to allow urban sprawl.

The SDF mentions four objectives that could be achieved through corridor development (RIDP, 2015/16:79):

1. Corridor development contributes towards spatial integration as it restructures fragmented urban areas.
2. It redevelops spoiled areas. It reduces the need for costly rollout of new infrastructure.
3. It creates urbanity.
4. It improves appearances of the urban landscape.

The above four objects form part of te competitive and interaction concept that directly links with the core-periphery theory of Friedmann (1966:17). This theory is one of the fundamental explanations of regional growth.

4.6 Spatial planning policy

Spatial patters are fixed and difficult to change. As in the case of Madibeng Municipality that has the same spatial issues, these patterns cannot be restructured completely. As mentioned before, people and business make their own decisions where to locate. The Rustenburg SDF successfully tries to manage these spatial issues.

According to the RSDF, 2010, one should address the weaknesses of the spatial structure through the planning and development of its future growth (Urban Dynamics North West Inc., 2010:63, 64). They set out six strategies to achieve this goal:

- ***Urban integration***: It implies to move away from fragmented and sprawling urban structures. Existing outskirt settlements should consolidate, and the Rustenburg core area should peruse.
- ***Bulk infrastructure development***: Advance bulk infrastructure could be a valuable tool to achieve the above-mentioned spatial pattern. The future bulk services will force future urban development into a more rational and desirable urban model. The model will result in location, implementation and function on the bulk services network
- ***Equitable access to social services***: The Outskirt settlements locate far away from SDC. The location results in high transport costs to the Core Rustenburg area. It is essential to establish a hierarchy of SDCs containing facilities such as clinics, police stations and community centres. These SDCs will bring services closer to the settlements and make them more accessible to the residents and achieve greater urban integration
- ***Land use and Transportation integration***: According to the RSDF (2010:65), public transport and land use development create urban corridors that form optimal land use structures that are cost-effective. It cancels the possibility of lost space that might result in unsustainable regional development. The aim is to pursue optimal land use that is diverse, but at the same time complements each other in such a way that it contributes towards the overall sustainable regional development.
- ***Protection of agriculture and open space***: This integrated focus and the land mentioned above use and transport integrations will make the process of protection of valuable agricultural land and open spaces easier in practice.

The aim of these development strategies is to develop a more rational, cost-effective and manageable structure. This Development Concept "forms the backbone of the SDF which provides a theoretical platform on which to construct the desired spatial structure for the Rustenburg Municipal Area." (Urban Dynamics North West Inc, 2010:66).

This chapter renders theoretical information, which sketches the background for the involved municipalities' regional development. The question remains whether it addresses any of the IDP and SDF problems. Based on the field research many professionals involved with development processes in this study area, have revealed a

different story, as they feel that it may stipulate and set out the problems to be addressed, but in practice, it reveals a different situation.

The SDF of Madibeng refers to promised “Precinct Plans” (2009:44), as detailed plans focusing on core development areas such as Brits, Hartbeespoort Dam, Lethlabile/Hebron, Mmakau, Bapong and Mooinooi. According to the SDF once the Local SDF for Urban Areas has been completed, Precinct Plans, including Urban Design Frameworks, will be drafted. Since 2009, no precinct plan was approved and implemented. This has diverted development because the SDF cannot be used as basis for the IDP, as the IDPs budgets and attention concentrate on core development areas. One cannot promote and implement sustainable development when a broad overview framework has to provide the basis for Integrated Development. An overview should break down the development regions with its objectives. This chapter reveals that the SDF does not assist the Integrated Development Frameworks with detailed development strategies and objectives, which obstruct the process of public-private partnership (sector relationship). Secondly, the concept “Integrated Development Planning” diverts the development processes leading to incorrect interpretation. How can one focus first on development and then want to correct development with “planning strategies”? The question should be: why not focus on the “plan” first (Spatial management) and then on “development” (Implementation of the Spatial Management Plan)? The study gradually reveals a new concept development **“Integrated planning and development implementation”** to accomplish research objectives.

4.7 Empirical study and empirical evaluation

The empirical study aim was to make a contribution to accomplish “integrated planning and development implementation” concept. The questionnaire contained multiple choice questions that strived to gather information needed for the purpose of this study, listed in table 4.2. All the answers of the questionnaires are summarized and compared in Table 4.2. Therefore, the issues are classified in one of the three main objectives set out in Figure 4.1.

Table 4.2: Field study summary			
Regional problems stated by policy and field study	Research objectives		
	Sector relationship	Spatial management	Policy implementation
Concern about environmental impact		√	√
Integrated system of spatial planning is slow	√	√	
Poor coordination	√		
The question arises who are responsible for spatial planning	√		√
Unqualified professionals in control of Spatial management	√		√
Poor quality standards	√	√	√
Lack of public participation	√		
People and businesses are not homogeneous		√	
Movement of people and businesses change the regional character		√	√
Inadequate advance planning	√		√
Clustering of settlements near mining activities root in dysfunctional central places		√	
These central places put a strain on bulk infrastructure delivery		√	√
Service delivery should be implemented over long distances which are expensive	√		√
Value of land decreases	√	√	
The N4 are not accessible		√	√
Mining attracts more large unplanned settlements located outside core develop areas		√	√
Government does not realize the local needs	√		√
Gap between development objectives and regional situations	√	√	√

Source: Own compilation

Table 4.3 simplifies the complexity of the problem statement (Section 1.2). All three objectives need serious attention where most problems are encountered when implementing the policy document. Poor coordination influences the integrated system of spatial planning.

People and businesses move around over space, which change the character of the region. This makes it difficult for authorities to plan if the necessary input from public sector is not consulted. These movements result in dysfunctional clusters, which make service delivery and providing in these residents' needs expensive. There is a clear understanding that there is a gap between the development objectives, which originates in planning theory and the regional situation. Objectives do not meet the regional situation, which complicates the implementation of policies. In the next chapter, a discussion on comparable case studies is conducted and how efficient sector relationship can contribute towards successful implementation of policies.

It was found that if the relationships between the different sectors could be established, it would encourage policy implementation and development objectives. Spatial management problems could only be bridged by better sector relationship and policy implementation. In the following section, the results of specialists' input towards this study are examined before discussing the identified problems. Many issues have evolved during this phase of the study.

4.8 Empirical survey

Town planning professionals practicing spatial town planning in this area on a constant basis have been identified. A basic criteria to be chosen was significant experience in spatial planning in the study area. At first, local town planners of Brits and Rustenburg were selected, who participated in the study area, but also assisted the research team by referring them to more town planners that also have experience in this study area. Other town planning specialists from this area were registered with the South African Association of Consulting Professional Planners (SAACP) and the South African Planning Institute (SAPI). The background of the planners was screened before they were involved. The town planners and specialists were divided into two groups: private sector and government. The mining authorities were included in the private group for the sake of the study and to reduce the complexity, it was assumed that their point of departure coincides with that of the private sector.

4.8.1 Questionnaire

The questions were set to focus on the objectives stated in Section 1.3. The questionnaire contains six multiple-choice questions (see questionnaire annexure). The options to select from are (table 4.3):

- *Option A:* Answer of the question is based on positive reaction to the current mining policies and implementation.
- *Option B:* Answer of the question is based on the negative reaction to the current governmental policies and implementation.
- Option C: Answer of the question focuses on the problem statement of this study.
- Option D: This was optional and gave the opportunity to the participant to give its own professionals input to the survey. This option where very helpful and gave feedback beyond expectation. The feedback was very helpful and many regional examples and scenarios regarding the study were revealed and could have been used to support the context of the study.

Table 4.3 summarizes the percentage of people that have selected each option of the questionnaire.

Table 4.3: Summary of options chosen

Questions	% - Option A	% - Option B	% - Option C
1	0%	12.5%	87.5%
2	37.5%	12.5%	37.5%
3	0%	0%	100%
4	37.5%	0%	62.5%
5	25%	0%	75%
6	0%	37.5%	62.5%

Source: Own compilation

Option C was the most favourable option that implies the importance of the problem statement, which is a crucial focus point in practice and needs attention. Question 3

shows a 100% selection in option C. Participants strongly feel that inter-governmental co-ordination should be promoted.

The group of respondents consisted of 46 from the private sector and 11 from the government sector (three town planners of Rustenburg and eight of Madibeng). The percentage of private sector participation was 47%. Of the 11 questionnaires that were sent out to the town planners from the government sector, only three were completed in spite of numerous efforts to get them involved. Therefore, the participation rate was 27.2%. This has brought a turning point in the research, because the unwillingness confirms our assumption that the governments' priorities are not at the sustainable development of the region as their policy frameworks proclaims.

4.8.2 Practitioner's contribution

The private sector was more willing to give us their feedback and the participation was beyond expectation (see table 4.3) (see Annexure 2). They confirmed the current problem in the study area. The questions were analysed separately in order to come to the essence of the problem statement in Section 1.3 (see figure 4.1).

- Question 1: *In your experience, who are the key role players responsible for planning and development within a mining environment?*

The private sector has identified the municipalities as the first ranked constitution in determining land use and spatial planning issues, where mining acts as a user of land like any other land user. The mining activities have a life span at the end of which operations are discontinued. Private planners are therefore convinced that it is imperative that mining houses and local municipalities work together to ensure a sustainable and viable environment. One of them used the example of Mooinooi: The mining houses are responsible for the engineering and maintenance of infrastructure and the municipality for land-use management. The municipality currently approves rezoning, but the mining houses disapprove of the actual development when it comes to provision of engineering services. This example proves the unwillingness of the mining authorities to implement the necessary infrastructure as they are convinced that infrastructure development is not their responsibility because they do not regard this development as part of their concept of land use. Development such as housing next to

the road infrastructure that they have established does not imply that they will also provide service delivery infrastructure such as sanitation and water.

- Question 2: *What is the significance to develop a mining environment with regard to sustainable economic growth and regional development?*

The private sector refers to the Local Economic Development (LED) initiatives, which should be consulted in order to ensure the sustainable growth when the mines close down. The mines have never been fully responsible for its impact on the surrounding environment. According to the private sector, no contributions towards upgrading of infrastructure were made in the past (especially those of a municipal nature). These infrastructures are usually not financed, given the legacy of the past where mining was generally exempt from planning regulations such as zoning.

- Question 3: *In your experience, does South African planning policy provide sufficient guidance for different role players, e.g. mining operations and Municipalities, in terms of Integrated Development Planning methodology?*

According to the private sector, necessary acts and policies are in place. The major problem is found in the interpretation and implementation of these acts and policies. They mention the incompetency of the government and mining houses not realizing the value of properly integrated planning and development. They do not experience public-private partnership. In the past, there has been very little or no strategic planning or development policies and control on proclaimed mining land.

According to private planners involved in the study area, mining as a land use category is not properly assessed in current planning policymaking. Mining is a unique land use category as it is non-permanent. Mining only lasts as long as the mineral resources abound. It is difficult to "plan" for mining as a future land use, given its source specific nature and sensitivity towards economic swings and roundabouts, (supply/demand varies over time and directly affects the use of land for mining). Mine authorities try to establish their own guidelines towards integrated development.

Lonmin mine has recently applied for rezoning in Elandsdrift for the development of a solar plant in an area of 3,5ha, which falls under Madibeng jurisdiction. This is the first

attempt at further future solar plant developments. These types of developments do not rely on the life span of mining activities. These solar plants remove the mines from the national grid as large consumers of power, enabling Eskom to deliver electricity to new settlements. If the life span of the mine declines, the solar plant could contribute to the power supply Eskom has to deliver. This integrated service delivery compliments the region in many different ways:

- Electricity is produced from a sustainable renewable resource;
- Mine development as well as local future development is promoted;
- The community of Marikana is uplifted to a next level;
- The solar plant reduces the environmental footprint of mining activities.

Shortcomings during this decision-making process come in where the government authority does not want to engage with the mining sector.

- Question 4: *Should policy documents directly identify the different role players (i.e. in a bottom-up manner) and their responsibilities during regional development to ensure sustainability?*

The private sector strongly feels that policymaking settles in the realm of authority, which makes the municipality the principal planner and manager of development of areas under its jurisdiction. According to the Municipal Systems Act (2000), the municipality is responsible to dictate and guide the involvement of other participants (i.e. the mining sector). Unfortunately, it has become the responsibility of the private sector to drive the municipalities and there is no partnership between private and government sector. Without partnership, sustainable development will not be possible. It is not the private sectors responsibility to drive government. The competency of the private sector should be in balance with that of the government sector.

- Question 5: *Does current planning policy in South Africa provide sufficient guidance for inter-sector coordination between local and mining authorities in terms of regional development?*

According to town planners specializing in this study field, most municipalities, where mining occurs on a large scale, are simply not experienced or aptly resourced to deal with the challenge in an appropriate manner. Mining usually plays an important role in

these local economies and tends to sidestep from having to comply with municipal policies and regulations. The municipalities “ignore” the thorny issue of mining because of the feedback mentioned in question four, where municipalities are not competent to “drive and guide participants”. Even though mining represents a somewhat one sided economic growth and suppresses other economic activities, it provides most of the employment opportunities which alleviates the financial pressure of government having to provide for the unemployed. Nevertheless, it is essential to establish a diverse local economy in order to ensure that if mining is terminated, other economic activities could establish further growth in the local region. The local authorities are aware of this fact as it is illustrated in their own integrated plans but it has been misinterpreted as it is regarded as a diverse economy.

- Question 6: *Mining operations and municipalities form an integral and co-dependent spatial entity. How should these two sectors approach development initiatives within a Municipality?*

The municipalities are constitutionally obliged to plan and regulate the use of land under its jurisdiction. Mining authorities are obliged to align their initiatives accordingly; except for the unique characteristics that are unique to “mining” as a land use i.e. being source dependent. One cannot mine anywhere other than where the mineral resource is. It is at this point, where partnership between the municipality and the department of mineral resources should be established. This refer to the theoretical foundation where resource bound location has been discussed (section 2.3 & 2.4).

4.9 Conclusion

An analytical theoretical discussion has provided alternative regional development implementation solutions .The BPDM is generally recognised as the economic growth engine of the NW province. Therefore, the study area in this chapter is clearly described in order to understand the regional situation. The crown-mining region, also the study area, is situated between MLM and RLM within the BPDM regions (map 4.6).

Since the discovery of platinum in the 1920s, intensive platinum and chrome mines establishes along the Merensky Reef that exercise opencast and underground mining within a distance of 70km. The SDFs create a theoretical platform, from where the desired spatial structure developed. The MSDF and RSDF both regard the Platinum

Corridor (N4) as a primary communication axis. Along this corridor, agglomeration benefits take action against unplanned, informal settlements and economic activities that cause regional fragmentation. This fragmentation hampers future development plans contained in the IDPs and increases the gap between development objectives and the current situation.

The current spatial issue cannot be restructured completely. A field study identified the current regional problems as spatial management problems can bridge sector relationship and correct policy implementation. Areas occupied before careful deliberation could take place, need measurements put in place to accommodate growth in those particular areas. In the next chapter, local and international case studies provide obvious solutions for similar problems occurring in other mining regions.

CHAPTER 5: Case studies: International and local practice

5.1 Introduction

The intense mining activities contribute towards extreme environmental impacts on the sustainability and development. Rapid rural-urban migration occurs at mining locations, and the study argues that a single (or more) entity need to take responsibility for directing the growth. The entities need to be familiar with the regional boundaries and their responsibilities. Referring to examples of the correct application of planning theory in practice, as well as the correct interpretation of relevant policies by the role players involved, may contribute towards the establishment of a cohesive team implementing a uniform approach towards sustainable regional development within a mining environment. Profound insight of examples of successful implementation of policies and strategies may contribute towards sustainable regional development. Also, identification of effective collaboration of different stakeholders is essential.

The aim of this chapter is to explore appropriate solutions and suggestions that could be successfully applied to the current state of development in the study area between Brits and Rustenburg, North West Province. This chapter contends with international perspectives providing an overview of previously addressed regional problems. Furthermore, local initiatives are compared arising from the fact that although many South African policies are based on international ideas, they are sometimes applied incorrectly.

5.2 Regional planning in a mining environment

The five sustainable regional planning dimensions, as deduced from the research objectives, affecting this study area are as follows:

- Environmental impact versus sustainability,
- Rural – urban migration,
- Locations versus physical landscape and socio-economic relationships,
- Stakeholder relationships and;
- Their recognition of regions.

In Sections 5.4 and 5.5 practical examples of these dimensions will be discussed, that could be used to address the current situation in the study area. Secondly, the mentioned field study summary discussed in Section 4.7 will be linked to related international examples. Then the way in which similar problems are addressed locally and internationally can be examined.

5.3 International mining practice

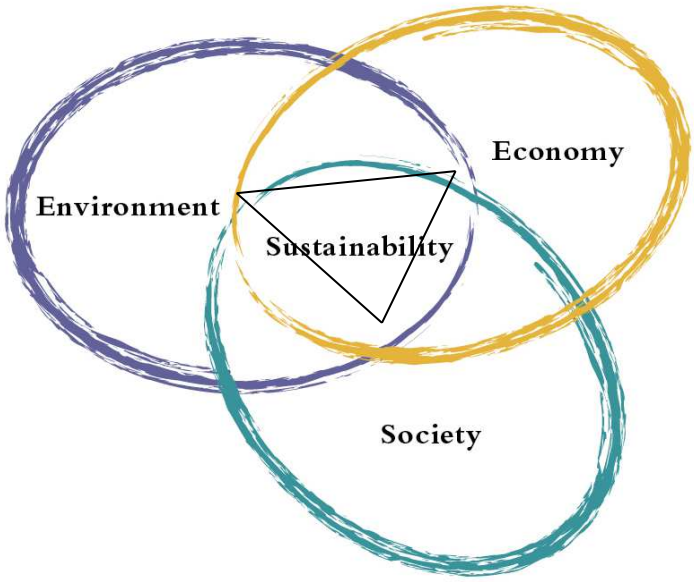
International sustainable mining practices have been consulted, to bring global perspective into the research. This section explores the views, priorities and concerns of other mining operations, practices and regions. This discussion offers a basis to determine additional policy actions.

5.3.1 Mining environments and impacts

Since the early 1900s, there was a growing interest in building sustainable development into the regional planning process (Glason and Marshall, 2007; 39). When trying to identify the features of sustainable development that are essential to understand sustainable development management models, one faces a theoretical issue with the conceptual description and evaluation of *sustainable development*. The necessary components for the building of all human societies are resources, wealth and land (Caldwell and Shrader-Frechette, 1993: 3). According to Ciegis *et al.,* (2009:28) there is not a singular approach to *sustainable development,* due to a variety institutions with different characteristics trying to define the term *sustainability*.

Generally, sustainable development encompasses three fundamental approaches: economic, environmental and social developments, which are interrelated and complementary. Gosh (2008:11) (Giddings et al., 2002:189*)* presents the concept of sustainable development as a geometric shape (figure 5.1), showing a triangular area where the three main areas of approach namely social, economic and environmental, coincide.

Figure 5.1: Common three-ring sector view of sustainable development



Source Giddings et al., 2002:189

Morelli (2011:7) defines environmental sustainability as:

> "*Meeting the resource and services needs of current and future generations without compromising the health of the ecosystems that provide them,"*

and more specifically,

> *".. a condition of **balance,** resilience and **interconnectedness** that allows human society to satisfy its needs while neither exceeding the capacity of its supporting ecosystems to continue to regenerate the services necessary to meet those needs nor by our actions diminishing biological diversity*."

Giddings, Hopwood and O'Brien (2002:187) regard sustainable development as a

> *"contested concept, with theories shaped by people and organisations with different worldviews".*

Of all the possible interpretations, sustainability is usually represented by the intersection of three spheres: environment, society and economy, which are perceived as separate, although connected entities (Giddings *et al*., 2002:187).

One can argue that these are not unified entities but rather fractured and multi-layered and can be considered at different spatial levels. It has been found that the reality of life

today is that the economy dominates the environment and society (Giddings *et al*., 2002:190). Giddings *et al.,* argues that international forums and organisations are influenced by the large corporations and take decisions accordingly without even the most modest level of democratic control. Political reality gives preference to the economy. In contrast, the reality is that the economy is dependent on society and the environment. Although understanding of sustainable mining may vary, it commonly incorporates the evaluation and management of the uncertainties and risks associated with earth resource development (McCullough and Lund, 2006:220).

As Morelli (2011:7) refers to "*a condition of balance*". Houghton takes the balance concept further and rather uses the word *equity*. Sustainable development in a mining environment should be based on principles that would apply to all issues whether they are classified as environmental, social and economic or any combination of the three. Houghton (1999:241) outlines five equity principles to establish sustainability:

- *Futurity-inter-generational equity;*
- *Social justice-intra-generational equity;*
- *Trans-frontier responsibility-geographical equity;*
- *Procedural equity -- people treated openly and fairly and;*
- *Inter-species equity -- importance of biodiversity*.

Above mentioned can be summarized: *futurity* means to take into account the needs of future generations; *equity* means covering social justice regardless of class, gender, race, etc. or where they live and *participation* means that people are allowed to shape their own futures. These principles: futurity, equity, participation and the importance of biodiversity would move societies beyond present approaches based either on monetary cost/benefit analysis or on a utilitarian view justifying the suffering of some to the benefit of others. In reality, the *equity* concept is difficult to bring into practice. However, if it could be put into effect, it might change a whole society and its future, something South Africans have been striving for since 1994.

Houghton has contributed these principles towards the model of integrating the common three-ring sector view of sustainable development. The overall concept of sustainability refers to the "balance" of the three-ring sector view (Giddings *et al*., 2002:194; Houghton 1999:235), which establishes *equity* and aims to reach the same level of interpretation and point of view. According to Giddings *et al*., (2002:194) the

differentiation of sustainable development into three spheres does not produce an integrated outlook. Therefore, Houghton proposed that human relations should be focused on, interacting on geographical space. Humans living a metamorphic life automatically change shape and alter the spatial aspect of geography, eventually affecting the economy. The departure point should be a humane outlook based on equity; “Humans are part of a web of connections within what is called the environment and society” (Giddings *et al*., 2002:195).This outlook relates to various planning theories discussed in Chapter 2.

5.3.2 Equitable partnership and engagement

The first suggestion refers to the challenge for government authorities and mining companies to engage with the associated community. They should establish an ***equitable partnership*** that will create a lasting legacy of sustainability to the community, avoiding environmental degradation and social dislocation (Veiga *et al*., 2001:192).

The International Finance Corporation (IFC) and the International Council of Mineral and Metals (ICMM) have written a report, which states “under-engagement is the biggest risk” (ICMM: 2012:3). Economists usually regard environmental assets as only part of the value of natural and manmade capital and the preservation thereof becomes a function of an overall financial analysis (Morelli, 2001:3). Morelli proposed this concept as a guiding principle for areas where human activities take place. The government sector, which is not economically driven, could not care less about the economic exploitation by mining companies. This is why the ICMM brings *under-engagement* to the attention of the world mine authorities. Economic enterprises have a direct influence on human activities and environmental affairs. Economic sustainability should involve analyses for protecting environmental assets, but not for determining what those standards should be. The standards set by the economy, limits the sustainability of the other two spheres (see figure 5.1). If the economic standards are the only factors to be taken into account, it is exceptionally one-sided.

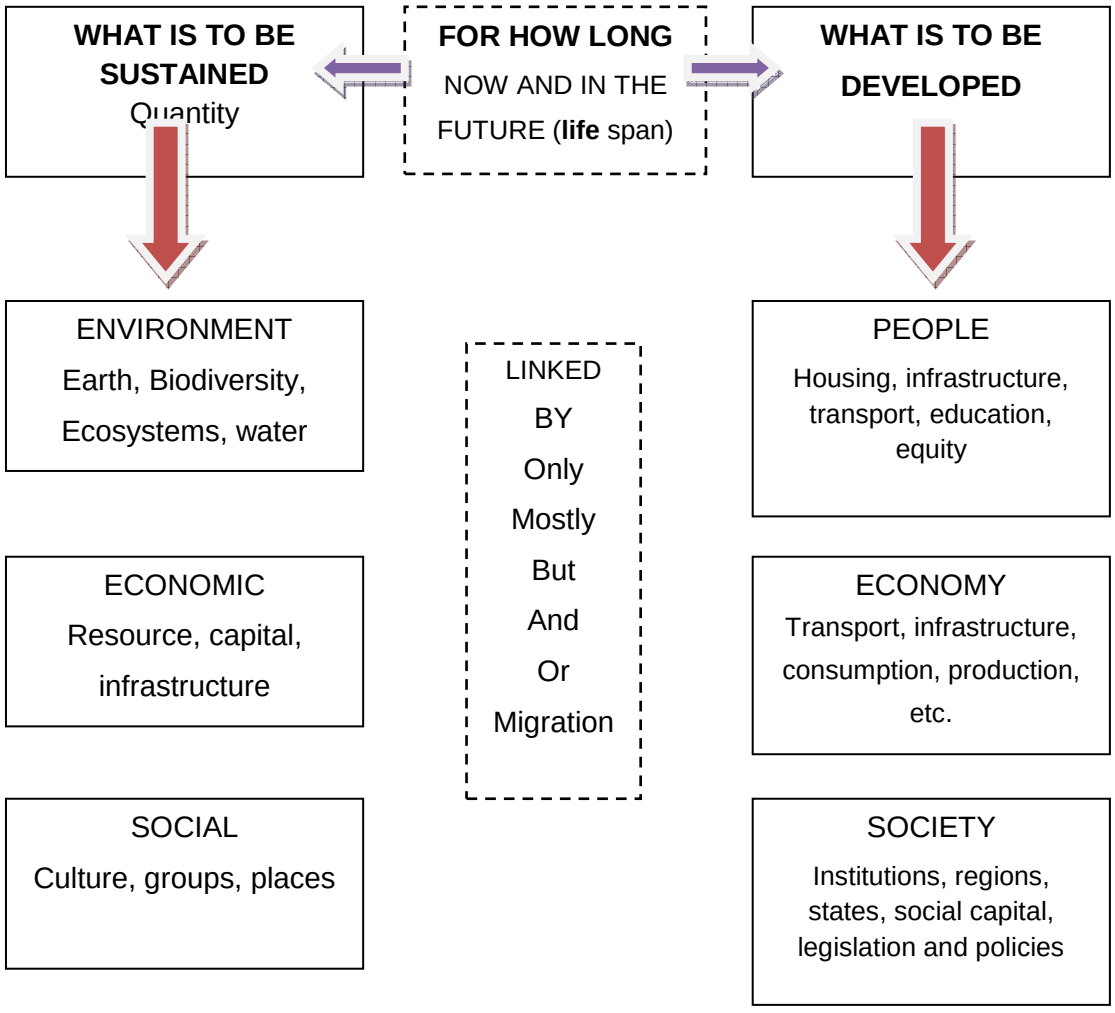
5.3.3 Life span of resources

Pezzy and Toman (2002:2) pose the question on the future of the specific resource having an influence on the environment in this mining region. There are certain criteria

influencing this question, for example whether the resource is renewable or not. The answer to this question will obviously affect the life span of mining locations. Non-renewable resources will be depleted and that will change the affected locations' life span. The type of agglomeration advantages that have been accumulated and their future after depletion is another consideration. Will the location (one can refer to a growth pole) be able to survive on complimentary economic advantages? This is an example of how certain situations may affect the sustainability and how the criteria may be managed.

The US National Research Council has provided a tool to manage decision-making processes on sustainable development processes (Kates *et al.,* 2005:11).

Figure 5.2: Decision-making processes on sustainable development processes tool



Source: Adapted from Kates et al., 2005:11 and U.S. National Research Council, Policy Division, Board on Sustainable Development, Our Common Journey: A Transition toward Sustainability (Washington, DC: National Academy Press, 1999).

The crucial questions are: "What is to be sustained?", "For how long?" and "What is the development goal?" The first question refers to which sphere of sustainability is involved: economic, environment or social. If all three should be sustained, all three should be listed. Question 2 and 3 refer to the life span of the development.

Each sphere of development could have a different life span. The environmental sphere, for example, should be sustained for future generations. However, the problem becomes more complicated if the question is extended to the part of the environment to be sustained and developed. Non-renewable and renewable resources respectively require a different management process as the life span differ. Furthermore, the management process will require different measures in order to establish the sustainability (Kates *et al.,* 2005:13). These examples reflect the inherent flexibility of sustainable development as well as the internal politics of the effort.

According to Kates *et al.* (2005:13), many of the sustainable development initiatives are undertaken by a diverse set of stakeholders and the resulting list reflect their varied aspirations on how to manage sustainable development. These different opinions hamper the implementation process. The second observation is that few of the efforts are explicit about the period in which sustainable development should be considered. Despite the emphasis on the standard definition of intergenerational equity, most efforts seem to be focused on the present or the very short term (Kates *et al.,* 2005:16). The different stakeholders experience pressure from different levels of development and try to solve the development issues in the shortest possible period. Therefore, the legislation and policy indicators are merely regarded as guidelines, instead of being utilised as management tools in order to establish sustainable development. Consequently, advance planning is not getting the due attention.

The National Research Council (Source adapted from Kates et al., 2005:11; Washington, DC: National Academy Press, 1999) has listed the indicators, which should be taken into account when using the sustainable development tool (Figure 5.2). Values as an indicator represent the beliefs, qualities and behaviour associated with sustainable development as well as the desirability to achieve it (Kates *et al.,* 2005:16). Practice as an indicator includes different sectors, social movements and institutional negotiation on sustainable development (Kates *et al.,* 2005:17). If values and practice can engage, the implementation process of sustainable development will be more

successful. The process of engagement should fit into the sustainable development period and enough time should be given for each step during the sustainable development process. No institution should be pressurised by any level of development and enough time should be given in order to ***plan*** before ***develop***.

5.3.4 Planning and development

The United Nations Conference on Environment and Development (UNCED: 1992), has taken the view that to address the interrelated problems of environment and development, demanded the production and implementation of strategies and plans.
A commitment to national sustainability plans is a key component of the UNCED agreements (UNCED, 1992:85), while the main statement of principles for actions, Agenda 21, regards "environmentally sound physical planning" essential to sustainable development. The emphasis is on the ***plan*** before ***development***. According to the United Nations, some techniques, frameworks and processes can be combined to facilitate an integrated approach. The objectives are as follows (UNCED, 1992:86):

- Review and develop policies to support the best possible use of land and sustainable management of land resources. This objective clearly gives a time framework of four years. It states "*by not later than 1996*".
- Improve and strengthen planning, management and evaluation systems for land and land resources, "*not later than the year 2000*".
- Strengthen institutions, coordinating mechanisms for land and resources, *not later than 1998*.
- Create mechanisms to facilitate the active involvement and participation of all concerned, particularly communities and people at local level, in decision-making on land use management*, not later than 1996.*

Academics from Belgrade, Serbia, have suggested implementation of the Territorial Agenda, which introduces mandatory implementation of an integrated strategic territorial approach for sustainable development (Maksin-Micic, 2009:40). The establishment of the integrated approach is to guide and manage development and is supported by the European Union Strategy for sustainable development (EU SDS, 2006). These territorial priorities are based on previously mentioned sustainability approaches and development tools, but the overall aim is to take sustainability right through the

implementation phase. The following six territorial priorities were set (Maksin-Micic, 2009:40-42):

- Strengthen polycentric development and innovation;
- Establish new forms of partnership and territorial management in developing urban and rural areas. Development could only be managed if a plan is shaped on how to achieve sustainable development;
- Promote regional competition and innovation clusters with the aim of stimulating development and specialization of peripheral and underdeveloped regions. In order to promote regional competition, advance growth pole identification should occur. If growth poles are not identifies in advance, the next territorial priority will not be able to take place;
- Strengthen distribution transport corridors, improve technical infrastructure and decentralise services of public interest;
- Promote risk management;
- Risk management will enable the different sectors involved in the development process to strengthen environment structures and cultural resources with development potential, especially in regions that drop back in development and in environmentally sensitive areas.

The last step should not put a full stop to the process of environmental impact in opposition to sustainable mining environments. ***Evaluation*** is crucial. Helm (1998:10) states that the implementation of any policy depends on the institutional aspect – the importance and significance of institutions involved with the policy and the competence of these institutions. Once again, public-private partnership is very important (Veiga *et al*., 2001:192). The implementation of the policy of sustainable development requires the evaluation of the dimension of organisational (institutional) sustainability, since effective, full-functioning institutions are essential for sustainable development in the realization of the social, economic and environmental aims set by the society. (The National Strategy of Sustainable Development, 2003:25) (Ciegis et al., 2009:33) also mentions the importance of the assurance of "*purposeful development, rational combination of departmental, regional, institutional and group interests. In addition limitations of those interests for the sake of the general benefits of the society are possible, only in the presence of strong management on the state, regional and municipal levels as well as clear inter-institutional division of functions".* The ignorance of *institutional dimension* and *institutional capital* is one of the biggest shortfalls of management of implementation of sustainable society development (Platje, 2008:145).

To summarize the proposed solutions in order to address environmental impact in opposition to sustainable mining environment, one should approach the state of ***balance*** where *equity between environmental, social and economic* factors is seen as a *holistic and integrated* process. ***Evaluation*** should be a continuous process.
To measure evaluation, the following questions should be asked continuously: what is to be sustained, for how long and what is to be developed. The repetitive asking of these questions will make the implementation of the sustainable objective attainable if an ***equitable partnership*** between the different involved institutions exists. It brings sustainable ***values*** into ***practice****.* The most important aspect to keep in mind is "*advance planning*". None of the stakeholders or participants should be pressurised by development factors, for example economic pressure. If a realistic period is allowed for the establishment of sustainable development, stakeholders will be empowered to commit to plans of action and keep risk management in mind.

5.3.5 International point of view on rural – urban migration

Mining communities are significantly affected by nearby mining operations (Veiga *et al*., 2001:192,193). Mining communities are interlinked through employment or through environmental, social, economic, or other impacts. The connection between mining communities could also be in the form of a city (serving as base or centre for supplies and financing) or a village (relying extensively on local mining) (Veiga *et al*., 2001:192).

The term *rural-urban migration* is quite familiar by now, but in fact, a reverse migration pattern takes place when mining locations influence migration. One should rather refer to *urban-rural migration*. The very complex distinction between "urban" and "rural" (mis-) informs not only the setting up of institutional arrangements but also and more broadly, the deployment of planning approaches and tools (Allen, 2003:135).

Allen (2003:136,137) describes this migration as different "systems" affected by the material and energy flow demanded by urban and rural systems. These systems are referred to as "push" and "pull" factors that urge migration. In Chapter 2, Section 2.6.1, the theoretical foundation refers to "forces of attraction". These forces of attraction establish agglomeration advantages within the involved region that cause the movement. Migration affects the social structures and institutional landscape. Most of the research regarding migration focuses on the social aspects causing migration.

However, migration is caused by social structures, which are affected by various other factors. Social structures are affected by land speculation, shifting economic activities of higher productivity, the emergence of mining or quarrying activities just to mention the least of the affecting factors (Allen, 2003:137). As a result, the social composition of peri-urban migration systems is highly heterogeneous and subject to change over time. Small farmers, informal settlers, industrial entrepreneurs and urban middle-class commuters may all co-exist in the same territory, but with different and often competing interests, practices and perceptions. Another distinctive characteristic Allen refers to is that social groups are in constant transition. This transition leads to the transformation of the institutional landscape. This relates to the change of the geographical location of the peri-urban interface. In addition, the orientation of the process through institutional arrangements or areas of responsibility tend to be too small or too large, too urban or too rural (Allen, 2003:138).

De Haas theoretical study on migration and development concludes that the optimistic views on migration and development that often prevail, testify to a lack of awareness of the substantial body of empirical and theoretical literature as well as past policy experiences with the issue. As early as the nineteenth-century, Massey et al. (1993:432) stated, "…*a full understanding of contemporary migration processes will not be achieved by relying on the tools of one discipline alone, or by focusing on a single level of analysis. Rather, their complex, multifaceted nature requires a sophisticated theory that incorporates a variety of perspectives, levels and assumptions*". Migration is definitely not a new concept and is being debated since the early 1900s. One could go back to the previously mentioned suggestion, namely planning before development. If there is planning, forces of attraction will most definitely influence development proposals, as well as the ideas on how this issue will be addressed. Leë (1966:50) states that migration processes will be managed and understood better, when advance planning has taken place beforehand. He revised Ravenstein's 19th century laws on migration and proposed a new analytical framework for migration. In his view, the decision to migrate is determined by the following factors:

- factors associated with the area of origin;
- factors associated with the area of destination;
- intervening obstacles (such as distance, physical barriers and so on);
- personal and economic factors (such as the benefits the specific region provides)

Lee (1966:54-55) argues that migration tends to take place within well-defined “streams”, from specific places at the origin to specific places at the destination, not only because opportunities tend to be highly localized but also because the flow of knowledge back from destination facilitates the passage for later migrants. Lee states that migration is selective with respect to the individual characteristics of migrants because people respond differently to “push” and “pull” factors at origins and destinations and have different abilities to cope with the intervening variables (Reniers 1999:681). In the case of a mining environment, localized resources define the stream and the opportunities within its region.

5.3.6 Forces of attraction

Most researchers who have applied the push-pull framework have assumed that various environmental, demographic and economic factors determine migration decisions. Two main forces to create the factors of push and pull are distinguished:

- Growth of a rural population causing Malthusian pressure on natural resources and pushing people from marginal rural areas (but in the case of the study area, from urban areas to rural areas) and
- Economic conditions (higher wages) luring people and businesses into rural mining communities and industrialized areas (Skeldon 1997:20) (King & Schneider 1991:62-3).

Taken at face value, the push-pull model seems attractive, as it is apparently able to incorporate all the factors that play a role in migration decision-making. Because of its apparent ability to integrate other theoretical insights, it has frequently been suggested that an overview of labour migration could best be achieved using a push-pull framework (Bauer & Zimmermann 1998; Schoorl 1998:103). It is generally acknowledged that labour possibilities represent the overall motive for migration. Fact of the matter is that it is not only labour that migrate. Economic factors such as the production of resources and products also add to the push-pull factor.

Push-pull models also tend to ignore the heterogeneity and internal stratification of societies. General contextual factors are regularly defined as either push or pull factors and are likely to work out in a differentiated way on the individual level and may subsequently encourage some people or businesses to leave and others to stay.

Another fundamental weakness of this model is that push and pull factors are generally mirrored in each other. It then becomes arbitrary and open to subjective judgment to establish whether the push or the pull is dominant.

Consequently, migration is often treated as a negative process. Recent reviews, (Agunias 2006; De Haas 2007b; Katseli et al 2006; Özden & Schiff 2005; Rapoport & Docquier 2005) have highlighted the potentially positive roles migration can play in social, economic and political transformation process in the development region. The common problem is the identification of the destination. The preferred location of the migrant people and businesses is difficult to identify but necessary in order to provide in advance.

In line with the propositions of the new economics of labour migration and livelihood approaches, the accumulated empirical evidence suggests that, in most cases, migration is typically not a *desperate response to destitution or a "flight from misery",* i.e. last alternative to escape from extreme conditions of poverty and unemployment. In line with the new economics of labour migration and livelihood approaches, most evidence supports the view that migration is rather a deliberate attempt by social groups (typically, but not exclusively, households) to spread income risks, to improve their social and economic status and, hence, to overcome local development constraints.

Recent empirical work has also challenged the assumption that migration automatically has a negative effect on inequality between rural and urban areas. Although such an effect has indeed been found in various studies, the impacts of migration on inequality in migrant sending communities differ, depending on the selectivity of migration and how this selectivity changes over time (De Haas, 2007a:57). According to the analysis of De Haas (2007a:61) migration

(i) is a process that is an integral part of broader transformation processes embodied in the term "development", but
(ii) also has its internal, self-sustaining and self-undermining dynamics and
(iii) impacts on these broader transformation processes in its own right.

The preferred location of the migrant people and businesses is difficult to identify but necessary in order to provide in advance. Therefore, subsequent decisions on development are complicated (2007:62). This is why it is more accurate to refer to the

mutual relationship between migration and broader development processes, instead of the one-way impact of migration on development.

5.4 Regional understanding

In Chapter 2 (the theoretical foundation) a clear understanding was formed of regional space and regional growth. The connection between the two concepts is accentuated. It was outlined that regional space forms the base where economic activities take place. It was also mentioned that economic space might exceed geographic space.

According to Martin and Sunley, (2007:584) existing models of self-organizing economic landscapes demonstrate that relatively simple rules of agglomerations and centrifugal forces can produce emergent spatial order that resembles edge cities and clusters or shows statistical regularities. They state that the economy consist of innumerable flows of connections. The point of departure is that not everything is connected to everything else and that makes the field of forces complex to define (see related theories in section 2.6.1 and 2.7.1). Section 5.3.2 explains push and full factors affecting migration patterns of social and economic entities. Socio-economic systems may exist in different spatial locations and systems may interpenetrate each other. Each individual part is simultaneously part of different systems (Martin and Sunley, 2007:585; Cilliers, 2005:610-612). Martin and Sunley are convinced that spatial entities such as regions and cities become self-organizing complex systems when they are strongly interactive. Therefore, national governments classify the interacting systems in hierarchical levels, as the national economy can be divided into smaller territorial subsystems breaking down its regions, cities and localities (Martin and Sunley, 2007:585). The South African government also classifies the different authorities in hierarchical levels: national, provincial and local governments to manage and control development (see chapter three and four).

The error of reasoning is that spatial economic subsystems are not closed. Subsystems can be identified within complex systems if the subsystem becomes responsible for maintaining its own arrangement and it can then be said to show ‘organisational closure’. In this situation, the organisation is determined purely internally even though the subsystem (a region or city) exchanges energy and matter (that is, flow of goods, services, knowledge, capital, money and people) with its environment (other regions

and cities). The interaction between these subsystems (regions, cities, clusters, etc.) may also determine systems at a higher hierarchical (and spatial) level so that boxes within boxes emerge. Allmendinger and Haughton (2009:2548) refer to Stokers (2002) concept of “congested states”. They are convinced that spatial planning is intended to provide glue to a fragmented governance system. The first reason they mention is that planning has no right to exist, if *value or face reform* is not clearly demonstrated. According to them, development control abuse planning (2009:2548). This conclusion is based upon several European Spatial Strategy evaluations with the focus on the United Kingdom. It has been recognized by the recent shift to “development management” as a way of engaging the regulatory control arm of planning into the project of spatial planning.

Glasson and Marhall (2007:50) refer to successful vertical and horizontal coordination in regional planning adopted by many other developing countries (Table 5.1). Different agencies join powers with central government in prioritizing some areas of future capital spending in each region, sharing the “hard choices” with the communities. This links successfully with what has been said by Veiga *et al*. about ***equitable partnership*** (2001:192).

Table 5.1: Vertical and horizontal co-ordination in regional planning

A. Vertical			
Central	Central government departments and agencies – all within different powers, agendas and interests	Government Offices for the regions and regional development agencies- both part of the central regional bodies	Pressure groups for business, environment , etc. In England mainly nationally organized, but have local particularities and life in some cases.
Regional	Regional assemblies and Greater London Authority/ Mayor of London		
Local	Local authorities		

B. Horizontal			
Regional	Core triumvirate in regions	Inner circle of interests(“policy community”)	Outer circle of interests
	Government Offices for the regions, regional development agencies, regional assemblies	Business and environmental interest groups in assemblies and acting independently	Smaller associations, businesses and individuals are acting occasionally on particular issues or smaller areas of the regions.

Vertical coordination between the different planning authorities or agencies is critical (Glasson and Marhall; 2007:50). The overall planning system regulation and major infrastructure funding are the responsibility of central government. Regional steering body is a separate level of government, having certain powers to direct or manage the local authorities.

An example of institutional innovations of vertical linking from the last few years in England is, the Examination in Public (EIP) for regional guidance/strategies. Before National government appoints a panel, where strategies are set with largely government priorities in mind, the Regional Assemblies should base priorities ground from the inner circle of interest, the policy community and the outer circle of interest. In South African contexts, this is supposed to be the responsibility of the provincial government. Local authorities should be called a vertical one, because representatives of the local authorities make up the majority of members of the Regional Assembly. This institutional arrangement generates tension, but it means that the relationship is more internalized and is best treated as a form of horizontal coordination. This is one of the instances where the regional planning body has to become expert at juggling. In planning processes move from the centre outwards, simultaneously horizontally and vertically, thus the bottom-up and top-down processes are simultaneously active as described in Section 3.3. A broad discussion will follow in Section 5.3.4 on the relationship between the different levels of planning.

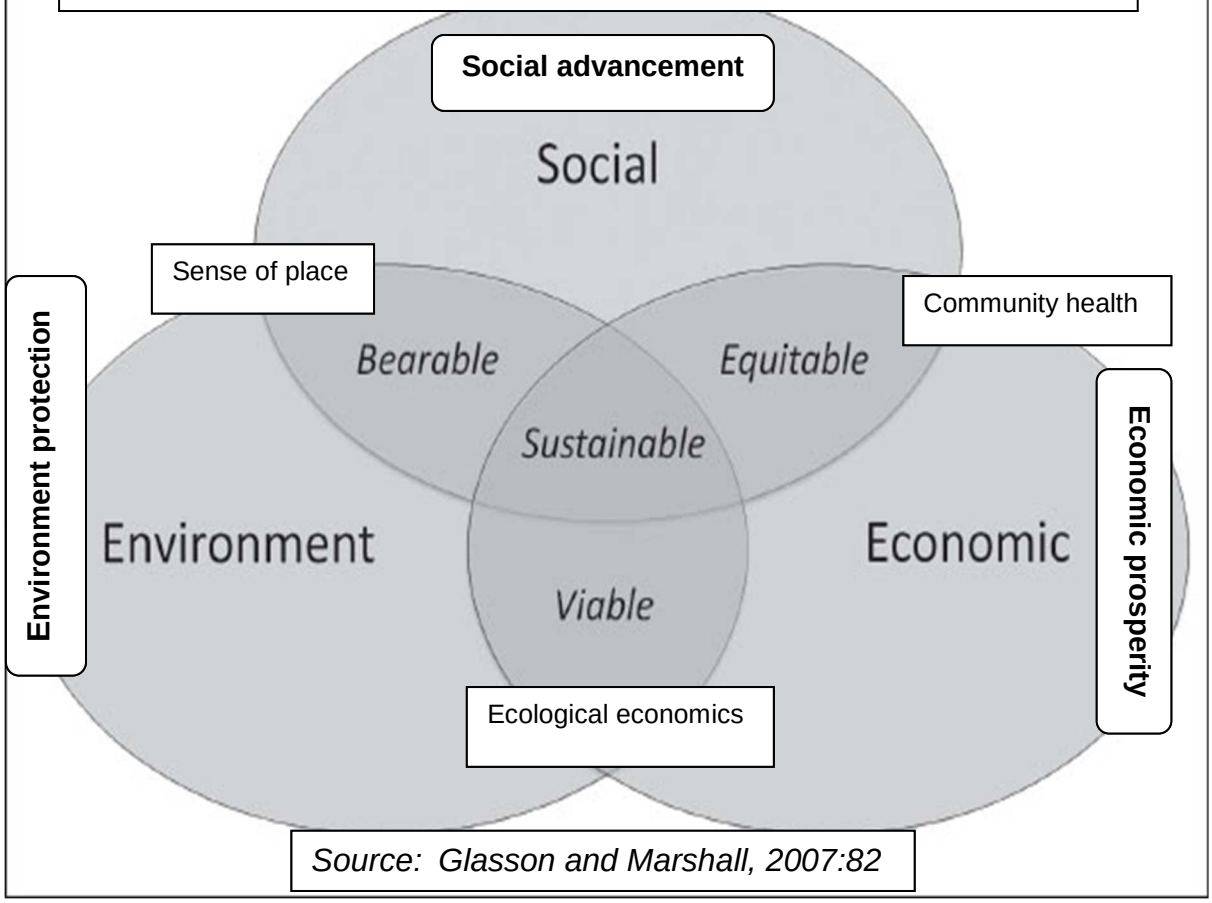
If the focus is again aimed at the essence of locations and physical landscapes, it has been found that various researchers have identified that the decision-making processes are mainly responsible for the incorrect identification of locations for development.

Huggins (2003:643-648) has specifically pointed out no less than 84 different types of entities, which form part of decision making processes, each with their individual "thematic development focus" and type of regional coverage affecting their decision-making. Glasson and Marshall (2007:70) have summarized Huggins' findings and referred to *theorising regional planning* in order to simplify the planning and decision process. They also adapted the conceptualising urban and regional competitive performance report used by the office of the Deputy Prime Minister (ODPM, 2005) to plan and understand competitive regional performance. This is of significance as it integrates all planning sections such as theoretical frameworks, key drivers for planning and competitive economic performance and outcomes, which play a role during planning. When *theorizing regional planning* is incorporated, regional space should be structured through discussions on the following four points:

- Where are the affected growth poles, clusters and agglomeration economies of the region?
- What are the possibilities for transport and connectivity?
- Where is polycentric development i.e. the connected places forming a spatial network?
- What are the conflict and opportunity dimensions of the region, which include dimensions of sustainability and sustainable regional development?

These four discussions are incorporated with the three-ring sector view of sustainable development. It is referred to as the integrated dimension of sustainability, Figure 5.2.

Figure 5.3: Integrated dimension of sustainability



Source: Glasson and Marshall, 2007:82

The discussion during the decision should take place on vertical and horizontal management of different levels as explained in table 5.1. The following items should form the agenda: spatial distribution of human activities (special discussion: horizontal level); best optimal locations minimising the frictional effect of distance; which locations are accessible; tendency of human activities; agglomeration advantages as well as economic scale, influencing the tendency of human activities and lastly how these human activities will organise themselves within the location. For each discussion there might be extra variables added to the list (Glasson and Marshall 2007:74-84).

Thus the arguments on which these discussions are based, originate in planning theories. Central place theory, distribution of services, industrial and growth poles, clusters and agglomeration of more specialized activities such as manufacturing and mining and patterns of transport connections that provide linkages in the spatial structure should be included.

Substantial regional theory seeks to explain changes in regional systems – and the questions about regional growth and structure, which were raised in the beginning of

this chapter. The nature of economic and human activities changes constantly and is diverse. Regional planning is integrated with socio-economic planning when the above structure of proposed planning is followed. Rural and urban areas should be seen as self-contained territories and each one should be discussed on its own merits.

The region stands central to territorial-integration of regions. In all these intermediate cases, a crucial control function must be performed by regional authorities in order to keep the potential benefits to the local community. Rules, regulations and authorities must been put in place, maintaining a well-balanced position. Also new forms of local governance through agreements, co-operation and private/public synergies could perform well and even better than traditional 'government' interventions (Camagni and Capello, 2013:1388). Therefore, the discussion should depart from regional agencies playing a huge role in the discussion of regional issues, to the top, of national government and to the bottom levels of the different involved spheres of development, local government, mining authorities, etc. The approach to regional planning and development, is usually incomplete and fragmented and the systems complex (Glasson and Marshall, 2007:74-84). To understand the complex systems in regions, Huggins came up with a solution.

5.5 Regional policy

Huggins (2003:640) uses "benchmarking exercises" to compare and monitor regions. Benchmarking is a generic concept or methodology, rather than focusing on the variety and evolution of differing forms of such benchmarking. This evolution has occurred as regional policy-making has begun to shift from processes undertaken principally on an intra-regional basis to integrating processes based on inter-regional learning activities. From the perspective of regional policy-making, benchmarking forms part of processes concerned with learning by comparing, where regions seek to measure their performance, activities and policies (Huggins, 2003:641).

The Lisbon Agenda and its drive for improved competitiveness and a shift towards a knowledge-based economy has become central to regional policy agendas (Camagni and Capello, 2013:1386). Regional benchmarking is also a key thread of the European Commission's Mutual Learning Platform, which has been established in 2005 to define policies, making regional innovation more effective, within the European Commission

(European Commission, 2006). In order to benchmark a policy, discussions on regional planning theory is a learning process which Rose (1993:10) refers to in his research as searching experience and lessons across space. Friedmann's core-periphery theory (section 2.7.4) forms a significant foundation to understand the regional development. Therefore, useful strategies and policies could be set that may contribute to future policy building in the region (Huggins, 2003:650). Critics suggest that regional benchmarking is a flawed technique since it does not allow regions to see themselves in a manner that is meaningful or constructive to policy formulation. Such criticism fails to take account of the variety and rapid development of regional benchmarking systems (Huggins, 2003:654).

Prior to the 1970s, policy-making objectives were all about "policy implementation", but recent policies rather refer to "policy-action" (Glasson and Marshall, 2007:139). If one can successfully benchmark regions and policies, the plan is just as good as the implementation. Therefore, they insist on listing responsibilities of different stakeholders in policies to ensure that the "continuous planning processes" take place within a "target time table" (Glasson and Marshall, 2007:148,150). This refers to Figure 5.2, the Sustainable Development Tool developed by Kates *et al*., 2005:11 and adapted from U.S. National Research Council, Policy Division, Board on Sustainable Development, Our Common Journey: A Transition towards Sustainability (Washington, DC: National Academy Press, 1999).

They distinguish between *hard planning skills* and *soft planning skills* (Glasson & Marshall, 2007:285). Hard planning skills are such as statistics, which reveal the physical reality within the regions, as well as the input from the local communities, local government and economic drivers from the region. Soft planning skills represent the constant monitoring, adjustments and review of policy implementation processes. Factors that bring about regional and economic growth are migration, income/employment opportunities, followed by demand and supply that constantly influence soft and hard planning. Thus, the lack of hard and soft planning skills refers to the fault in planning that Friedmann and Alonso (1975:712) refer to: "… the reality that careful planning is not taken into consideration in the growth of regions".

5.6 Sustainable regional planning mandate and performance

This section outlines the international perspectives of regional planning mandates and performances. The conclusion of their proposals is that sustainable dimensions are necessary to draw the attention of different multi-disciplinarians involved in the planning process of regions. Public-private partnership will be established as vertical and horizontal discussions in the process of development take place. This discussion involves the input of both the professionals and the local communities. The objectives formulated by discussions, usually originate from local input where data is available and regional reality could be compared with planning applications. Only then could advance planning affect the decisions to be made. Only then planning can take place before development. The implementation process could follow policy formulation, which guides development processes. Policies should not only list objectives, but should also address stakeholders' responsibilities and set a reasonable period in which each stakeholder should complete their responsibility. The sustainable development tool is useful. Only then planning can take place before development. While each region has a unique combination of requirements for competition, globalization is necessitating heightened interaction and linkage, especially for mining regions. Regions are required to increase their economic pool and consolidate their competitive strengths by mining enterprises as a means of eradicating their weaknesses. Thus, once again it brings sustainable regional ***values*** into ***practice*** (section 5.3.1).

It is most definitely the biggest challenge to build values into practice. As previously mentioned in section 5.3.3 stakeholder relationships are complex systems and are equivalent to congested government states. The international tendency is to use spatial planning to provide the glue to a fragmented governmental system in order to establish planning. The spatial frameworks intend to set values for equitable partnership. If not, incorrect identification of development locations takes place. These development locations form the central point of push and pull factors, which stimulate the growth in these locations. Stimulation of growth poles benefits from agglomeration advantages (see section 5.3.2).

The way towards accurate regional benchmarking and policy benchmarking goes hand in hand with continuous evaluation of planning and implementation processes that could

only happen through equitable stakeholder relationships. It opens the door for implementation that result in action.

5.7 South African perspective

South Africa has endorsed many international conventions, protocols and treaties, thereby committing itself to sustainable development (Nzimande & Chauke, 2012:135,136). Mining activities have numerous impacts on the landscape of South Africa, for example the disturbance of natural environment, topography and structural cohesiveness of societies in general and poor management (Nzimande & Chauke, 2012:136).

In 2008, the cabinet approved the South African National Framework for Sustainable Development (NFSD), with the vision of "People-Planet-Prosperity" (2008:1, 6). In its draft policy on a framework for considering market-based instruments to support environmental fiscal reform in South Africa, the National Treasury notes "*As the South African economy continues to develop, it is increasingly important to ensure that it does so in a sustainable way and that, at the same time, issues of poverty and inequality are effectively addressed. It is, therefore, important to appreciate that it's not just the quantity of growth that matters, but also its quality.*" (2008:6).

The following five strategic objectives are identified in the NSSD 1:

1. Enhancing systems for integrated planning and implementation;
2. Sustaining our ecosystems;
3. Using natural resources efficiently towards a green economy;
4. Building sustainable communities;
5. Responding effectively to climate change.

The first objective is of relevance for the study referring to enhancing systems for integrated planning and implementation. Towards achieving this national vision for sustainable development, the department set up a three-phase road –map:

Phase 1: The framework aims to understand sustainable development in the South African context. This phase sets medium and long-term economic, social and environmental governance trends that influence sustainable development.

Phase 2: The framework deals with preparing and planning for action. It includes formalization of an institutional framework for sustainable development. The

identification of an existing institutional mechanism that can facilitate cross-sectorial and multi-stakeholder coordination is the focus here. The role of the action plan is to make sense of the directions of priorities that were set.

Phase 3: The framework anticipates the implementation and monitoring of the processes. This requires strong appropriate monitoring, evaluation and reporting systems, including principles and a set of indicators, to monitor and evaluate performance in order to be able to determine success or failure. It also determines what corrective or adaptive measures are needed. The National Strategy for Sustainable Development and Action Plan – also known as the NSSD 1 (2009–2014), builds on the NFSD and several initiatives have been launched by the business sector, government, NGOs, civil society, academics and other key role players addressing issues of sustainability in South Africa.

This strategic plan correlates with what has been stated in section 5.3.1 and process principles have been aligned with the decision-making processes based on the sustainable development processes tool (figure 5.2). The first principle is based on integration and innovation promoting the improvement and strengthening of planning, management and evaluation systems for land and land resources (UNCED, 1992:86). The second principle is based on consultation and participation, which strengthen institutions, coordinating mechanisms for land development. Mechanisms have to be created to facilitate the active involvement and participation of all concerned, particularly communities and people at local level, in decision making on land use management (UNCED, 1992:86). The last principle is to implement policies in a phased manner. The document outlines a need in South Africa to ensure that there is capacity to implement sustainable development. This statement was made through evaluation of the planning processes. This statement acknowledges that sustainable development remains critical across all sections of South African society, especially the public sector. Planning, implementation, monitoring, evaluation and reporting have to form part of routine work during the planning and development process.

Therefore, a number of institutional arrangements have been developed to support the implementation of the NSSD. The aim is to establish public-private partnerships. In the Green Paper: National Strategic Planning of September 2009, national spatial guidelines are identified as important tools for bringing about coordinated government action and alignment (NSSD, 2011:36). Planning for sustainable development, national

government has divided the process into three main steps and provided a PLANNING tool in order to establish the planning process (NSSD, 2011:36, 37)(Figure 5.2 is applicable). The three steps involve:

- Governments medium-term planning: The five-year strategic plans that are developed by national and provincial departments are to be informed, among others, by the national vision (2030). These five-year strategic plans should include sustainability indicators and targets as core indicators agreed to by each of the government sectors and as required by the Treasury Guidelines for Strategic Planning. In their interactions with municipalities and their roles of surveying strategic planning, provincial governments must therefore ensure that municipal integrated development plans (IDPs) include sustainability indicators.
- Annual planning: The President and premiers highlight the importance of sustainable development as directed by the national vision and strategic plan and the MTSF. National and provincial departments then have to include sustainable development indicators and targets in their annual performance plans (APPs), while municipalities must include them in their annual service delivery budget implementation plans (SDBIP), which are linked to their IDPs.
- Spatial planning: Provinces must include a spatial plan (the Provincial Spatial Development Framework). Similarly, local governments, in the development of their IDPs, must also include a spatial plan (the Spatial Development Framework or Spatial Development Plan). This means that both provincial and local governments need to align their development plans and spatial development frameworks with the national perspective. In this way, coordination, alignment and integrated action with respect to the development of a spatial economy can be achieved. In addition, the integration of sustainability principles in the national strategic plan, the PGDS and the IDPs of local government will ensure that sustainability is reflected in spatial planning.

The plan addresses the private sector and encourages them to do the following:

- Identify sustainable development goals and actions that are relevant to their sectors;
- Agree on sector sustainability indicators and targets in line with those contained in the national strategy;
- Discuss and agree on monitoring and reporting mechanisms for sustainable development (This might entail a requirement that companies submit annual

progress reports on their activities and progress towards contributing to sustainability targets.);

- Submit annual industry sector sustainable development progress reports to the NCSD;
- Contribute to funding of sustainable development in partnership with government and donors to support projects and initiatives aimed at supporting sustainable development.

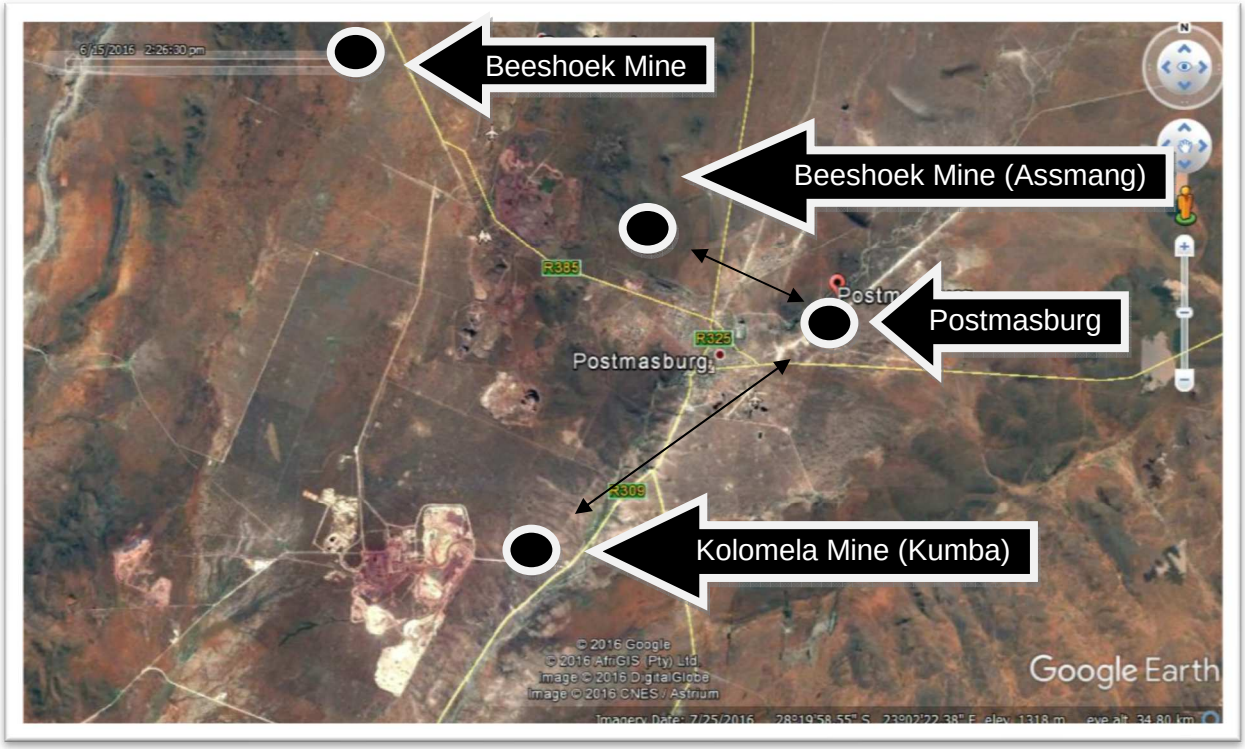
According to the above document, the civil society pays the highest price for unsustainable development practices. It is visualized for civil society to be represented in the consultative forum and to play the following roles:

- Identify, design and implement community-based sustainable development projects
- Participate in research on sustainable development
- Serve as a watchdog; tracking the performance of government and the private sector against sustainability targets. (This role will also include lobbying and advocacy for sustainable development.)

However, the question remains if this transpires in reality. This strategic plan represents an adaptation of planning and strategies, which are difficult to evaluate in terms of implementation. Clearly, this document relates to international perspectives, but no new research is available to evaluate the performance of this strategic plan. In my opinion, these document states strong and practical principles, but these principles do not yet reflect in reality. The objective is that this document would serve as a catalyst for policy change that will facilitate the achievement of the desired ideal state as articulated in the national vision for sustainable development. Even though this document has not had a fair chance to kick off, the strategies and principles are not new to government sectors. Most of these strategies were supposed to be incorporated in their policies as they were mentioned in previous national policies such as the National Spatial Development Perspective 2009.

5.7.1 Local case study

In a recent study, Drewes and Cambell (2015) used the town of Postmasburg in a local case study. This town experienced rapid growth the past ten years because of extensive minng development in the surrounding area (Drewes and Cambell, 2015). The Tsassambe Committee was established between the Tsantsabane Local Municipality, Kolomela Mine (Kumba) and Beeshoek Mine (Assmang) in 2006 that enable the municipality to deal with the mining pressure (see Google earth image below):



The private sector are employed in public infrastructure projects and it was assumed that the market will manage projects well which would result in more value for money. Drewes and Cambell consulted the international overview and find that many countries find the PPPs as a solution to finance infrastructure projects. However, in South Africa the situation differs. It seems as South African Government slights Private-Public-Partnership.

They identified two different mining towns in South Africa: (i) The first one are controlled and managed by mining companies. For example housing units are only occupied by

mine employees and do not accommodate other residents. (ii) The second attempts provide a variety of housing mine houses and private houses.

They have not found any policy in South Africa that guide development of mining settlements (Drewes and Van Aswegen, 2010:) (Drewes and Cambell, 2015:). The only guidance was provided by the National Spatial Development Perspective (NSDP) (SA, 2002 &2006:) (Drewes and Cambell, 2015:). It requested that employees should be empowered through home ownership and to move away from development at unsustainable locations on mine land. However, that is where the people need to settle and evidence is provided in the study area (see map 4.2 and 4.4). They identified the provisions made in terms of Section 80 and 81 by die Municipal Systems Act (Act 2000) that force municipalities to make service agreements with external parties. During an interview with mister M.J. Oosthuizen (General Manager of Beeshoek Mine, Beeshoek, 2009), he explained to Drewes and Cambell (2015) that there is a lack of institutional capacity at local government sphere in order to support infrastructure development. This is no new news to this study as the same conclusion was made when professionalisms gave their input (See section 4.8.2). Therefore, the Tsassambe Committee was established as a public-private-partnership to address these concerns. The PPPs were based on three fundamental concepts:

- Terms and reference – To find common ground between the various parties, key issues determined the functions of the Tsassambe Committee. It specified the role and responsibilities of each party involved and how they should engage and it resolved the status of the land where development was envisaged.
- Scope of Projects – The committee embarked projects considering the overall need for human settlements.
- Meetings and workshops – The Committee based their planning processes on a day-to-day management where detailed feedback on each project were given from the representatives and mining companies.

Drewes and Cambell found that joint-venture model successful in terms of spatial planning and bulk infrastructure development. This base model can be replicated in other rural centres in South Africa. They also identified the importance of planning in such a way the social, economic and physical goals are meet.

5.8 Conclusion

Since the early 1900s growing interest to build sustainable regional development into the regional planning process, posed the first challenge. That was to establish equitable partnership between government authorities and mining companies. The aim of this was to find solutions and suggestions that could be successfully applied to the current study area. The United Nations established an integrated approach to guide sustainable development through six territorial priorities. This approach tended to strengthen polycentric development and innovation, establish new forms of partnership and territorial management in developing urban and rural areas, to promote regional competition, strengthen distribution and transport corridors and to promote risk management.

These territorial priorities acknowledge mining communities or any other development community as nodes that are interlinked with employment opportunities and economic activities. Push and pull factors affect these activities, which initiate migration within the region. This migration is caused by agglomeration factors and social structure, which are affected by various other factors such as employment opportunities, housings, basic needs, education. This migration takes places over the geographic space. However, it was mentioned that economic space might exceed geographic space. The error of reasoning is that spatial economic systems are not closed. Therefore, vertical and horizontal coordination in regional planning are important (table 5.1) It has been found that various researchers have identified that the decision-making processes are mainly responsible for the incorrect identification of location for development with improper development strategies. Therefore, discussion during the decision should take place on vertical and horizontal management of different levels as explained in Table 5.1.

South Africa has employed many international strategies towards sustainable development. South Africa acknowledges the fact that mining activities have immense impacts on regional development. A vision on development is based on three phases: to understand sustainable development in the South African context; preparing and planning or action; implementation and monitoring. This motion forms the foundation of the recommendations by this study, but in the context of the specific study area. This planning vision and strategies as discussed in Chapter 5, make it possible to draft a strategic development plan for the study area. The qualitative and quantitative data are

processed to generic principles that might contribute to sustainable regional development in a mining environment.

CHAPTER 6: Conclusion

6.1 Introduction

The encompassing problem of unplanned regional development is the essence of this research study. Three fundamental problems were identified: (i) The rapid regional growth complicates sector co-operation because they contradict their responsibilities that affect sustainable regional development in a negative way. Municipalities and mining operations do not seem to integrate their development efforts; (ii) Policies are incorrectly interpreted and are not implemented. It requires a policy framework that encompassing all the relevant policies regarding planning theory and legislation in place to address unsustainable regional development; (iii) There is a need for a regional plan that appropriately integrates planning theory and policies applicable to this study area which will benefit the region and the nation towards economic opportunities and investment..

In the first part of this chapter, the research that has been compiled and assessed is drawn together and assessed. The theoretical foundation of the research will form the point of departure in this chapter. The essence of all the theories is examined and applied to the study area. It is important to understand the significance of these theories are to produce a realistic and applicable proposal later in the chapter. The theories are parallel to the status quo of the region. In the application of the theories, the dynamics of the study area can be understood more clearly. All the layers of the theoretical foundation are brought together to form a holistic idea of the study area. The problem is posed (Chapter 1) that unplanned regional development is the result of changes in the physical landscape. The theoretical foundation aims to understand sustainable development strategies to promote and establish prospective planning. Theories relate to regional space, and regional growth offers predictions for prospective to develop sustainable policy strategies.

Following the theoretical essence of the research, the empirical study was brought into consideration. The research that was done in the empirical study also forms layers of focus. The layers of focus of the empirical study will illustrate the meaning of each part. Each layer explored in the empirical study has its unique contribution and value added to the purpose of the research. The next step in the synthesis is to illustrate the links

between the theoretical foundation and the research in the empirical studies. The relationship between the two parts of the research is of utmost importance. This relationship forms the difference between utopian proposals or feasible proposal in practice. The synthesis part of the chapter concludes all the findings and lays the foundation to establish feasible proposals. Discussions in Chapter 4 and 5 provide evidence for the problem statement that is posed. The problem statement has been confirmed to be appropriate in Chapters 3 and 4 that role-players responsible for sustainable regional development act as different entities. The sustainable regional development could only happen if they engage in policies and joint capabilities to establish sustainable development. The private sector and government sectors are interrelated to such an extent that they are not familiar with their limitations to understand their responsibility towards their regions. A precinct plan is proposed to address this issue (Sections 6.4 and 6.5)

6.2 Synthesis

This research focuses on sustainable regional planning in a mining environment. Special attention is given to the theoretical foundation as it provides the foundation for the development of sustainable policy strategies. In every instance, two parts are explored in their finest detail: part 1 focuses mainly on the regional space (Section 2.1) and understanding geographical regional approach (Section 2.2 and 2.5). Part 2 deals with regional growth (Sections 2.7 – 2.7.5), the relationship between core-periphery (Section 2.7.4) and the regional development (Section 2.7.5). The aim is to conclude with a detailed theoretical approach that supporting long-term economic growth models (Section 2.7.6) and the new economic geography (Section 2.8). The study strives to pay special attention to interpreting relevant policies (Section 3.2) of the role players involved and to acknowledge the different stakeholders facilitating the rapid growth in the focus area (Section 3.5).

The theoretical sections (Chapters 2 and 3) recognized the phenomenon of agglomeration that indicates the initial advantage, causing significant spatial and environmental impacts. Merensky Reef is one of most intensified mining regions in the world. The intensification of mining activities together with the advantages caused by agglomeration is significant to the environmental impact.

These agglomeration advantages have (See section 2.6.1) generated a number of informal settlements located between Brits and Rustenburg. These settlements are self-sustaining due to a number of informal businesses. Annexure 1 and 2 show examples of the impacts in the study area.

Agglomeration can be subdivided into internal and external agglomeration (Steyn & Barnard, 1976:201-210) (Sections 2.6.1 and 2.6.2). Internal agglomeration is typically characterised by efficient utilisation of machinery, large-scale specialisation and large-scale purchasing, research and market capacity. The external advantages depend on the mining activities which attract local development, work opportunities and infrastructure. The problem of external advantages appears with the informal operation of this localisation. Without the necessary infrastructure and resources, informal localisation of settlements and businesses cannot upgrade to formal operation(Section 2.7.6). The external advantages imply basic infrastructure developed by the mines' investments. It is regarded as basic service delivery to the locals. However, the reality is that the mines are providing short-term infrastructure for their benefit and future mining operations. Therefore, the internal specialisation of the region is under pressure to diversify the local economy. As previously mentioned this attracts new unplanned settlements, requiring bulk infrastructure. Without adequate infrastructure, land values are reduced, (see section 2.7.2), causing the area to be unattractive for businesses to locate there and provide new services, which may have contribute towards the increase of living standards.

The central focus is on the mining industry, which is changing the physical landscape as well as social-economic relations and having a direct influence on the people and their activities (Hansen, 1972:50-77). These regions are in need of a regional plan that contributes towards the opportunities of the region to attracting investment that will bring about overall economic improvement to the region.

Rural urban migration (See sections 1.2, 2.4 and 2.7.4) is of importance to establish new opportunities along a development axis (Refer to sections 2.6, 2.6.1, 2.6.2, 2.4.4.2 and 4.4) that might make the region attractive. Mining activities are resource bound and agglomeration advantages used to attract new development along the development activities. In order to implement strategic spatial development strategies adequate

sector relationship is of essence. Four aspects that influence sustainable regional development arise from the literature:

(i) Rural-urban migration (See sections 1.2, 2.4 and 2.7.4) ;

(ii) Development axis influences (Section 2.6 , 2.6.1, 2.6.2, 2.4.4.2 and 4.4);

(iii) Mining activities (Section 2.4, 5.3.1, 5.3.4 and 5.4)); and

(iv) Policy implementation (Section 3.6, 5.5 and 5.6, .

- **Rural-urban migration**

  The NWDP mentions the "*Resource-critical regions***"** (2011:279). The study area, referred to as the "Platinum Belt" (See section 3.7.1) is a critical region of great importance and competition. This confirms the importance of sustainability in this study area as it is necessary for the economy to be feasible. Brits and Rustenburg experience excessive rural-urban migration between these nodal points (See section 2.3, 2.4 and 3.3). Despite the rural-urban migration, dysfunctional decentralisation of urban populations has been identified. As mentioned before, mining activities are area bound and

  The NWDP emphasizes the "*resource critical regions"* with competition between development and environment (North West Planning Commission, 2013:134). It needs to be mentioned that development and environment are in competition for space. Presently the region lacks directing growth to ensure sustainable regional development in spatial surface. Interaction between rural and urban localities establish unbalances within the region because of the flow of employees, demand and supply (see section 2.7.3 and figure 2.10). As soon as the residents flock towards the employment opportunities at resource locations (rural areas), the employment rate decreases and implies a decrease in income as well. As soon as income decreases, demands for local goods is cut down(Refer to section 2.6 and 2.7.4 also refer to figure 2.12 and 2.16)). This results in unregistered informal business operations such as street markets and spaza-shops. This causes a vicious circle causing low-income residents to locate around these mining activities. More residents migrating to these locations progressively worsen the cycle effect. Another impact that influences this cycle is the friction of cost (Section 2.7.4 and figure 2.4). These mining operations and businesses need transport. This brings us to the development axis of the N4 and "bunk" road (see map 6).

- **Development axis influence**

  The friction of transport cost increases because of the inaccessibility of markets, which causing dysfunctionality. Markets have not located in the optimal location as described in Palander and Hoover's industrial urbanization (Isard, 1972) (see section 2.7.4 and figure 2.16)). These locations are resource dependent. Markets have locate there due to mining operations. The NWDP notes the "resource critical regions cannot be ignored." (2011:279). The Minister has pertinently referred to the "Platinum belt". This belt has necessitated the development axis namely the N4 route that links South Africa's economy with that of Botswana and North African countries. Along this axis, settlements and businesses have clustered near employment opportunities at mining locations(Refer to section 2.8.4 and figures 2.13, 2.14 and 2.15) . The effect of the development axis however, has not been realized. This failure should be laid before the governance of the NW Province, which failed to initiate this manifestation. Secondly, the local municipalities of Rustenburg and Madibeng should have been focused on the possible effects coming to their municipal regions. In the meantime, the minister emphasises the "Platinum Belt" as a resource-critical region to establish transnational development corridors consequently creating an integrated Southern African Economy (See section 3.7.1). Nevertheless, this rapid anticipated growth has not been given the necessary planning and management in lower spheres of governance.

- **Mining activities**

  During the empirical study, a mining region has been evaluated and it has been found find that mining regions tend to be stuck in the second or third stage of Friedmanns theory of development (Refer to section 2.7.6 and figure 2.15). This means that transition takes place from one core periphery structure and develops into a new larger core due to agglomeration benefits, leading to multi-core structures. The competition that the natural resources establish should be enhanced and the multi-core structure should be kept in mind in order to extend integrations between cores and peripheries. This situation is preferable to independent core-periphery regions, as independent entities cannot drive competition.

  Mining as a land use category has not been properly addressed in current planning policymaking. It is a unique land use, which is not permanent. Land uses

such as “Residential” and “business” are more lasting. Mining will only last as long as the mineral resources abound. It is difficult to "plan" for mining as a future land use (See section 4.8.2, 4.9, 5.2, 5.3.1-5.3.4 and 5.3.6). According to private practitioners (Section 4.8.2), mining activities exercise influence on other development initiatives. As the previous example of the solar plant at Elandsdrift near Marikana has illustrated, it could have positive effects. Related activities could prevent ageing of rural settlements. These related land uses could attract new land uses, which will constantly promote the renewal of the rural environment accordingly (See sections 2.6, 2.6.1 and 2.6.2). This does not imply over development of rural areas, according to private practice practitioners. This only implies that spatial management of rural areas should retain the rural character, which could only be done by the management of the local government.

- **Policy implementation and sector relationship**

  According to the conclusion of the survey, it became evident that previously very little or no strategic planning or development policies and development control on proclaimed mining land have been exercised(See sections 4.8 and 4.8.2). In fact, until recently all proclaimed mining land has been excluded from any town planning legislation and in some instances it is still the case. The field study has proven that the necessary acts/policies are in place. The problem seems to be the interpretation and implementation. There are no properly informed people in the Government, who realize the value of proper integrated planning and development. Through public-private partnership, the skills and assets of each sector (public and private) are shared in delivering a service or facility for the use of the public. Therefore, at municipal level, these aspirations are reduced to a wish list of projects with very little (if any) relationship. No public-private partnership is in place. The situation in the study area is that the areas had been occupied before careful deliberation could take place in the study area. The NWDP confirms that almost all the provinces have areas categorize as having agricultural, tourism or mining potential (National Planning Commission, 2011:279) but even though the areas are identified, the necessary precautions are not in place to assist the fast growing mining areas. The zones should only be designated after careful consideration against a set of criteria and then there should be measurements put in place to accommodate growth in those specific areas. One should also take into

consideration the agglomeration advantages that should stimulate growth in the proposed development areas.

The theoretical foundation aims to understand sustainable development strategies in order to promote and establish prospective planning. Theories relate to regional space and regional growth that offers predictions for prospective sustainable policy strategies. The above enables the research to connect the relationship between South African policy-making and planning theories. Policies act as spatial instruments to establish implementation in South African development.

6.3 Recommendations

This section deals with a proposed regional policy approach and spatial representation. The first phase focuses on the generic policy approaches that include general strategies. Three main instrumental tools, critical in policy formulation, were prominent in the case of this study:

- ***Growth centres***: Central places and the contained agglomeration advantages (discussed in section 2.3 - 2.6.2) and the regional effect;
- ***Core periphery theory and industrial localization*** (section 2.7.2 - 2.8); and
- Balanced and unbalanced growth effects within the ***Total spatial system*** because of growth centres and their regional effect (section 2.6.2).

Policies should acknowledge that mining activities tend to be a land use centre to localized settlement. It is referred to as urban-rural migration, where people move from urban areas to mining location. Mining as a form of land use creates employment opportunities and attracts other functions (because of agglomeration advantages) that serve the settlement (see section 2.3).

- **Non-central places**

  Leading industries (such as mining activities) are limited to specific geographic spaces where they establish a growth pole (discussed in section 2.7.3). The problem is that they cannot provide a closed economy for the node and its immediate region (Friedmann 1966:18, 56). These small regions should be planned to bridge periphery and core areas such as Brits and Rustenburg (see section 2.7.4). This will establish migration, along a strong development axis (such

as the N4 and the Bunk road). A paradigm change has taken place in these mining regions and it is important to be aware of urban-rural migration. With reference to figure 2.16, the only difference is that this process causes industrial rural localization where people migrate from urban (core development areas) to rural areas (non-central places that are under-developed). Once again, the importance of unbalanced growth towards smaller regions is to address the challenge of a balanced economic growth. Each core expands within the region in separate locations too small to have their own closed economy. Consequently, they still depend on the core development areas Brits and Rustenburg.

These locations should be identified and managed better in future. In order to do so the range of mining areas should be determined for services to be rendered. Because these localizations are not necessary, earmarked for settlements and economic activities and consequently not properly planned by the municipalities, services (such as schools and clinics) are not available. As already mentioned, these settlements are referred to as non-central places (see section 2.4) because of the deposition of natural resources. (Hoover, 1948:3,4), which implies the dispersion of settlements. This does not necessarily mean services are deposited automatically. People cannot be planned they make their own decisions and services are not usually planned for areas where people decide to settle.

Table 2.1 compares central and non-central places. This illustration provides that non-central places imply lower distribution of goods and services. Services are limited, services are offered on small scale and habitation tend to be in small but more scattered settlements.

- **Advance planning for mining regions**

  These small, scattered settlements have already started to expand towards each other. People localized rapidly in the study area, consequenlty the huge backlog of services. Better planning could have prevented this to happen if advance planning was undertaken. Therefore, as soon as new small non-central settlements start to form near mining activities in future, there would be no need for forced centralisation as the decentralisation has already taken place. Municipalities should rather provide in their needs with better forward planning such as in the IDP.

- **Economic specialization**

  The deposition of minerals and mining activities establish growth imbalance (see section 2.4). Geographic growth imbalances should create opportunities in order to create a more balanced economic growth. More balanced economic activities will establish more sustainable regional development. Mining activities localize where the minerals are and the minerals are deposited randomly and unbalanced in the physical environment. Thus, the aim is to balance the distortion through focus on a more diversified economy, which will contribute towards the regional development. The only way to create regional unbalance-balanced growth is by concentrating economic activities within a mining region instead of mining activities. It is important for the region itself to plan through the SDF in order and provide specialized services such as training centres and schools, instead of waiting on the mining companies to perform such examples of diverse economic development.

- **Specialization is established by creating stronger developmental axes**

  When developmental axes could be identified in order to ascertain the force of development(Section 2.6-2.6.2 and 2.7-2.7.4), the formation of non-central settlements and also their contribution to specialization might be influenced (See section 2.4). It is important that these non-central places should be accessible to new economic activities (Section2.7.5).

- **Geographic space and economic space**

  When geographic space and economic space, similarities are traced, it will materialize and better alternatives for development will be created9 See section 2.5). They should be considered in different layers that act upon each other. Geographic space commence lead unbalance regional development as resources are uneven distorted(Refer to section 2.2), but economic activities yearns for a more balance regional approach Economic space yearns for balanced regional approach. For example, factors such as mining activities, water, boreholes and accessible roads, relate to geographic space. Economic space signifies localization. Employment opportunities, services, schools and businesses completely dependents on geographic space factors such as accessible roads, water and infrastructure. Economic space brings about economic activities, which

act upon geographic space. These two concepts are inseparable before tracing similarities; it might contribute towards successful future regional planning. Economic systems should be restricted to economic space in order to move from economic space to geographic space. This is necessary because economic systems (activities) act upon geographic space (see discussion in section 2.5). Human movement establishes movement of goods and services within geographic space, which in turn generates economic activities.

- **Movement overcomes geographic distance**

  The dimension of and distance between bodies exert power of attraction on one another (see section 2.6). As these non-central places start to grow, they become larger and the force of attraction intensifies. Therefore, policy makers cannot underestimate the attraction forces, as every activity needs optimal locality (Friedmann & Alonso, 1964:38) within the abstract economic space. It is observed that mines and related activities still aim to create optimal and strategic localization. It is a valuable consideration to plan other economic activities. Diverse economic activities should be established in order to create vibrant economic regions that not only depend on one economic activities such as mining.

- **Mutual agglomeration advantages**

  In Section 2.6.1, the discussion deals with agglomeration advantages as nodal points exist because of agglomeration benefits. Area bound mining activities and economic activities share mutual agglomeration benefits. Therefore, to find and compare mutual external and internal agglomeration advantages will contribute to the specialization of these nodal points. One should remember that it is important to develop mining areas in such way dependence should not only be on mining activities but also on other economic activities. The performance of such a region depends on resources, capital stock, technologies, innovation and economic choices (Hirchman, 1958:33; Abel *et al.,* 2009:9). Growth is equal to the limitations of the immediate environment of the main node and is concentrated firmly on the periphery (Refer to Mydrals' (1957:28) backwash effect in section 2.7.2). Dependence should not only be on mining activities but also on other economic activities. Because mining is such a use economic entity in the area, it require many skills and educational training. Therefore, training centres and workshops might contribute significantly to the diversification of economic activities.

- **Stage of development**

  Dualistic unbalanced socio-economic specialization differs from Friedmann's (1966:70) dualistic geographic unbalanced industrialization (see figure 2.14). These developments also adhere to the four stages of development discussed in Section 2.7.5.

6.4 Proposals rising from the private sector and policies

As mentioned, minerals are not consistently distributed. Despite this, growth centres are influenced by democratic decision making, social imbalances, investment and economic influences such as economic growth, business opportunities and amendments in decision making processes (stated by Hansen, 1972:60 and is proved by field study done). Previous policies discussed in Sections 3.2.1, 3.4 - 3.4.3, 3.5 have tried to restrict people and economic activities in order to manage spatial distortion. The following proposals were found in relevance of the problems identified in the study area.

- **Advance planning**

  Policies need to aim at ***advance planning for specified locations***. Existing informal settlements have already indicated where people want to locate within these regions. Now it is the government sectors responsibility to plan and engage with private sector. These sectors should move away from industrial concentration and ***focus on socio-economic specialization locations***. The policies should emphasize socio-economic opportunities (Addressing specific departments such as human settlements and social development) that will establish mutual agglomeration benefits for mining activities and other economic activities. Examples are as follow:

  - *Education centres:* primary and high schools and other education facilities that might contribute to specialized social skills;
  - *Infrastructure*: such as proper roads (such as pedestrian and bicycle friendly roads) and light public transport available in the vicinity of the small region that is too small to have its own closed economy. The infrastructure of streets should be developed in such a way that it will accommodate retail entrepreneurs. These measures will establish very small growth centres whose attraction will depend on its own dimension and the demand of its own

population, while interacting outside its small region along the light transport routes (Meyer, 1969:9) (see discussion in section 2.6.1 and section 3.5).

- **Sector relationship**

  Do not change inter-level and intra-level policies. These policies are well compiled and legislation does supports implementation. The problem lies within the relationship between the private sector, government and the public sector. The MPRDA states that government does have an influence on decision-making processes of mines. These mines are the main forces of attraction towards these small regions.

  The MPRDA initiating the SLPs could be more significant in promoting the objectives of the SLPs. Instruments on how it could be promoted interlink with SLPs objectives (Regulation 42 in terms of the act) and theoretical tools such as discussed in section 6.2 (also refer to Chapter 2). This should be put in practice with the emphasis on sustainability. It is important that local governments include municipal SLP objectives in their SDF and IDPs. These objectives should help mines to address socio-economic problems through formulation of their SLPs and align it with municipal objectives. Here the Municipal Systems Act plays an essential role by contributing towards SLPs.

- **Beyond development plans and strategies**

  *Municipal policies should go beyond development plans and strategies**.*** Strategies should align with national and provincial objectives and be implemented. They have to meet their own region's needs. Social development objectives should be formulated by spatial studies done in collaboration with mining authorities and the private sector. The private sector is enthusiastic about providing input as observed during the field study. Spatial studies revealed a ***need for theoretical application*** in order to bring geographic and economic spaces, responsible for the social imbalances, together. This is one of the problems identified by the NDP 2030. Discussions in Section 3.4.4 state that the central plan is to expand employment opportunities contributed by mining activities and a ***diverse economic region in the vicinity of the region*** in order to attain a decent standard of living. The overall aim of the NDP of 2030 is to have a diversified economy by 2030. This could be accomplished by initiating diversification of ***small economic regions*** that will

contribute to the bigger economic regions and additionally to the national economy contribution holistically.

- **Establish implementation**

  The aim of the argument is to move beyond the implementation. Geographic spatial development strategies based on theories, should meet economic spatial operations. Principles set for spatial development management (refer to Section 3.7) is of importance before any policy objectives and outcome could be formulated. Theories act as internal instruments of policies (see section 3.6 and figure 5.2).

  According to the NPC, there are five spatial development management strategies: spatial justice, spatial sustainability, spatial efficiency, spatial resilience and spatial equality with the focus on ***"resource critical regions"*** (NWPC, 2013:134). This study area is a typical example of resource critical regions. The N4 and the bunk road should be developed into strong development axes (plural) that interlink smaller regions. It is also very important to acknowledge non-central places in order to promote sustainable development. *Optimal localization towards and in the vicinity of the development* axes will encouraged development which will enable **"*vibrant economic development nodes"*** desired by the BPDM (2010:125). This movement will contribute towards sustainable development, as the functionality of these non-central places will be improved.

  The establishment of informal development nodes is a definite challenge in the study area. IDPs should focus on the "integrated planning purpose". Obvious locations where identified (Map 6). Therefore, the IDPs should make provision for social structure and services needs in order to promote balanced growth within the distortion of socio-economic activities (see discussion on mutual agglomeration benefits discussed in section 6.2). Thus, a platform for a diverse economy is created. Instead of focusing on large regions, they should zoom into smaller regions and their own needs. Once again, input is needed from the private sector.

It can be concluded that mining activities contribute to agglomeration benefits that encouraging all activities within a mining region. The agglomeration benefits encourage rural-urban migration, development along development axes, new mining activities as well as related activities, which require better policy implementation. There however are

good strategies in place and these are included in the relevant involved policies (see chapter 3), but the battle remains the implementation of the strategies because of poor private and sector relationship (especially the municipal government). Each municipality and region plays an important role during decision-making processes and the development stages. It is important to identify role players and at what stage their responsibilities should come into action. The private and government sectors should form a cohesive team and it is proposed that provincial, municipal and private sector should establish a regional development team that take the responsibility of the regional development. The teams' new development plan must take vertical and horizontal coordination into account development (see section 5.4 and table 5.1). The coordination should form part of the joint-venture processes between the government sector and private sector in order to establish public-private-partnership. Their focus should lie on regional planning. Joint venture should not exclude communities and should consist of central and regional bodies. When policies are formulated, it should include central and regional bodies. It is proposed that municipalities manage central bodies and regional bodies include government powers as well as regional authorities that influence the regional development such as mining companies, town planners and developers. Their decision-making should be based on and integrated dimension of sustainability (see figure 5.3). The integrated dimension of sustainability interlinks theoretical concepts with practical implantation.

Table 6.1 represents focus points that were involved when drafting the precinct plan for the study area. This aims to find common views during decision-making that focus on integrated sustainable regional development based on theoretical concepts that is of value and needs to be involved. The synthesis, proposals and general strategies were all combined in this table. When comparing Sections 6.2, 6.3 and 6.4 above, one will find that all the important strategies were incorporated within the table information. The following section focuses on a practical integrated dimension of sustainable regional development that include theoretical strategies that could be implemented in the study region. Table 6.1 was of significance when to identify the problematic areas.

6.5 Spatial representation

The spatial evaluation (see Chapter 4, sections 4.4.2, 4.4.3, 4.5.2) made it possible to offer a proposed spatial representation before the discussion could offer proposed joint-

venture between the different parties involved. The aim is to provide a useful policy document that could be applied in the study area to establish sustainable regional development. Map 6 proposes a simple illustration of practical strategies stipulated in Table 6.1. The first column of the table set the aspects that influence the sustainable regional development. The first aspect that was looked into was *rural-urban migration* that was established because of agglomeration benefits occurring next to *mining locations*. All the possible agglomeration benefits should be considered, but for the purpose for this study, the focus ly on the most important employment opportunities that attract new settlers. This migrations occur along the two significant *development axis'* are the N4 (Bakwena National Highway) and the identified bunk road, which holds agglomeration benefits for settlements. In Map 6 it is clear that most of the settlements already located along these two development axis. Considering the second column of Table 6.1, mentioned four aspects that influence the sustainable regional development which most definitely affects the total spatial system of the region. Therefore, the third column provides clearance on the theoretical concepts. These locations are considered *non-central places* that need advance infrastructural planning. Because the current situation makes restructuring impossible, favourable established settlements were chosen to form new non-central development nodes. Policies should reduce scattered mining locations to only a few important locations that form the central focus in order to include advance planning for these scattered mining locations. A balance growth approach will make these locations attractive and encourage specialization. Specialization will lift the development to another level that will enable economic activities to ensure a better wellbeing for the rural population.

Available statistics in the local municipal SDF's and IDPs (Urban Dynamics North West, 2010:32; RIDP, 2015/16:73) were used to identify three development focus areas along the two-development axis (N4 and bunk road). The two development axis runs parallel with each other, which strengthen the development attraction and agglomeration benefits. The study area was divided into three groups: A, B and C which represented different clusters of non-central places that were the proposed development focus areas for this study purpose. It proposes that these non-central places should be consolidated into development clusters. This will enable one to ensure high quality linkages between the various development focus areas and the two municipalities. The consolidation will help to develop strategic focus areas for development of sustainable economic development and infrastructure provisions within a mining environment. Cluster A falls

within the western limb of the study area and Cluster B and C falls within the eastern limb of the study area (see map 4.7). Map 6 illustrates the three clusters.

- **Cluster A: Waterkloof, Bokamoso and Nkaneng cluster.**

  Cluster A consist of Waterkloof, Bokamoso and Nkaneng. This is where the bunk road origin in the western limb of the study area. Intense mining operations takes place here by Anglo-platinum occur here, Westplats, Xtrata, Lonmin and various chrome mines (see map 5). These holds many employment opportunities for residents as well as economic activities. The cluster links very well with the CBD area of Rustenburg, which establishes a strong movement between Rustenburg CBD and the cluster of settlements. As these settlements are located in the rural area, the proposal is to regard them as a cluster of non-central places that should encourage sustainable development integration with Rustenburg. The settlements are in the region of to the local urban area with an average distance of 9 kilometres, which should make the infrastructural development and specialization effortless as the distance is important with regard to the location advantage (see section 2.6 and figure 2.5). Interactive forces are great as the distance is small and these settlements will attract each other strongly.

- **Cluster B: Marikana, Elandrift and Wonderkop**

  The population census of 2001 (Urban Dynamics North West, 2010:32) stipulated that Wonderkoppies and Marikana each has significant population growth. Near Marikana and Wonderkoppies, Elandrift also appeared to be of interest among new settlers as Lonmin mining operations take place in the vicinity. The N4 and bunk road embrace the settlers who prefer to locate along the primary development corridors. These clusters bind the development axis that yearn for sustainable infrastructure development. It also longs for specialization, as many unskilled people prefer to move here to benefit from employment opportunities. Specialization is needed in order to create a stronger development axis in the region creating the possiblity for better infrastructure development across the study area. This non-central cluster poses to act as a half way cluster. This cluster connects cluster A and C with the two municipalities. This mutual agglomeration benefits provided by the mining activities will create a stronger development axis and movement of people and goods that will safeguard against

regional stagnation. It is important to acknowledge that movement overcomes distance.

- **Cluster : Modderspruit, Majakaneng and Bapong**

  This cluster is where the bunk road originate within the eastern limb of the study area (see map 4.7). Significant growth appears and is of great concern for Madibeng (Metroplan, 2009:18). The aim is to link the development focus areas and the Brits CBD with the other main development focus areas to ensure access to services, specialization and sustainable development. This cluster should be regarded as the bridge between Brits and Rustenburg as it is the most intensive development area. Significant growth appears along this development axis as it is highly accessible. The accessibility of the cluster must be applied successfully to promote specialization and social-economic development.

Policy documents fail to understand geographic space and economic space that could simplify complex regions. The role of the government sector and mining authorities can play a significant role. Municipalities aims to manage their geographic space according to accomplish sustainable development on social, environment and economic level. Mining authorities focus on economic development and their activities acts upon economic space, exceeding geographic space. These two powers should join their different space concepts in order to integrate both sectors development motives. Their joint powers, which should be included in the SLPs, can contribute to the identification of different agglomeration benefits that different development locations might establish (as proposed in the previous paragraph).

6.6 Conclusion

The plan is to include theoretical and private sector input in local SDFs and IDPs in order to develop social development objectives. This includes geographic and economic preferences that should be aligned with SLPs. It could only be done by means of the input from private sector. SPLUMA provides public participation processes and it must be taken to heart, as it is the responsibility of the municipality to encourage participation. They must go beyond the stipulations of SPLUMA. They should display a willingness to be guided by the private sector as well. The outcomes of the SLPs should be revealed

by the SIPs. In turn, the SIPs should reveal what has been captured from theory and private sector input. Thus, the IDA Act No 23 of 2014 will show to better advantages as it will establish the bottom-up approach, which gives effect to the principles of co-operative government. When above mentioned has been taken care of, it will potentially contribute towards the NDP 2030s plan to stimulate local markets and strengthen conditions promoting labour-absorbing activities that will promote socio-economic growth.

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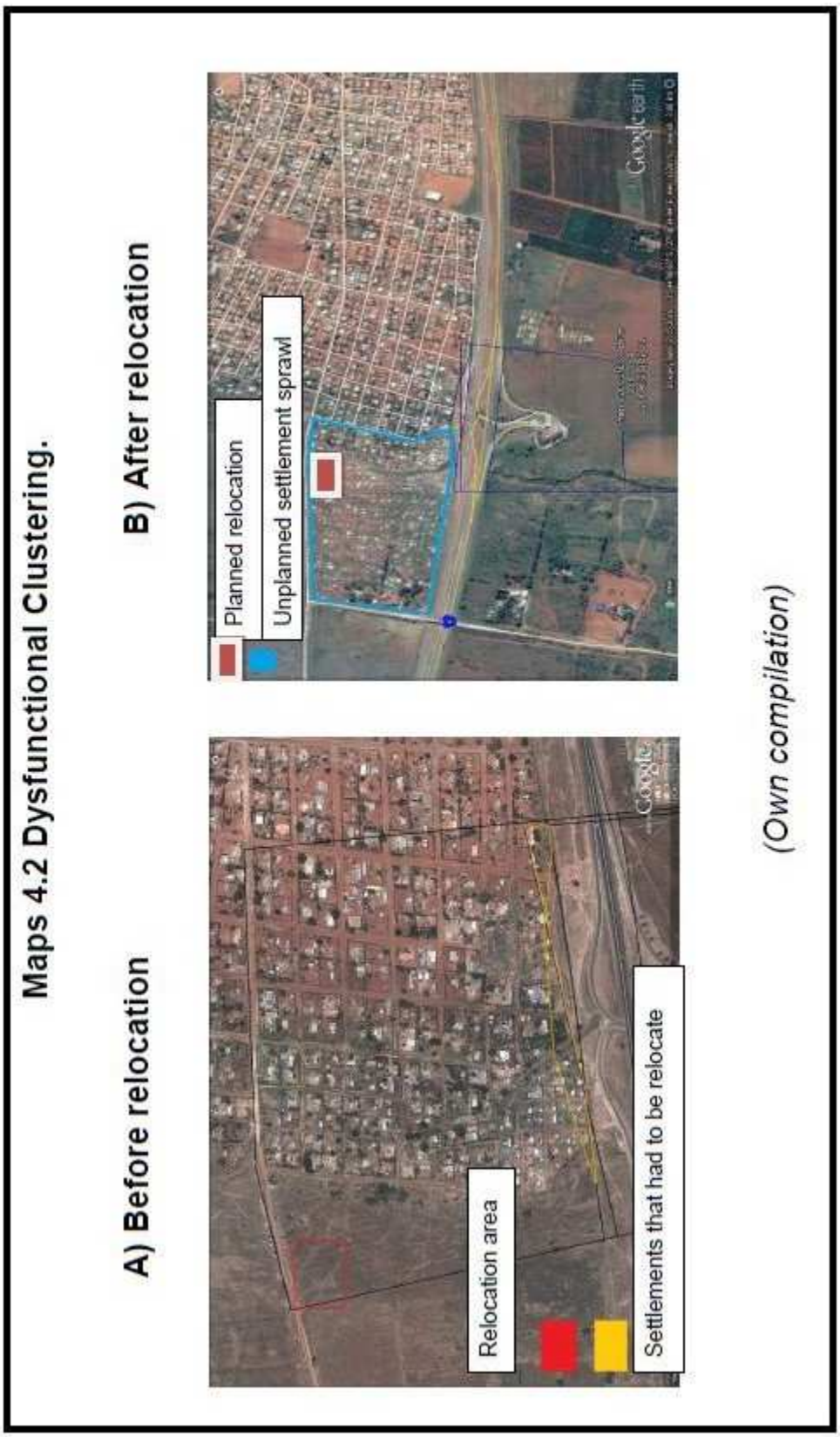
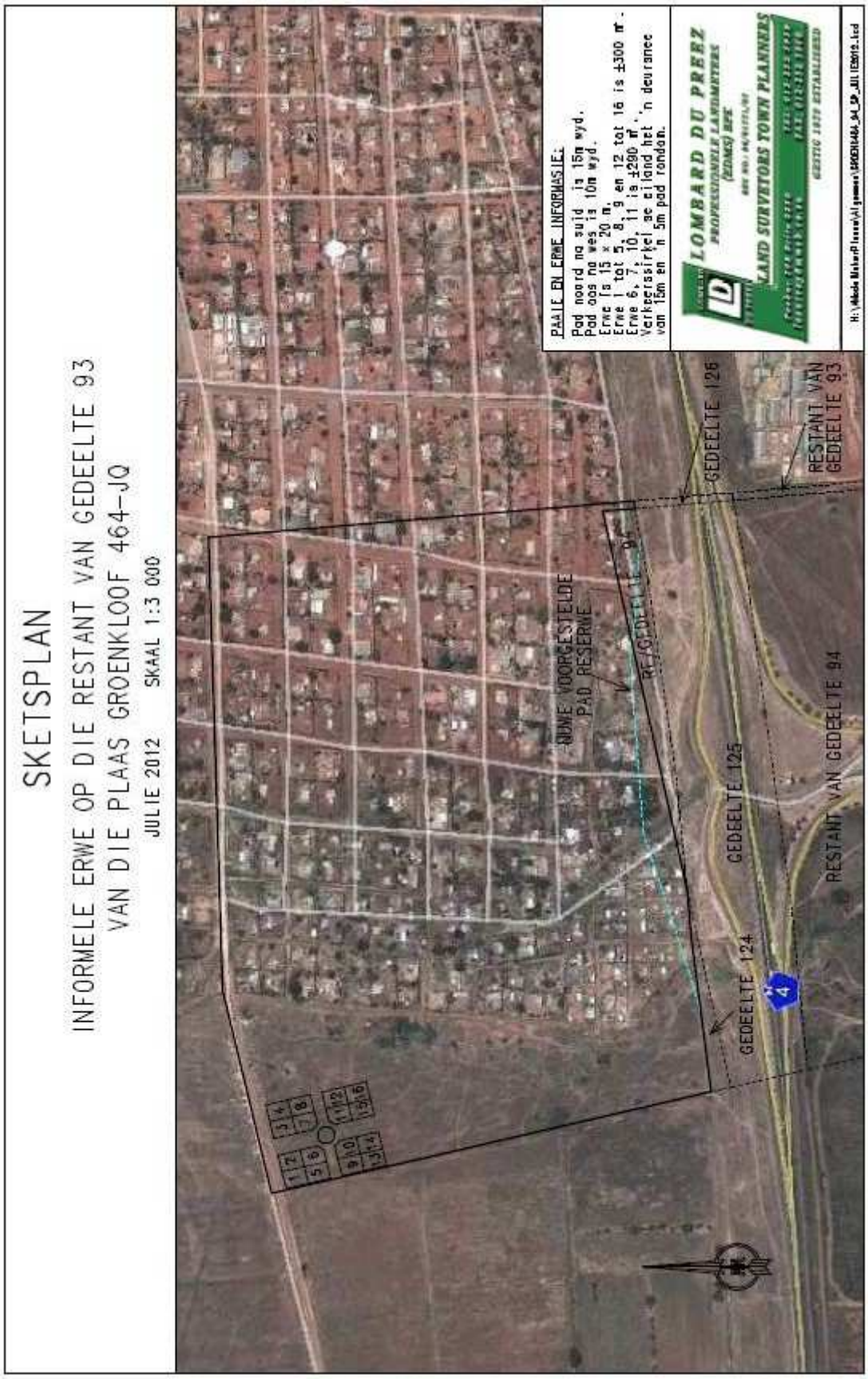
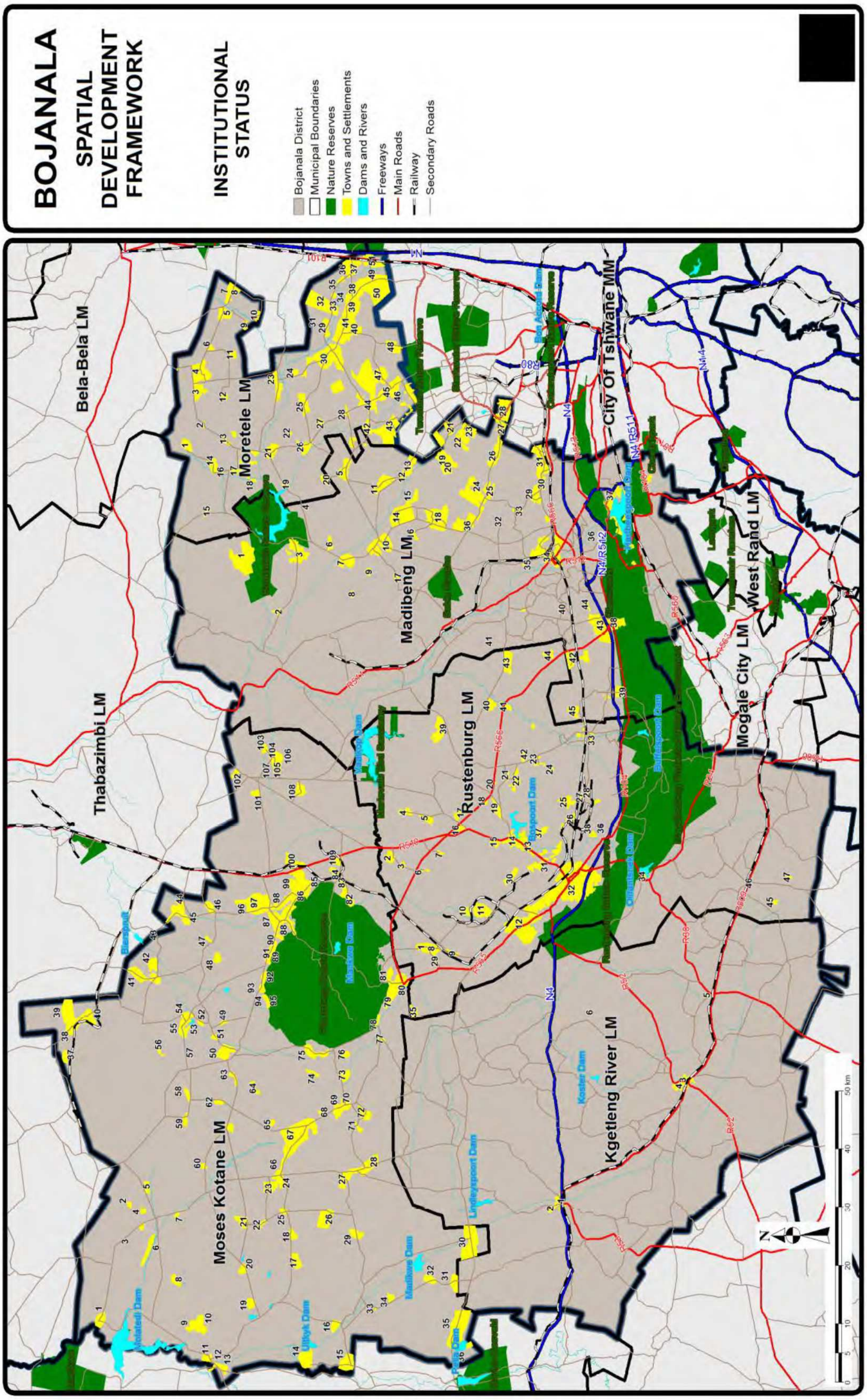
Map 4.2: Dysfunctional clustering



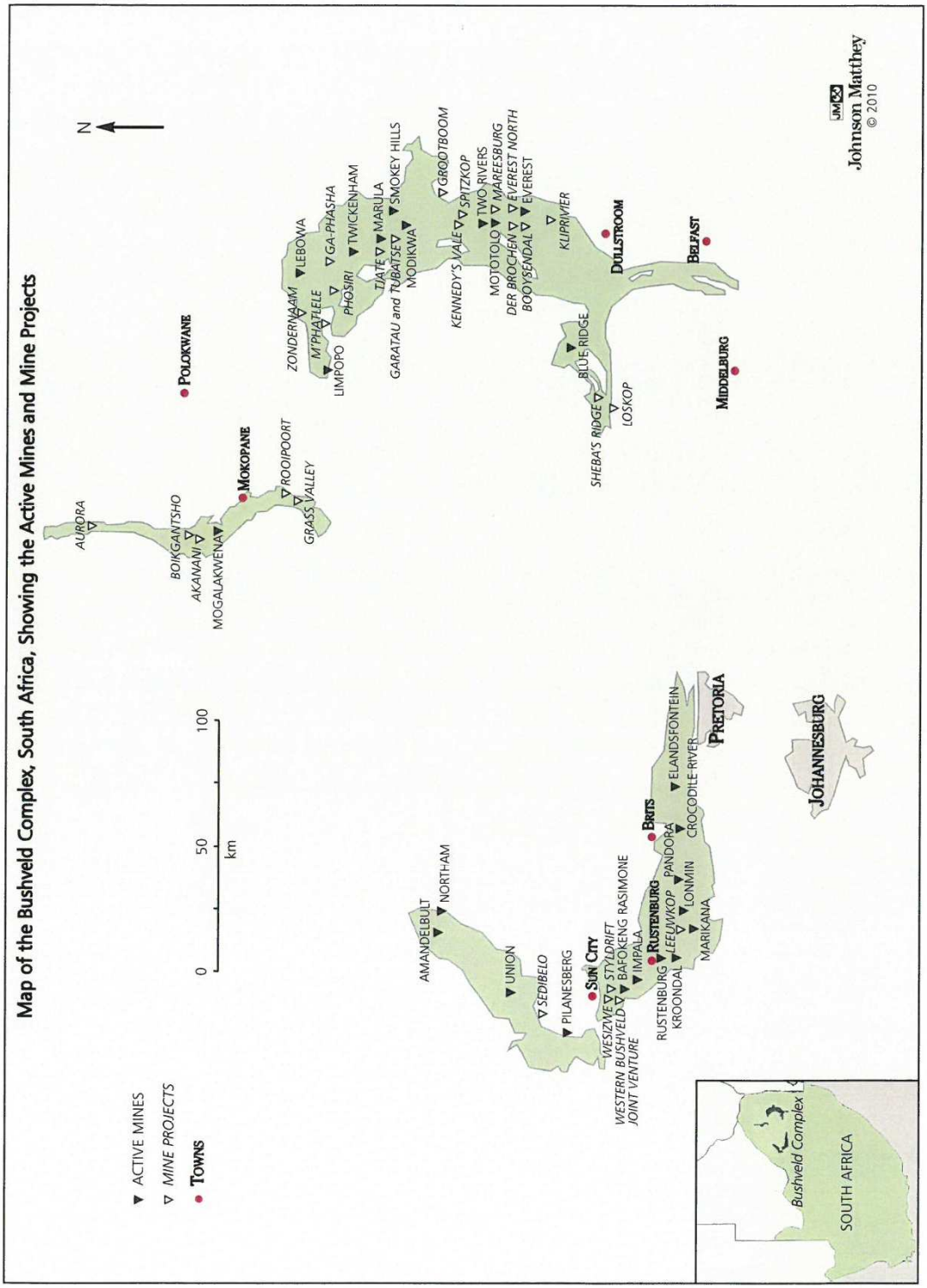
Map 4.3: Sketch plan



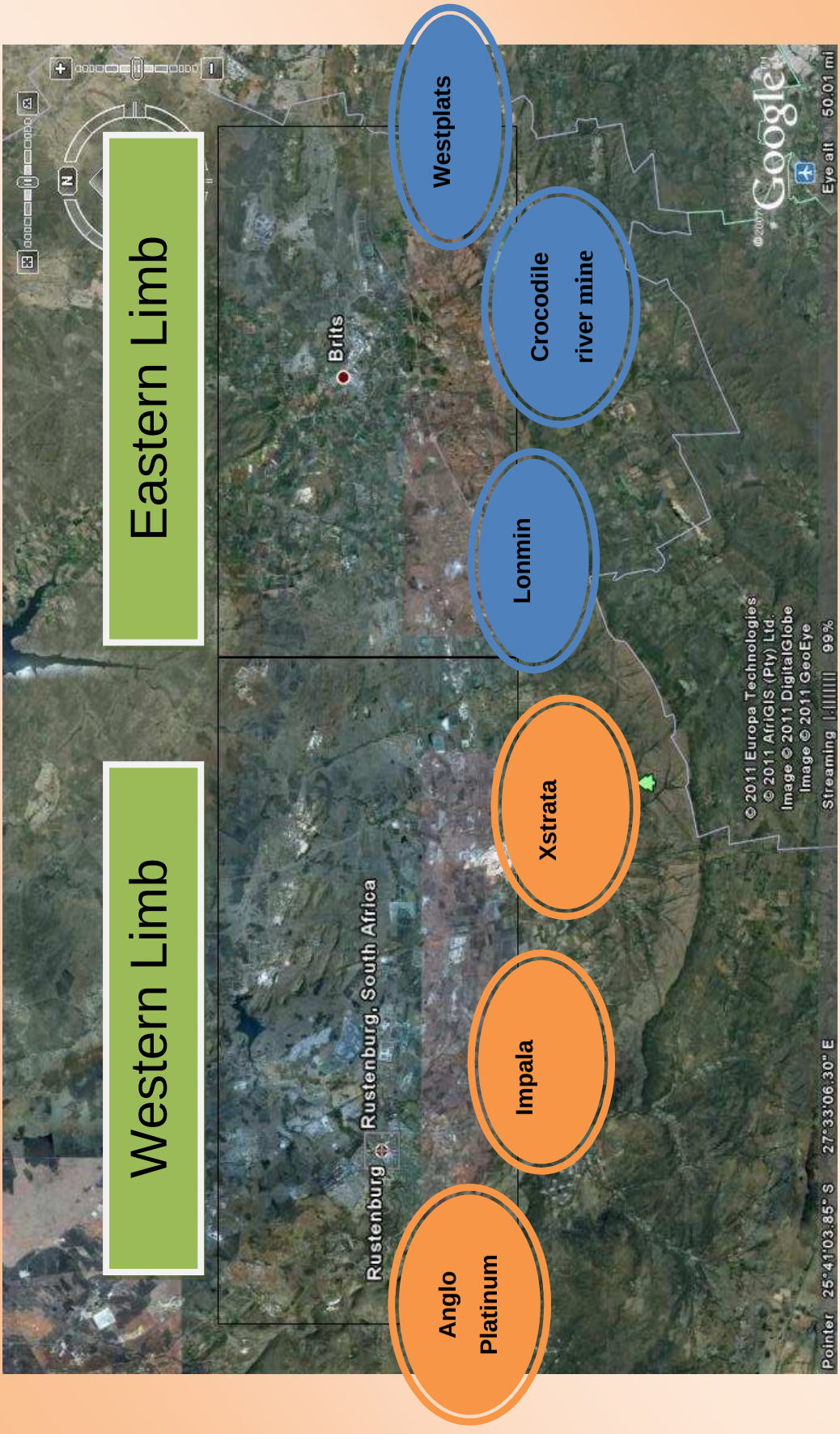
Map 4.4: Settlements pattern in District



Map 4.5: ***Bushveld Complex*** *in South Africa showing the eastern, western and northern limbs. Major towns and cities are marked in red, operating platinum mines and projects currently underway are shown in green.*

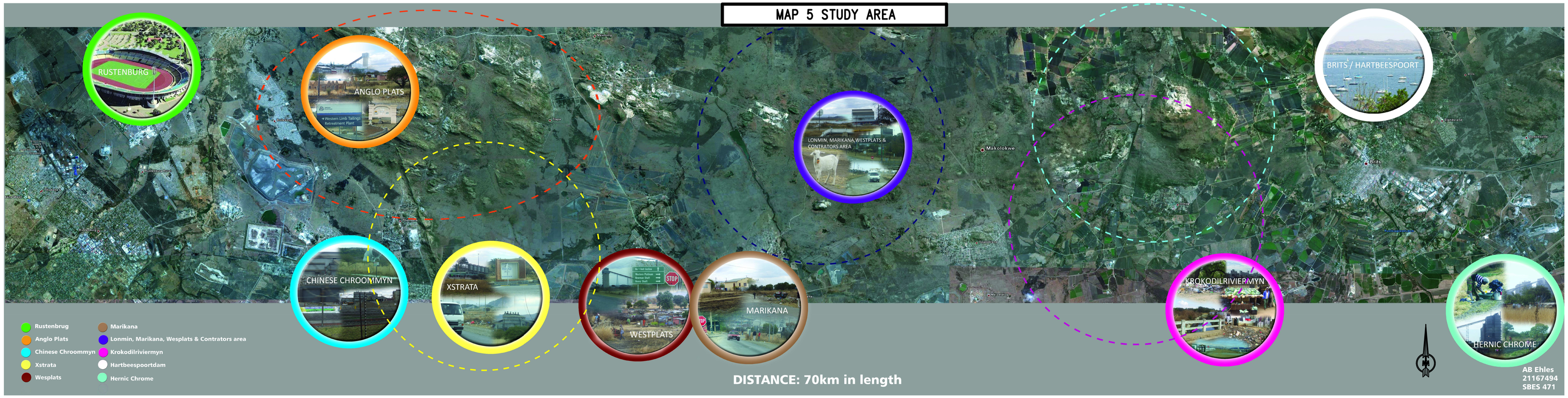


Map 4.7 Location of the study area



Map 5: Study Area

MAP 5 STUDY AREA



DISTANCE: 70km in length

AB Ehles
21167494
SBES 471

MAP 6 THE BUNK ROAD

Origin N4 - Bapong
Terminus R104 -Wonderkop

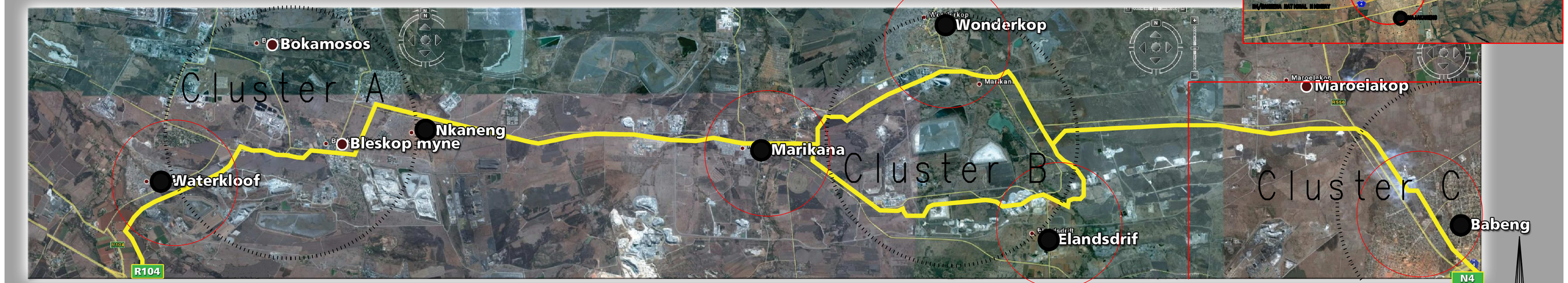


Table 6.1 Focus points

Aspects influencing sustainable regional development		***Theoretical concepts that guide decision making in order to find mutual regional development objectives***		***Sector relationship in order to plan advance***	**Advance planning** – Specify location where the focus should lie on social-economic specialization
Rural-urban migration	These four aspects refer to the total spatial system influenced by: • Growth centres • Core-periphery development • Industrialization	Non-central places	• Identify preferred locations in region • Earmark settlement and economic activities • Identify location in need of services		
		Advance planning for mining regions	• Integrate scattered settlements • Centralize non-central places		**Sector relationship** will provide inter- and intra-level policies and plan
Influence of the development axis		Economic specialization	• Geographic growth imbalances creates opportunities • approach geographic imbalances created by natural resources by balance economic activities • provide specialized services at these economic activities • Provide specialization along the development axis which creates forces of attraction and creates new opportunities. It will manage to balance economic activities.		
		Movement overcomes geographic distance	• balance economic activities along development axis upon geographic space	***Enable sectors to go beyond development plans and strategies in order to establish implementation***	In order to go beyond development plans and strategies there is a need for **theoretical application** en **establishment of diverse economic regions**
Mining Activities		Mutual agglomeration distance	• Focus on forces of attraction with mutual agglomeration benefits for example specialized services, education, telecommunication, transport		
Policy implementation		Stages of development	• Identify the stage of development for each non-central place		**Resource critical regional** and **vibrant economic nodes** will ease implementation as it is **favourable to invest**

(Source: Own compilation)

ANNEXURE 2: Mining activities

QUESTIONNAIRE ANNEXURE

NORTH-WEST UNIVERSITY
YUNIBESITI YA BOKONE-BOPHIRIMA
NOORDWES-UNIVERSITEIT

Town and Regional Planning

Case study:

Sustainable regional development in a mining environment.

Please answer the following questions.

Question 1:

1.1 Occupation: _____

1.2 Job description: _____

Question 2:

In your experience, who are the key role players responsible for planning and development within a mining environment?

A) Mining authorities should take the lead in this process because their activities stimulate economic growth together with infrastructure development and so it is their responsibility to achieve sustainable regional development.
B) Municipalities should take the lead to ensure that the necessary policy implementation pressure are exercised upon mining authorities to ensure sustainable regional development
C) Municipalities and mining authorities should work together in these proses and find solutions to apply the policy documents in practice.
D) Other

Question 3:

What is the significance to develop a mining environment with regard to sustainable economic growth and regional development?

A) Sustainable regional development depends on policy implementation and the cohesive co-operation between municipalities and mining authorities.
B) Mine activities are costly; the return on investment can only be measured in the long-term and has therefore a negative impact on socio-economic development and environmental impacts.
C) Mine activities stimulates economic growth points in a region by providing a foundation for economic activities, therefore positively impacts the sustainability of a mining environment.
D) Other

Question 4:

In your experience, does South African planning policy provide sufficient guidance for different role players, e.g. mining operations and Municipalities, in terms of Integrated Development Planning methodology?

A) Yes, development objectives, strategies and programmes are highlighted in national policy such as the National Development Plan (NDP), provincial policy such as the Provincial Spatial Development Strategies (PSDS) and local planning policies such as the Integrated Development Plans (IDP) and Spatial Development Frameworks (SDF's).
B) No, South African planning policy is too subjective and can be interpreted in many different ways.
C) Integrated Planning is a specialized task and can only be mastered through years of experience in both Strategic and Statutory Planning in the professional arena. There is a lack of competency of different role players during regional development processes to implement the policy documents that are successful compiled.
D) Other

Question 5:

Should policy documents directly identify the different role players (i.e. in a top-down manner) and their responsibilities during regional development to ensure sustainability?

A) Yes, to ensure that the different key role players do not neglect their responsibilities
B) No, they know what their responsibilities are in terms of sustainable development.
C) It is not about underlining responsibilities, but the sincere acceptance of responsibilities of both parties and to apply the regional planning methodology in practice.
D) Other

Question 6:

Does current planning policy in South Africa provide sufficient guidance for inter-sector co-ordination between local and mining authorities in terms of regional development?

A) No, the Strategic Plans of the government are not sufficiently aligned with mining activities and need to be revised in order to strengthen inter-sector co-ordination.
B) Inter-sector co-ordination should not be promoted. Each sector should only be responsible for their development.
C) Inter-governmental co-ordination should be promoted. Local and mining authorities are both equally responsible for sustainable regional development and the implementation of policy documents in practice. They would have to come to an agreement to overcome this lack of cooperation
D) Other

Question 7:

Mining operations and municipalities form an integral and co-dependent spatial entity. How should these two sectors approach development initiatives within a Municipality?

A) The mining sector and municipal sector should each compile their own document regarding development initiatives
B) The mine sector should align their regional development with municipal regional development policy

C) They should compile one document that address both sectors` development needs and that will contribute towards cohesive cooperation and empathy towards each other.
D) Other

NORTH-WEST UNIVERSITY
YUNIBESITI YA BOKONE-BOPHIRIMA
NOORDWES-UNIVERSITEIT

Answer Sheet

Please mark the corresponding letter of each question, accept in the case of “D-Other”, and write your own opinion and comment.

Question	A	B	C	D – Comments:
2				
3				
4				
5				
6				
7				

Please do not hesitate to contact me in case of any queries.

Thank you.

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Study leader: Dr E. Drewes
North-West University

FIELDSTUDY FINDINGS

Questions	% - Option A - Questions based on positive reaction on the current mining policies and implementation.	% - Option B – Questions based on the negative reaction on the current governmental policies and implementation	% - Option C - Questions that focus on the study problem statement	Feedback – This was option D where the participant could have given their personal input and gave their own opinion to the research questions about the influences of policy documents and the different stakeholders participating in the mining activities.
2 **In your experience, who are the key role players responsible for planning and development within a mining environment?**	**0%** *"Mining authorities should take the lead in this process because their activities stimulate economic growth together with infrastructure development and so it is their responsibility to achieve sustainable regional development"*	**12.5%** *"Municipalities should take the lead to ensure that the necessary policy implementation pressure are exercised upon mining authorities to ensure sustainable regional development"*	**87.5%** *"Municipalities and mining authorities should work together in these proses and find solutions to apply the policy documents in practice"*	Municipalities = constitutionally the authorities of first instance in determining land use and spatial planning issues Mining is a use of land as any other Mining activities have a certain life span (e.g. 15 years) where-after operations are discontinued. It, therefore, is imperative that mining houses and local municipalities work from day one together to ensure a sustainable/ viable environment – both the operational and housing side. Mooi Nooi case: Mining House responsible for the engineering infrastructure/maintenance, etc. Municipality for land-use management. Currently rezoning are approved by the Municipality, but Mining House says no to the actual development when it comes to provision of engineering services.
3 **What is the significance to develop a mining environment with regard to sustainable economic growth and regional development?**	**37.5%** *"Sustainable regional development depends on policy implementation and the cohesive co-operation between municipalities and mining authorities"*	**12.5%** *"Mine activities are costly; the return on investment can only be measured in the long-term and has therefore a negative impact on socio-economic development and environmental impacts"*	**37.5%** *"Mine activities stimulates economic growth points in a region by providing a foundation for economic activities, therefore positively impacts the sustainability of a mining environment."*	Mining, as a land use, has never been fully responsible for its impact on the receiving environment. No contributions towards upgrading of infrastructural networks (especially those of a municipal nature) are paid as a rule (given the legacy of the past where mining was generally exempt from planning regulations such as zoning). Other LED initiatives should be explore other than mining to ensure sustainable growth when the mines close
4 **In your experience, does South African planning**	**0%** *"Yes, development objectives, strategies and programs are*	**0%** *"No, South African planning policy is too subjective and*	**100%** *"Integrated Planning is a specialized task and can only be*	Mining as a land use category is not properly assessed in current planning policy making. Mining is a unique land use category as it is non-permanent. Mining will only last as long as the mineral resources abounds. It is difficult

policy provide sufficient guidance for different role players, e.g. mining operations and Municipalities, in terms of Integrated Development Planning methodology?	*highlighted in national policy such as the National Development Plan (NDP), provincial policy such as the Provincial Spatial Development Strategies (PSDS) and local planning policies such as the Integrated Development Plans (IDP) and Spatial Development Frameworks (SDF's)."*	*can be interpreted in many different ways."*	*mastered through years of experience in both Strategic and Statutory Planning in the professional arena. There is a lack of competency of different role players during regional development processes to implement the policy documents that are successful compiled."*	to "plan" for mining as a future land use; given its source specific nature and sensitivity towards economic swings and roundabouts (supply/demand will vary over time and impact directly on the use of land for mining). In the past there were very little or no strategic planning or development policies and development control on proclaimed mining land. As a matter of fact, until recently all proclaimed mining land was excluded from any town planning legislation and is some instance it is still the case. The necessary acts/policies are in place. The problem is the interpretation/ implementation of it. There are no Knowledgeable people in the Government, or mining houses that know/realize the value of proper integrated planning and development. Therefore, at municipal level, it becomes nothing else than a wish list of projects with very little (if any) relationship between them. No public-private partnership is in place.
5 **Should policy documents directly identify the different role players (i.e. in a top-down manner) and their responsibilities during regional development to ensure sustainability?**	**37.5%** *"Yes, to ensure that the different key role players do not neglect their responsibilities*."	**0%** *"No, they know what their responsibilities are in terms of sustainable development."*	**62.5%** *"It is not about underlining responsibilities, but the sincere acceptance of responsibilities of both parties and to apply the regional planning methodology in practice."*	Policy making lies in the realm of authority. At the municipal sphere, the obligation is primarily on the Municipality to plan for and manage the development/use of its jurisdiction. Its responsibility is foremost – to dictate and guide the involvement of other participants (i.e. mining sector). But policies should also be there to ensure role players fulfill their responsibilities. Partnerships between the private and public sector are important. Without this, sustainable development will never be possible.
6 **Does current planning policy in South Africa provide sufficient**	**25%** *"No, the Strategic Plans of the government are not sufficiently aligned with*	**0%** *"Inter-sector co-ordination should not be promoted. Each sector should only be*	**75%** *"Inter-governmental co-ordination should be promoted. Local and mining authorities are*	Policy plans typically "ignore" the thorny issue of mining because of the factors mentioned in Question 4 above. Most municipalities where mining occurs on a large scale are simply not experienced/ resourced to deal with the challenge in an appropriate manner. Mining usually

guidance for inter-sector co-ordination between local and mining authorities in terms of regional development?	*mining activities and need to be revised in order to strengthen inter-sector co-ordination."*	*responsible for their development"*	*both equally responsible for sustainable regional development and the implementation of policy documents in practice. They would have to come to an agreement to overcome this lack of cooperation"*	plays an important role in these local economics and tends to "get away" from having to comply with municipal policies/regulations. Public – Private partnership
7 **Mining operations and municipalities form an integral and co-dependent spatial entity. How should these two sectors approach development initiatives within a Municipality**	**0%** *"The mining sector and municipal sector should each compile their own document regarding development initiatives."*	**37.5%** *"The mine sector should align their regional development with municipal regional development policy."*	**62.5%** *"They should compile one document that address both sectors` development needs and that will contribute towards cohesive cooperation and empathy towards each other."*	The municipality is constitutionally obliged to plan and regulate the use of land in its jurisdiction. It follows that a mining company is obliged to align its initiatives accordingly – save for the unique characteristics which is peculiar to "mining" as a land use – i.e. being source dependent (one cannot mine anywhere other than where the mineral resource is). A unique "partnership" between the Municipality and the Department of Mineral Resources must be established. Public – Private partnership