Spatial Planning in large urban systems: The Gauteng City-Region

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ABSTRACT

The majority of current regional research focuses on individual cities rather than an urban system as a whole. This approach overlooks the critical influences of urban systems, particularly at regional scale. As a result of regional development, the geographical layout and distribution of nodes becomes uneven. Some nodes expand and establish themselves faster in a region, depending on the type and purpose of each node. The dynamics and relationships between a set of nodes are thus tied to the urban hierarchy.

Regional planners have researched the various factors that contribute to the development of an area and its urban system over time. Theoretically, planners hoped to steer the region's development in a strategic direction. In specific geographical an area, spatial planning instruments such as nodes, corridors and planning regions are used. Despite several strategic planning initiatives, the region continues to have imbalanced growth and hierarchy. An urban system's role as a spatial planning tool is studied. Different national and sub-continental applications are utilized to demonstrate the many implications and impacts that this may have.

Strategic policies made by many government areas can improve spatial planning. As a result, policies were investigated using the present design process and its execution. The researcher uses both a developed and a developing country in the empirical study to analyse distinct design processes and the application of international policies and frameworks. The use of an urban system as a spatial planning tool could help create a more balanced geographical distribution of nodes in a region. An urban system can also be used to connect and integrate diverse nodes and regions in order to form beneficial and long-lasting economic linkages.

***Key words**: spatial planning, urban systems, urban hierarchy, regional spatial planning, spatial planning instruments, policy, legislation.*

OPSOMMING

Die meerderheid van huidige streeksnavorsing fokus op individuele stede eerder as op 'n stedelike sisteem as geheel. Hierdie benadering ignoreer die kritieke invloede van stedelike stelsels, veral op streekskaal. As gevolg van streeksontwikkeling raak die geografiese uitleg en verspreiding van nodusse skeefgetrek. Sommige nodusse brei uit en vestig hulself vinniger in 'n streek, afhangende van die tipe en doel van elke nodus. Die dinamika en verwantskappe tussen 'n stel nodusse is dus gekoppel aan stedelike hiërargie.

Streekbeplanners het verskeie faktore nagevors wat bydra tot die ontwikkeling van 'n gebied en sy stedelike stelsel met verloop vantyd. In teorie het beplanners gehoop om die streek se ontwikkeling in 'n strategiese rigting te stuur. In elke gebied word ruimtelike beplanningsinstrumente soos nodusse, korridors, beplanningstreke, ensovoorts gebruik. Ten spyte van verskeie strategiese beplanningsinisiatiewe, het die streek steeds ongebalanseerde groei en hiërargie. 'n Stedelike sisteem se rol as 'n ruimtelike beplanningsinstrument word dus bestudeer. Verskillende nasionale en subkontinentale toepassings word gebruik om die vele implikasies en impak wat dit kan hê, uit te wys.

Strategiese beleid wat deur baie regeringsgebiede gemaak word, kan ruimtelike beplanning verbeter. Gevolglik is beleide ondersoek deur die huidige ontwerpproses en die uitvoering daarvan te gebruik. Die navorser het beide 'n ontwikkelde en ‘n ontwikkelende land in die empiriese studie gebruik om duidelike ontwerpprosesse en die toepassing van internasionale beleide en raamwerke te ontleed. Die gebruik van 'n stedelike stelsel as 'n ruimtelike beplanningsinstrument kan help om 'n meer gebalanseerde geografiese verspreiding van nodusse in 'n streek te skep. Hierdie stedelike stelsel kan ook gebruik word om diverse nodusse en streke te verbind en te integreer om sodoende goeie en langdurige ekonomiese skakels te vestig.

***Sleutelterme**: ruimtelike beplanning, stedelike stelsels, stedelike hiërargie, streeksruimtelike beplanning, ruimtelike beplanningsinstrumente, beleid, wetgewing.*

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

SECTION 1: CONTEXTUALISATION

CHAPTER 1: INTRODUCTION

1.1 Introduction: Research orientation

Africa is currently the continent that is urbanising the fastest (World Bank, 2022:1). As a primary role player on the continent, South Africa's spatial planning policy system, along with related implementation instruments, have seen significant modifications since the country entered the democratic era in 1994 (du Plessis, 2013:69).

With the continuous population growth, it is crucial to focus on spatial planning. Over the last few years, not enough has been done to improve the current imbalanced distributed spatial patterns which may result in possible future problems. According to European Spatial Development Perspective and Keeton and Nijhuis (2019:227), these problems include increasingly relying on private transport, high unemployment, social exclusion, and lack of public spaces (Committee on Spatial Development, 1999:64; Keeton and Nijhuis, 2019:227). Keeton and Nijhuis (2019:228) also state that environmental challenges, including insufficient waste management and climate change threats, can arise because of the lack and quality of spatial planning. Jain and Korzhenevych (2019:1) states that the abnormal population and development growth, result in a lack of required infrastructure, lack of affordable housing with strain on bulk services. Existing spatial plans have instead intensified these issues in large urban systems.

Over time, according to Parr's (2017:156) Central Place Theory, a fundamental theory in spatial planning urban systems have become very complex and is not adequate anymore. Most regional research focuses on individual cities rather than the urban environment, ignoring the critical role of urban systems (Webb *et al*., 2018:57). Du Plessis and Landman (2002:55) observed that South African cities are among the world's most inefficient and unsustainable cities, which is also the opinion of the Gauteng City-Region Observatory (2021:1). The focus area of this study will be the Gauteng City-Region which has a largely unbalanced spatial framework.

Even though unbalanced spatial patterns have been a major focus area in research, the regions and their structures continue to experience unbalanced social, environmental, and economic development (Keetan & Nijhuis, 2019:228), despite various strategic spatial planning initiatives. This is a clear indication that the current systems are not an effective strategic spatial planning method. The Gauteng City-Region continues to expand drastically and, despite all these problems, still lacks an effective spatial development policy (Republic of South Africa, 2022:7). This research will focus on complex urban systems as a strategic spatial planning initiative.

1.2 Problem statement

The following problem statements are relevant for this study:

- An increasing unbalanced spatial development structure is developing in the Gauteng City-Region.
- The efficiency of existing strategic spatial planning instruments can be improved.
- Existing spatial planning initiatives do not consider urban systems as an effective spatial planning tool.
- A lack of research on large urban systems exists, especially in the southern hemisphere.

According to Du Plessis and Landman (2002:55) and the Gauteng City-Region Observatory (2021:1). South African cities are among the world's most inefficient and unsustainable cities. The Gauteng City-Region has a largely unbalanced spatial framework. Even though unbalanced spatial patterns have been a major focus area, the regions and its structures continue to experience unbalanced development, despite various strategic spatial planning initiatives. This is a clear indication that the current systems are not effective strategic spatial planning methods and there is clearly room for improvement in spatial planning. Changes in the spatial organization of settlements, particularly growing reliance on automobile transportation and land use segregation, are jeopardizing access to essential services and community support. The importance of urban and regional planning in improving the wellness of people and cities, the quality of life in the future is crucial.

> *"If planning were judged by results, that is, by whether life followed the dictates of the plan, then planning has failed everywhere it has been tried. No one, it turns out, has the knowledge to predict sequences of actions and reactions across the realm of public policy, and no one has the power to compel obedience." Wildavsky (1987:21)*

If cities and towns are to become more sustainable and habitable, they must be planned in a better way. At all levels, the endeavour to take an integrated approach to urban problems necessitates considerable policy and behavioural adjustments.

1.3 Research objectives

The primary goal of this study is to analyse and reflect on large urban systems as a strategic planning strategy in the South African Gauteng City-Region.

The objectives of the research are:

- Obtaining insight into an integrated approach of applied spatial planning and large urban systems.
- Determine various approaches to spatial planning on different levels in an urban system.
- To potentially address the spatial imbalance that exists between regions through functional analysis of Land Use Scheme.
- Analysing the theoretical nature of large urban systems.

1.4 Hypothesis

An urban systems approach potentially provides a more effective strategic spatial planning instrument for large South African city regions.

1.5 Research Methodology

The research methodology in this dissertation comprises of theoretical and empirical components, which finds application on various geographical scales, as specified in the international and national domains.

The overall strategy will become clear in Chapter 2 and the reader will grasp the importance of this study within its specific research paradigm and setting.

The pragmatism paradigm is a research paradigm that is founded on the notion that researchers use the philosophical and/or methodological approach that works best for the particular research problem. Since pragmatism bridges the gap between the two extremes, it allows for a more flexible and reflective approach to research design, making it the paradigm that is most appropriate for this study.

This study uses a clear statistical data analysis together with the interpretation, views, and observations of many planning researchers and case studies, therefore a mixed method approach is the appropriate approach. The best method for addressing "how" or "why" issues, when the researcher has little control over events, and when the focus is on a contemporary phenomenon in a real-life setting - according to Yin (1989:13, 1994:1,6,9) - is the use of case studies.

1.5.1 Literature Study

The aim of a literature study is to enlighten the researcher about the subject and to comprehend the literature before formalising an argument (Arshed and Danson, 2015:31). It is crucial to first evaluate the literature on the existing usage of regional planning instruments in spatial planning before considering the potential usefulness as a tool for spatial planning. During this research focus will be given to classic location theory, that focuses on the spatial distribution of economic activities (Richardson, 1973:73) and development theory. More recent views and critics thereof will be analysed in detail.

Minimal research on spatial planning in urban systems has been published in the South African context that causes scoping literature to be the ideal review developing insights on the topic. A scoping literature review is one of the first steps to gain insights into the development of studies where little research has been performed (Pham *et al.*, 2014:379). Urban studies in various countries will need to be investigated to comprehend insightful recommendations.

A few primary theories that will lead this study, but not limited to, is Bourne's (1997:339) research of functional urban systems in Canada, Berry's (2005:110) central place theory and his research on urban systems and spatial analysis and Glasson and Marshall's (2007:60) research on regional planning. The definition and investigation of an urban system, as well as the interaction of different systems, will be done through literature. The two theories of Christaller (1966) and Bourne (1975) will primarily be used in the study of urban systems.

Literature searches like Google Scholar, ResearchGate and Microsoft Academic will be used to ensure thorough research. Understanding the complexity of urban systems will become clear in consulting the following authors' research, to list only a few:

(i) Cities and complexity (Batty, 2005);

(ii) Self-Organisation and the City (Meyers, 2009); and

(iii) The dynamics of complex urban systems (Albeverio *et al.*, 2008).

Economic development goes through numerous stages (Rostow and Rostow, 1990), which is essential in this study. Settlement growth contributes to varied settlement sizes, which can be divided into distinct hierarchical orders (Zipf, 1949:573; Hirschman, 1958:217), leads to a focus on the interaction between these hierarchical orders, since the same services cannot be supplied to all (Berry & Horton, 1970:169).

1.5.2 Empirical Study

In the past, regional planning relied on a limited numbers of planning instruments for development. The goal of this study is to suggest a novel approach in which the urban system can be used in an integrative way to stimulate growth in strategically selected locations or nodes at different stages of development. The main goal is to show the use of an integrative approach to urban systems that can be used to foster regional growth on various geographical sizes. The existence of many geographical scales, causes theory and discussion to focus on several scales and stages of development.

According to Gauteng City Region Observatory data (2021:1), South African cities are among the most inefficient and unsustainable cities in the world (Du Plessis and Landman, 2002:55). The Gauteng City-Region has a largely unbalanced spatial framework, therefore the study concentrates the focus on the Gauteng City-Region.

Qualitative data was gathered from existing policy documents, as well as an assessment of the current situation of regional planning in urban systems. The qualitative approach has the advantage of providing more comprehensive information and a better insight into the study's comprehensiveness. Both qualitative and quantitative data are used in this empirical study. The qualitative data includes South Africa's regional development policies. This study's main focus was quantitative data, which comprised a variety of datasets. The quantitative information was pooled, compared, and visualized. On both dimensions mentioned above, development policies and strategic visions had a significant influence on the development of the specific region. Lessons learnt, best practices, and the present status quo were all considered in the study of developing growth policies and initiatives.

1.6 Structure of the study

- Chapter 1: Introduction

A basic introduction, problem statement, aims and objectives, research questions, research methodology and structure of the dissertation is discussed, giving a clear overview of the goal of the purpose and goal of the research.

- Chapter 2: Research Methodology

The research methodology in this study addresses the research context, research purpose and the research paradigm and explore the importance of the research on spatial planning in urban systems. The data generation, analyses and interpretation methods will also be discussed along with the relevant procedures that will be followed.

- Chapter 3: Urban Systems

A crucial chapter in the research, since it investigates the many hierarchies of settlements that have emerged as a result of settlement interaction. The relationship between hierarchy and efficiency and, the effectiveness of various hierarchies are assessed. The final part of this chapter is an evaluation of urban systems in order to identify the many levels and ways of interaction. The analysis of urban systems is of utmost importance since the main objective of the study is to increase regional resilience in different urban systems.

- Chapter 4: Regional Planning and Development

Chapter four focuses on regional planning and regional development, which includes the Core-Periphery model. Regional development as a spatial planning tool is discussed and shown on geographical scales. Development theory is discussed, as well as planning instruments such as nodes, corridors and regions. The importance of this chapter is that it to illustrates the result of the development that takes place between nodes. Finally, regional delineation is discussed.

- Chapter 5: Empirical Study: International Case studies

The result of urban systems in industrialized and emerging nations is investigated. The findings, limitations and recommendations are elaborated on in Chapter 8. Case studies is used to examine the geographical distribution of countries, as well as the policies that have been put in place to structure that distribution. Regions from Australia and Brazil with significantly similar features in South Africa will be analysed in terms of population distribution, economic characteristics, policies and legislations, and development objectives. The findings of the case studies will later is be compared to the findings of Gauteng City-Region in chapter 7.

- Chapter 6: Case Study: Gauteng City Region South Africa - policies and legislation

The focus is on national policies of South Africa. The effect of implicit and explicit policies will be the subject, with a concentration on specific areas in South Africa The economic development and well-being of a region is used to determine the effectiveness of a policy. The South African

economy, as well as the geographic distribution and the relevant policies to promote regional planning, will receive particular attention.

- Chapter 7: Case Study: Gauteng City Region South Africa

The analysis of South Africa's spatial distribution will be followed by a shift in size, or a focus on a regional level. The Gauteng City-Region will be assessed in terms of its key economic sectors, spatial distribution, and policies in place to improve regional development and overall regional resilience. In the final chapter, the results of these spatial distributions, as well as policy design and implementation, will be of utmost importance.

- Chapter 8: Discussion and Recommendations

The main conclusions from the literature as well as ideas generated from the actual study will be summarised in this final chapter. To increase the efficacy of policies in South Africa that support spatial planning within the larger urban system, a number of recommendations and suggestions is based on the the concepts and results acquired through research based on the literature and case studies.

CHAPTER 2: RESEARCH METHODOLOGY

2.1 Introduction

The orientation, problems, aims, and objectives of the study as well as the hypothesis were briefly described in the preceding chapter. These served as an overview of the research, the importance thereof, what to expect, and how it fits into the larger picture of current regional planning. With these components making up the research orientation, it's important to understand the research strategy, which includes the framework and paradigm through which the study objective is seen, as well as the fundamental reasoning and sources that relate to the research subject.

According to Kothari (2004:3) the primary goal of research is to uncover the truth that has been concealed and is yet to be discovered. Leedy & Ormrod (2011:68) further explain research as the process of gathering, evaluating and interpreting data in order to comprehend a phenomenon. Rajasekar *et al.* (2013:2), defines research as *"a logical and systematic search for new and useful information on a particular topic".*

Sahay (2016:1) is convinced that, like peeling an onion, young researchers should work their way from the outer to the inner layers of the study onion. The processes necessary in creating a research effort are shown in Figure 2-1, which was prepared by Saunders *et al.* in 2007. The stages of research are described in great detail in the onion. Its usefulness comes from the ability to be applied in a variety of settings and to nearly any research methodology (Bryman & Cramer, 2012:10).

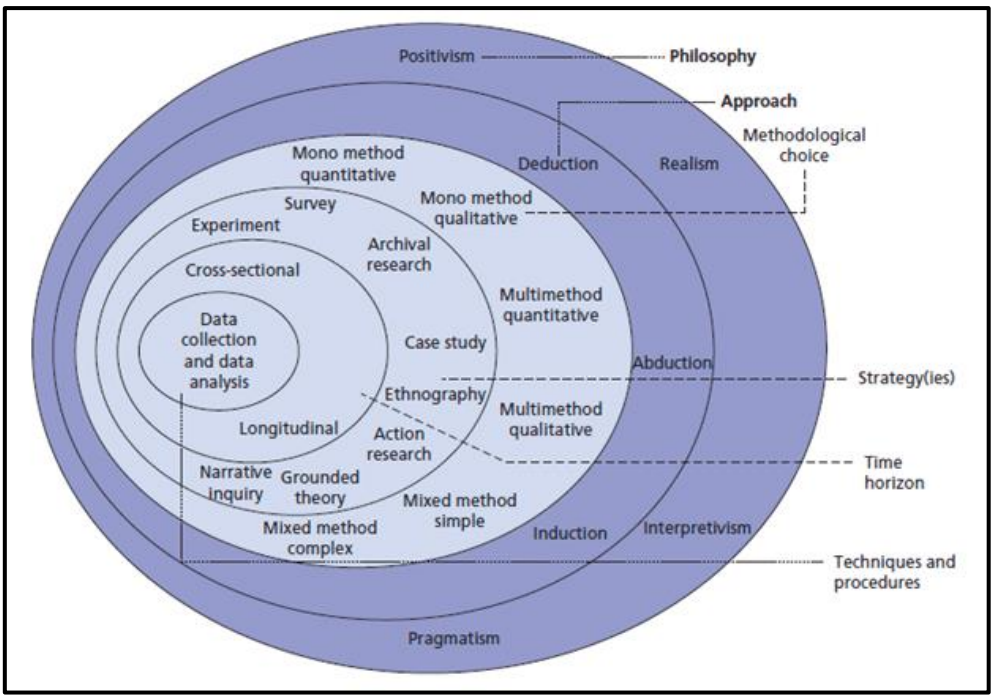


Figure 2-1: The research onion

Source: Saunders *et al.* (2007:130).

The Research Onion displayed in Figure 2-1, consists of 6 layers: research philosophy, research approach, research strategies, a research focus, a research time frame, and techniques and processes. Each layer needs to be removed one by one in the building of the research process. In this chapter the researcher will analyse the first four layers of the research onion as per Saunders *et al.* (2007:130), followed by the research context and research purpose, to fully comprehend the process of this research.

2.2 Research context

The previous chapter's discussion of research orientation provided an introduction and guideline putting the study in context and forming an idea of the research objective. By examining the challenges, objectives, and goals outlined in chapter one, it is clear that the research is mostly theoretical in nature, but also with a clear practical applicability.

In this study, regional planning theory served as a reliable guide for the researcher in the attempt to construct a general explanation of the relevant theoretical subjects outlined in chapter one. The goal of this study was to present a different spatial initiative by combining theoretical and empirical contexts. Verma and Mallick (1999:6) states that the major purpose of theoretical knowledge is to lead the researcher through the investigation, which is confirmed in this study. Best and Khan (2006:10) disagrees with this statement and views theory as nothing more than an attempt to find a broad explanation for a specific occurrence.

This study was conducted based on the *pragmatic* research paradigm. The diverse aspects of the study arose from regional planning interests in various shared meanings, descriptions, and tools suitable to the profession's field. Pragmatism incorporates a variety of hybrid methodologies in order to comprehend human behaviour (Kivunja & Kuyini, 2017:35). The aim of the study is to support in confronting the concerns of the experience, and getting to know the world in a practical way. Pragmatism offers a framework that is based on experience and is action-oriented (Hothersall, 2019:864). Therefore, practical expertise in social work research may offer theoretical understanding. According to Kelly and Cordeiro (2020:8) pragmatism is an especially effective paradigm to use as a guide in research that aims to improve practice and policy while adhering to the quality-driven rigors of academic research, which is the goal of this study. Pragmatism is beneficial in the entire study process. It is used for the research to be flexible and adaptive throughout the study process with iterative inquiry, experience, knowing, and acting as suggested methods to improve the usefulness and worth of research initiatives (Kelly & Cordeiro, 2020:9).

The first half of the study topic created the expectation and interpretation environment of a distinct theoretical notion that applies to the investigation, viz *spatial planning*. This pertains to the philosophical framework under which the research was conducted, by examining and analysing the many perspectives on the theory in this study. The section of this dissertation topic titled "...in large urban systems" points the reader to a distinct practical objective and impact based on the theoretical underpinnings.

2.3 Research purpose

The purpose of this study is exploring the effectiveness of urban systems as a spatial planning initiative. Exploration study is suitable for this research as the study in South Africa is relatively new. The research is intended to be *formative* in nature, with a variety of formal stages and methodologies followed during the study. According to Biesta (2010:100), pragmatism is not just a philosophical viewpoint but also a set of practical philosophical instruments for dealing with problems. A research paradigm known as pragmatics focuses on finding workable solutions to real-world issues. It emerged as an approach to research for more practical researchers (Creswell & Clark, 2011:120; Maxcy, 2003:162).

The regional planner can estimate this potential contribution by thoroughly examining the role of urban systems as a spatial planning instrument using the topic-specific information and observations provided by the researcher. Clear parts of the research design (covered later) appeared during the discussion on the research setting and purpose. To proceed deeper into the thesis and the general strategy, it is vital to grasp the features of the research design and determine the accurate incorporation of the design in twentieth-century regional planning.

2.4 Research philosophy

Research philosophy, according to Kuhn (1962:23), is both an "established model or pattern" that serves as an organizational framework, and a more in-depth philosophical perspective on the nature of social phenomena and social systems. Any investigation's foundation is its research philosophy, which outlines the set of assumptions it is built upon (Saunders *et al.*, 2019:130; Phair & Warren, 2021:1).

To meet the study's aims and objectives set out in Section 1.3, pragmatic philosophy is used in this study. To emphasise the use the four research philosophies (positivism, critical realism, interpretivism and pragmatism) are briefly explained, where it becomes clear that a pragmatic approach is most suitable to reach the study's aims and objectives.

Positivism philosophy is referred to as a scientific way of study, and it is commonly employed to find the causes and effects of many phenomena. It is commonly utilised in research as a worldview since it tries to understand observations using facts or quantifiable entities (Kivunja & Kuyini, 2017:30). In this paradigm, research is based on hypotheses being formed, ideas being tested, and recommendations and conclusions being offered. This paradigm aims to foresee and explain a phenomenon based on the measured outcomes. This philosophy as basis does not fully succeed in comprehending and, meeting the aims and objectives of this study.

The Critical Realism philosophy is defined by Kivunja and Kuyini (2017:35) as a study that focuses on social concerns and aims to solve economic, social, and political problems. This paradigm aims at political transformation while addressing social injustice, enhancing spatial justice through participatory research. The aforementioned challenges frequently lead to political conflict, which, also, does not completely satisfy the philosophy as suitable for this study.

According to the interpretivism philosophy, reality can only be fully comprehended by subjective interpretation and intervention. According to Chalmers *et al.* (2009:1) the goal of this philosophy is to comprehend the subjective field of social sciences. This methodology focuses on the way a person thinks and interprets several concepts, and it tries to comprehend the perspective of the person being researched rather than the researcher's perspective.

In order to obtain answers to the topics being investigated, pragmatic research designs contain operational judgments based on "what will work best." This enables pragmatic researchers to conduct research in novel and dynamic ways to find solutions to research challenges. As a result, to comprehend human behaviour, this philosophy incorporates a variety of hybrid methodologies (Kivunja & Kuyini, 2017:35). This paradigm is relevant when researchers determines their own associations in order to meet the study's aims. Since no single reality exists, this paradigm allows

researchers to combine quantitative and qualitative methodologies to create their own interpretations of reality.

A research paradigm known as pragmatics frequently relates to multi- or mixed-methods research (Biesta 2010:100; Creswell & Clark 2011:130), used in this study (refer to Section 2.6). Pragmatism's fundamental objective is to approach research from a practical perspective, where knowledge is continuously questioned and comprehended rather than being fixed (Phair & Warren, 2021:1). In this study information regarding spatial planning, urban systems, regional planning and policies implemented for spatial planning is being questioned and studied to fully comprehend the advantages and disadvantages, making the pragmatic approach the most suitable to use.

Viewed as a paradigm, pragmatism avoids the challenging questions of truth and reality and admits philosophically that there are various, distinct realities that are open to empirical investigation, and thereby concentrates on finding solutions to issues in the "actual world" (Creswell & Clark, 2009:20-28). As a result, pragmatism is not bound by (or limited by) any single ideology & therefore the researcher is led towards a pragmatic philosophy by the interventions of the application and role of urban systems as a spatial planning tool. According to Creswell and Clark (2011:11), many forms of pragmatism can be found in social research of the built environment. Feilzer (2010:8) states that pragmatism bridges the gap between the two extremes, allowing for a more flexible and reflective approach to research design making this paradigm the most suitable for this study.

It is thus clear that pragmatism is the most appropriate philosophy to reach the aims and objectives in Section 1.3.

2.5 Research approach

> "Your research approach is the broader method you'll use for your research – inductive or deductive" – (Phair & Warren, 2021:1).

Inductive approach entails forming predictions about new situations based on previously acquired information (Hayes *et al.*, 2010:278). Inductive tactics include developing theories from research rather than commencing with a theory as foundation. (Phair & Warren, 2021:1). The goal of inductive inquiry is to create a theory (McCombes, 2019:1).

Conversely, deductive methods begin with a hypothesis and use research to either support or refute it. (Phair & Warren, 2021:1). McCombes (2019:1) states that the goal of deductive research is to put a theory to the test.

Unlike inductive and deductive reasoning, abductive research can be used to understand, develop, or modify a situation. Abductive reasoning is a practical strategy for enhancing the social sciences through a procedure of "systematic combining" in academic research, as indicated in Dubois and Gadde's model below (Figure 2-2). This study will mostly employ this research methodology.

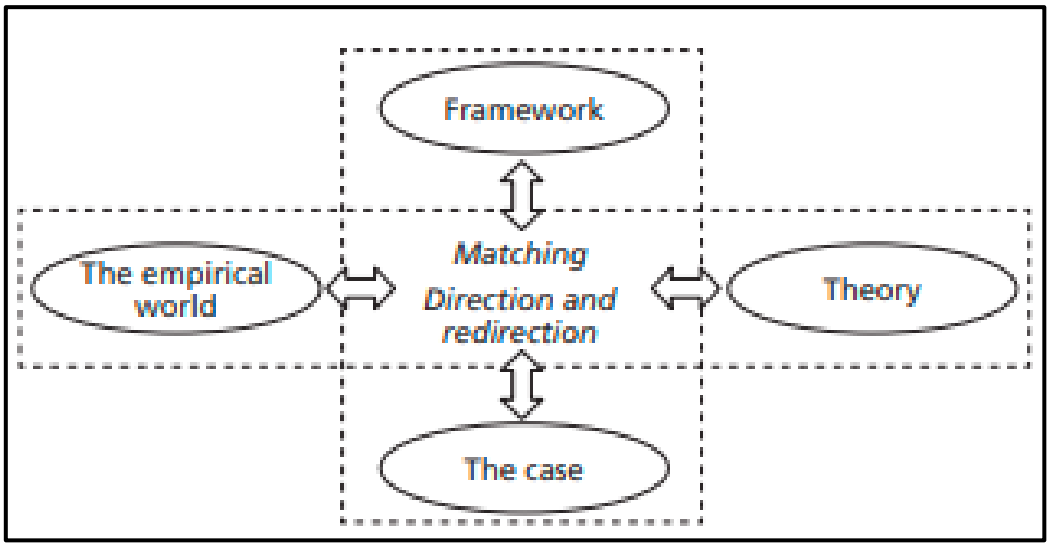


Figure 2-2: Dubois and Gadde's model.

Source: Dubbois & Gadde (2002: 555)

2.6 Methodological approach

Quantitative research focuses on numerical data, while qualitative research, on the other hand, is concerned with textual, visual, or audio-based data, as claimed by Phair and Warren (2021:1). While the quantitative approach provides an unbiased evaluation of reality, the qualitative approach aids the researcher in exploring and leading to a better understanding the complexity of the specific phenomenon. While these approaches are still being used for research, many academics and researchers from various disciplines are turning to mixed method research as a methodological option. Both quantitative and qualitative research methodologies analyse and investigate various knowledge claims in order to address a particular type of research question.

According to Tashakkori and Teddlie (1998:61) an insight on different levels of analysis can be obtained by combining quantitative and qualitative approaches. This research will mainly use a qualitative research approach in the form of case studies, but quantitative research will also take place when using empirical data like population sizes, causing this study to use a mixed method research approach.

This study uses a mixed method technique therein that it combines statistical data analysis in combination with the interpretation, judgments, and observations of several planning researchers.

2.7 Research design

2.7.1 Case Study Research

Yin (1989:13, 1994:13) describes a case study as an empirical investigation into a current occurrence in its real-world context, involving numerous sources of information. Case studies are utilised in a variety of contexts as a research approach (Yin, 1989:13, 1994:1):

- research in policy, political science, and public administration,
- sociology and community psychology,
- management and organizational studies,
- research on city and regional planning, as well as
- the conduct of social science dissertations and theses.

The best method for addressing "how" or "why" issues, when the investigator has little control over events, and when the focus is on a contemporary phenomenon in a real-life setting, according to Yin (1989:13, 1994:1,6,9), is the use of case studies. It is crucial to include the social context and culture when conducting case study research, which means that this kind of study is virtually always qualitative and usually inductive (Phair & Warren, 2021:1). Case study research has the distinct advantage therein that it can deal with a wide range of evidence, allowing an inquiry to maintain the holistic qualities of real-life events (Yin, 1989:14; 1994:3). Having these advantages, case study research is the best tool for capturing the complexities of organizational phenomena (Yin, 1989:12; 1994:2). One of the benefits of using the case study research approach is the ability to observe and investigate phenomena in their natural environment. An important component of Information System research is to capture the context. Benbasat, Goldstein and Mead (1987:371) also recommend using the case study approach in research.

On the other hand, the likelihood of questionable evidence or prejudiced viewpoints influencing researchers' findings and conclusions has been a major issue about the appropriateness of case study research (Yin, 1989:21; 1994:10). While bias can creep into other types of research, using case studies in research has the potential to be more problematic. However, there are a number of approaches that can be employed to alleviate these worries.

The built environment as a whole lacks a unique research design to use and instead "borrows" designs from social science disciplines, claim Du Toit and Mouton (2013:126). The intricacy of the research is increased by the fact that regional planning is only one aspect of the built

environment. Despite their complexity, research designs are critical in understanding and conducting research in this particular sector.

Multiple case studies were deemed necessary in this study in order to demonstrate the potential contribution of regional planning on both a national and international/subcontinental scale. The study's central problem was contextualized within these various case studies and the related policies. Multiple case studies were used to diagnose the geographic level that the comprehensive investigation is applied to. This assisted in the identification of areas where more detailed investigation and evaluation was required. The use of multiple case studies enhances the applicability of the study and may lead to future expansion and use of the study to a greater variety of themes and geographical areas. Pragmatism paradigm and case studies both are mainly used in social sciences and is therefore applicable to this research.

This study demonstrates how a regional planning process can employ an urban system as a spatial planning tool. A formal urban system should thus be formed when doing strategic regional planning.

2.8 Conclusion

The main objective of this chapter was to demonstrate to the reader the research's paradigm structure, methodology, and justification of strategies used. The significance of this study within its particular research paradigm and context was clarified. What to expect in terms of the overall strategy, by having a thorough comprehension of the research procedure was also addressed. The outline of the research framework employed in this study is shown in the picture below.

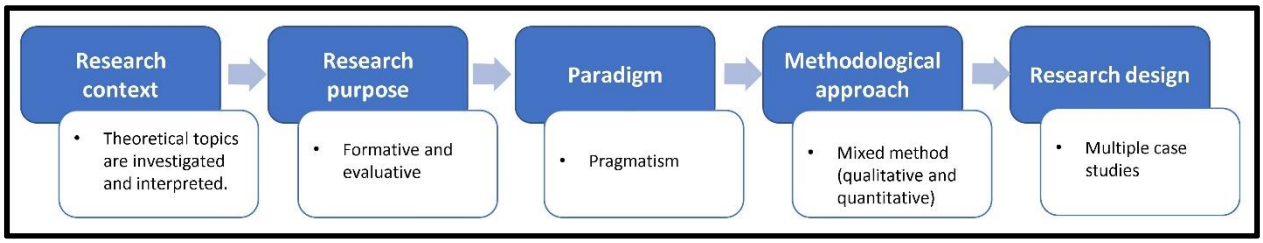


Figure 2-3: Outline of the research methodology

Source: Own compilation

The next chapter focuses on different opinions and views regarding urban systems and the relation to spatial planning. Urban hierarchy and different levels of urban systems will be explained which is important to understand the research, especially the eventual recommendations.

SECTION 2: LITERATURE REVIEW

CHAPTER 3: URBAN SYSTEMS

3.1 Introduction

An urban system is defined as a collection of spatially connected cities that perform complementary roles in proportion to their sizes and types (Shi *et al*., 2020:2). Understanding urban systems is crucial since there are various nodes within a region, and their significance and importance vary, depending on the services and specialisations they provide, as well as population growth. Chapter three forms part of the theoretical investigation where different studies and theories regarding urban systems will be discussed. The study's major goal is to potentially improve spatial planning in urban systems; hence the critical analysis of urban systems. This chapter serves as the starting point of this research. It is crucial to analyse the fundamental ideas of spatial planning in order to comprehend the significance of urban systems and how they can be used as a tool for spatial planning.

The theoretical framework of this research, in this chapter, examines urban systems and the urban hierarchy. Components like the interaction and dynamics of an area's urban hierarchy are the main topics of this section on urban systems and urban hierarchy. The construction of an urban hierarchy in urban systems could show the spatial planning tools. while urban systems might be connected in an integrative regional planning strategy. The economic growth and habitability of any specific place are heavily influenced by the efficiency of the urban system.

The first sections of this chapter deal with urban systems, which are utilised to show regional interaction, and emphasise the importance of the urban hierarchy. In the analysis of the urban system, it becomes evident that it could be employed as a spatial planning tool.

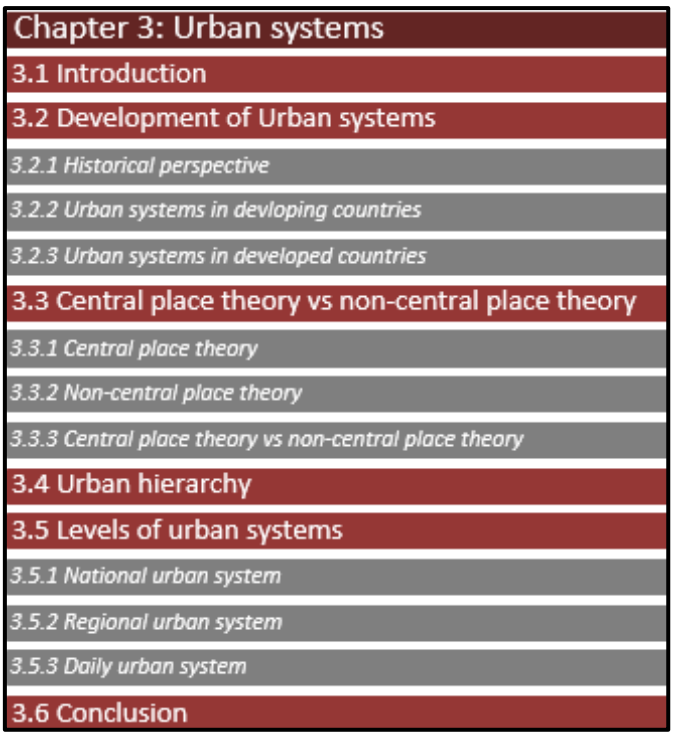


Figure 3-1: Chapter 3 outline

Source: Own compilation

3.2 Development of urban systems

3.2.1 Historical perspective

The functionality and interaction of the urban system are what ultimately determines a region's growth and development. Main nodes and minor nodes constantly interact with each other in order to assure a region's growth, development, and operation. The system that connects a region's communities or nodes ensures that core nodes receive support and inflow from lesser towns, and vice versa. This guarantees a mutually beneficial partnership. Several authors, like Pred (1977) and Smailes (1971), focus on the urban system's concept, functionality, and the impact on regional development. In this section opinions and theories on the urban system will be examined.

Duncan *et al*. (2013:46) coined the phrase, "*urban systems"*, as part of an effort to impose a functional organisation on the United States metropolitan areas. According to Smailes (1971:1) and Maksoud (2003:1), urban systems are identified as the *"intelligible wholes for urban studies".* Regional geography, traditional macro-scale urban studies, and regional economics all contribute to the concept of an urban system (Simmons, 2019:2). Pred and Kuklinski (1977:310) further argues that an urban system is a collection of cities that are interrelated due to economic fluctuations, information diffusion and interchange, and the flow of products, capital, and people.

Parr (2017:151) states that cities do not exist in isolation; instead, they are part of a larger urban system. Bourne and Simmons (1978:15) define urban systems as *"a collection of interdependent cities that make up a region or a country."* They (Bourne & Simmons, 1978:16) further argue that to examine a city, is not enough to have a basic understanding of its changes. The city should rather be viewed as a system that generates growth and development patterns.

Simmons (1981:136) and Marshall (1989:2) determined that the set of urban centres above a practical threshold of population size within a given region, constitutes the essential feature of an urban system. According to Christaller (1966:16), another characteristic of an urban system is that all of its cities are arranged in a nested hierarchical structure. The core city or cities of high-order functions is at the centre and smaller cities of low-order functions at the periphery. Hamlets, villages, towns, or even cities are interconnected and interact with one another This concept will be discussed in Section 3.4 to understand the different tiers of hierarchy identified at national and regional levels.

Berry (2005:160) and Pred (1997:90) established the concept of 'Urban Systems Theory,' which defines 'urban systems' as functionally linked groups of cities. Pacione (2009:121) refers to a group of towns and cities that are interconnected in such a way that any major change in population, economic vitality, employment, or service supply in one system has ramifications in the others. Van Aswegen *et al.* (2019:122) states that the distribution of production and consumption centres determines the organisation of urban systems. Like every other system, an urban system has a well-defined pattern. It is a system made up of various components, each of which can alter and affect the system as a whole. That is, when changes take place inside the urban system, it has an impact on both people's activities and other areas of the region. Urban systems are constantly changing (De Goei *et al*., 2010:1450), therefore people's lives will constantly be influenced.

Van der Laan (1998:224) divides urban systems into three types - illustrated in Figure 3-2 - that can be linked to Central Place Theory. The various categories can be understood as stages in a development influenced by changes in economic structure. As a result, shifts in a region's economic structure, will result in urban system shifts as well.

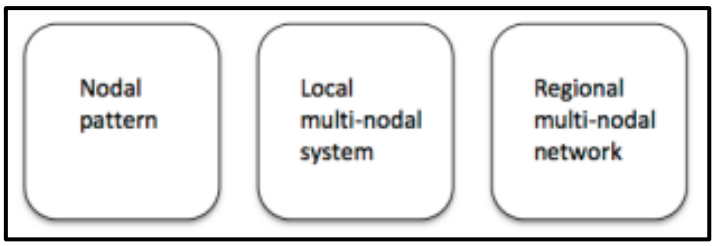


Figure 3-2: Forms of urban systems

Source: Van der Laan (1998:224)

Looking at the above, it is clear that:

- The nodal pattern is the classic hierarchical model, in which towns are concentrated in central towns and cities.
- At the top level, the Local Multi-nodal system demonstrates the opposite of hierarchical structure. Although the hierarchical structure remains dominant, there is an increase in horizontal, non-nodal towns, notably at the local level. These towns become more symmetrical.

The framework wherein all urban settlements are arranged and interact in terms of size and function, is referred to as the urban system, according to Maksoud (2003:1). No urban settlement can be studied independently from the surrounding urban system. Friedman (1986:21) and El-Shanks (1984:335) recognises that the city could not be analysed separately from the urban system because of the close ties between the two regional planning theories. Renaud (1981:16), first conclusion is that a city's size correlates with its place in the urban hierarchy. The second conclusion reached by Renaud (1981:16) was that a city or settlement's function is influenced by both its size and its participation in the overall growth and development of the region.

Undoubtedly, urban systems have been an intriguing and well-liked research topic. Over time, more established and older urban systems became the foundation upon which new, modern urban systems are developed. For instance, older European regions and cities are much more complex than urban systems in Sub-Saharan Africa (Blackman, 1995:337). As a result, urban systems developing countries are probably going to be different from those in developed countries (discussed in section 3.2.2). The older and more entangled the urban system is, the more difficult it is to determine the dynamics and current hierarchy (Maksoud, 2003:2).

3.2.2 Urban systems in developing countries

Globalisation does not only have an economic impact, but also an impact on a multidisciplinary level. Both developing and developed countries' urban systems are not immune to these effects

(Maksoud, 2003:1). Unable to manage and reap the benefits of new economic and urban space values, brought about by foreign investment, is one of the problems that emerges frequently in the cities of developing countries.

One of the main issues raised by Maksoud (2003:1) is that emerging country urban systems face the rapid rate of urbanization brought on by new job possibilities in cities. In addition, is the contribution of continued migration between rural and urban areas, and urban concentration and congestion in only one or two key nodes across the nation. All of these problems result in an unequal regional organisation across the nation, with a significant gap between higher ranking hierarchy nodes, as well as other inferior nodes. Such lopsided policies led to the emergence of unbalanced urban systems.

Makoud (2003:2) further states that few emerging countries, such as Korea, Brazil, and Yugoslavia, have witnessed polarisation reversal and more balanced and dispersed urban systems. In contrast, the vast majority of developing countries continue to struggle with unbalanced and overconcentrated urban systems. The turning point in a region's spatial pattern of growth and development is referred to as polarisation reversal (Richardson, 1973:23). This shift in the spatial pattern is the result of a decline or complete cessation of concentration in metropolitan areas, at which point deconcentration starts happening (Keen & Townroe, 1981:1). As a result of this phenomena, urban systems in developing countries stay simple and focused, whereas urban hierarchy develops in a more spatially imbalanced manner in these circumstances.

Globalisation and foreign investment often provide challenges for unbalanced urban systems that have not yet undergone the process of polarisation reversal (Botha, 2018:117). In order to identify the factors that contribute to the development of urban systems in developing countries worldwide, Maksoud (2003:2) researched the impact of a country’s inability to handle and incorporate external investment, polarisation reversal, or change in spatial pattern. This study set out to uncover not just the factors influencing the urban system, but also those that might affect the growth of urban systems in the future, with nations moving through various stages of development.

In emerging countries, a fundamental issue is to strengthen the function of urban networks as economic growth engines (Gilles, 2015:40). Many developing countries' urban systems frequently functions as a hindrance in the process of economic expansion. The transformation of these countries' urban systems into economic growth engines is therefore a considerable task. Maksoud (2003:3) projected the future of the urban system, influenced by four major factors, as follows:

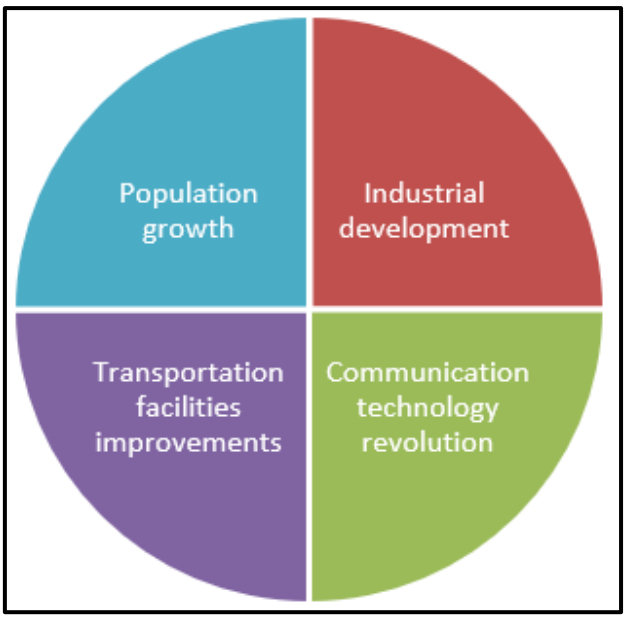


Figure 3-3: Four major factors which influence the future of the urban system

Source: Own compilation

According to predictions, the global urban **population** will surpass 5 billion by 2025, with over 90% of the population living in developing countries (Faraji *et al.*, 2016:34). Applying the historical growth rates, developing countries should see a huge increase in population. The declining significance of agriculture, causes **industrialisation** to be responsible for meeting the needs of the growing population. The information and processing industries will rise significantly (Maksoud, 2003:3). The extraordinary advancement of the **transportation** infrastructure had a significant impact on the sense of place (Maksoud, 2003:3). Large urban agglomerations, based on highly efficient transportation systems, will emerge, with modern, rapid, and secure untraditional transportation infrastructure connecting regions and sectors of cities (Maksoud, 2003:3). The information and **communication** revolutions are the dominant aspects of the twenty-first century (Maksoud, 2003:3). Depending on the efficacy of remote sensing and communication infrastructure, urban communities are likely to become more isolated and segregated (Maksoud, 2003:3).

Changes in national or regional spaces affect each of these individual urban centres in different ways.

3.2.3 Urban systems in developed countries

Hodge (1967) concentrated his work on urban systems using a number of independent investigations of the American urban system. He concluded that the following key dimensions have an impact on the urban system:

- the magnitude of the node in the region, both in terms of population and economics;
- residents' socioeconomic characteristics;
- population and family structure;
- the population's mobility and fresh growth; and
- ethnic diversity; and the node's location within the national spatial economy.

Hodge (1967:101) recognized the importance and impact of the labour force and employment, and linked it with the unique roles and categories of nodes in an area. The towns that play a significant role in government administration, manufacturing, mining, college towns, trading centres, and military towns were all recognised. The phases of Rostow's economic development (Rostow, 1960) can be connected to Hodge's (1967:120) findings in this regard (section 4.3.1).

According to Roberts (2014:11), there are significant differences between urban systems in developed and developing countries, which contribute to economic development. These differences include the lack of connections and relationships between primary-, secondary-, and tertiary-level cities in the national, regional, and global contexts. Roberts (2014:111) finds that urban systems in industrialised nations and regions are significantly more stable than urban systems in fast-emerging countries and territories due to continual innovation and modernisation.

3.3 Nodal development

According to a recent study by Dawkings, the theoretical underpinnings in the central place theory are useful for comprehending the spatial organisation of retail and services, and the theory's content is widely applied because it covers a wide range of relevant activities (Dawkings, 2003:137,155).

A description of both central and non-central areas can be found in this section. Understanding the differences between central and non-central places is crucial because it will have a substantial impact on the study of resilience in urban systems, which can include either central or non-central areas, or even both in some instances.

3.3.1 Central Place theory

The Central Place Theory (CPT) developed in Southern Germany was introduced by Walter Christaller in 1933 and has since become a major theory in urban and regional planning. According to this theory, each central location in an area reflects a specific function in a hierarchy of places. The central-place theory aims to explain how settlements are positioned in relation to one another, how much of the market a central location may dominate, and why certain central locations are hamlets, villages, towns, or cities (Altaweel, 2020:1). Since the 1950s, this theory has been used to fit and explain urban systems in many locations by focusing on the links between urban ranks, functions, and quantities (King, 1985:12), as displayed in Figure 3-4..

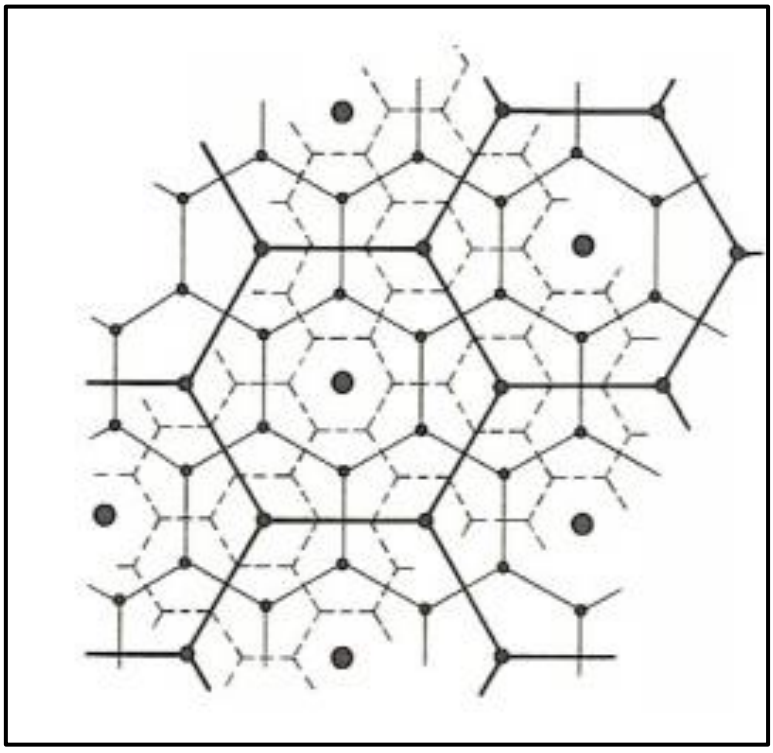


Figure 3-4: Christaller's Central place Theory

Source: Christaller (1966:18)

The central place theory is determined by a number of elements, including population, social structure, financial well-being, and product demand. According to Christaller (1966), the spatial pattern is determined not only by agriculture or industry, but also by the location of the service sector and the domicile of the customer. The necessity of settlements is because activities may be carried out more effectively when they are concentrated rather than dispersed, . Therefore, cities and their core areas contain a specific service area. The economic theory called the central place hypothesis forecasts the establishment of the best settlement patterns based on spatial competition (Christaller, 1966).

Meijers (2007:250) argues that network theory should take the place of the central place theory because it more accurately describes the functioning of a central location in an area. Central places are part of a network or hierarchy of locations. On the other hand, Godfrey (1999:585) defends the application of the central location theory by emphasizing that it only applies to internal demand for goods and services.

Although all regions have some nearby centres, higher-order centres are found in larger towns, which meet the demands of the population, as opposed to smaller towns where needs are not always met (Christaller, 1966). The location and size of a central location are determined by the quantity of services and functions provided. (Christaller, 1966:18). According to Christaller (1966:19), the best position of a town is in the midst of a region, which he defines as the *"centrality of a central place"*. Taylor, Hoyler and Verbruggen (2010:2803) states that the central place theory is a depiction of a spatial hierarchical arrangements of settlements (discussed in section 3.3). Knitter (2013:8) corroborates this by stating that higher-order places perform all of the activities of lower-order places while also providing extra functionalities not available in lower-order locations.

The central place theory was put to the test by a number of people in an attempt to improve and refine Christaller's views. August Lösch (1954:520) proposed the best reformulation, in which he reconstructed the central place theory utilising fundamental economic principles to refine the theory. Lösch (1954:520) argued that the rigid hierarchy of the central place theory was excessively constricting and recommended a more complicated bottom-up structure that took geographical factors in economic zones into account (Mulligan *et al*., 2012:408). A service area forms around a central location with all of its operations, providing assistance to the local population and communities. To access its services, people from the surrounding service area will also travel to the central location. Christaller (1966:22) recognized this notion and stated it as follows *"An economic distance is determined by the costs of freight, insurance, and storage; time and loss of weight and space in transit; and as regards passenger travel, the cost of transportation, the time required and the discomfort of travel."*

3.3.2 Non-Central place theory

Christaller's central place theory was founded on the idea that geographical areas are uniform. Non-central places, according to Geyer (1989:379), are youthful, underdeveloped central places. The arrangement of natural resources, according to Hoover (1948:3, 4), is the most obvious basis for the dispersion of enterprises and people. In the case of non-central locations, there is a growth imbalance in the region (Hansen, 1977:8). Prior to the industrialisation process, central places were frequently categorised as non-central places during the industrialised age. It was also seen

as a symbol for young, underdeveloped urban areas (Geyer, 1989:386). Non-central locations emerge in regions as a result of a primary economic sector activity, such as natural resource extraction (Richardson, 1973:170).

The town's non-central location can be explained by outlying places. Compared to the regional spatial system, these sites may play a fairly central function in the immediate surrounds, yet they can be termed non-central places (Knitter, 2013:8). Non-central development is distinct and has a variety of reasons for its existence. As a result, significant preparations must be made to assist with the industrialisation of these areas. The developments would thus be more long-term. Non-central locations are typically smaller than normal, and have a lot of room for growth. Although the size and nature of an economy determine whether a non-central site exists, it does not always play as important a role in the larger regional economy as the economy in a central location. Site constants offer a range of possibilities that aids in the existence of a non-central site, such as a nearby fixed natural resource (Weber, 1909:33).

The structural extension of urban systems, which can be gauged by the number of economic activities or population growth, is what is referred to as the growth or development of an urban system (Berry & Horton, 1970:200). The national system can be seen as the industrialisation of the nation's economic system as a result.

3.3.3 Central place theory vs Non-central place theory

The major distinction between central and non-central locations is the position in the region's hierarchy of locations. Central locations are large locations that are typically placed at the top of a region's hierarchy. Non-central locations are thought to be less significant and smaller, and are typically found at the bottom of the hierarchy (Christaller, 1966:69).

Non-central areas primarily provide people with basic needs and have limited services and functions. In contrast does central locations offer a wider selection. Agglomeration benefits are only provided by a small number of existing enterprises in non-central areas, although greater opportunities for investments and the launch of new businesses in central locations exist. The population of central locations generally exceeds that of non-central locations (Richardson, 1973:53). In terms of goods, services, job opportunities, and other factors, central places have much more to offer. Huge businesses are present, which leads to greater and more career opportunities. It is inevitable when more people, more services and products, and better credentials are concentrated in key areas, that both the supply and demand of services and goods will rise. Demands for these goods and services, as well as suppliers, have an immediate effect

on the economy. Non-central place theory was thus created as a quest to understand the evolution of central places.

Richardson (1973:53) compares the differences between central and non-central locations (refer to Table 3-1).

Table 3-1: Central Place and Non-central place theory

	Central Place	Non-Central Place
Hierarchy	Normally in the top of the hierarchy in the district.	Lower in the hierarchy in the district.
Services	Many services and functions in the city.	Limited services and functions.
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 Richardson (1973:53)

The degree of interaction between distinct nodes is critical to the city's development and progress (Lane *et al*., 2009:123). As the city continues to expand and grow, it will be able to advance in the urban hierarchy and fulfil its particular position and specialisation in the urban system (Beckmann, 1958:245). Therefore it is difficult to envisage a region's nodes in isolation. Instead, it should be imagined as a link or brick in the urban system's network. At the regional level, a separate urban hierarchy and urban system can be identified. Transportation corridors and economic activity are just two of the characteristics that enable interaction between these numerous nodes (Alcácer & Chung, 2009:1749). It is quite easy to determine this urban layout at the regional level (Berry, 2005:147). It's not apparent how these primary nodes are maintained by the intermediate level of

subsets of nodes at the sub-regional level, and therefore the focus area for this study, Gauteng-City Region, can be categorised as a central place location.

3.3.4 Urban area

An urban area can be categorized as a central or non-central location, as explained in sections 3.3.1 (central places) and 3.3.2 (non-central locations). It was also underlined that economic activity, whether it is the availability of natural resources or the provision of goods and services, results in both central and non-central areas.

A general theory of location based on theoretical principles that could be used in any circumstance was proposed by Weber (1909:127). He claims that the location of an industry is chosen to cut down on time, effort, and transportation costs. Weber also put forth three presumptions regarding the geographic system. Most important is the location of raw materials, then the size and location of the market, followed by a few set locations for manual labour (Weber, 1909:129). In conclusion, Weber states that a successful business should be situated close to resources to cut transportation costs.

An urban area is described as a geographic area where people are primarily concentrated around non-agricultural activity (Weeks, 2010:34). Size and density of an urban area are influenced by a number of variables, such as the population density, economic and social organization, and the change from natural to build environments (Weeks, 2010:43).

3.4 Urban Hierarchy

To better understand the dynamics, linkages, and results of interaction between nodes or communities in a region, the urban system was studied in the preceding section. Throughout this research, it became clear that a region's urban system was directly impacted by the rank and number of settlements or nodes (Alcácer & Chung, 2009:1750). The rank and size of a settlement within a region or urban system is one of the most significant factors affecting the growth and evolution of a territory.

New approaches of comparing cities and towns emerged in the 18th century, focusing on population and urban functions (John, 2012:4). Walter Christaller's landmark study in 1933, which gave rise to central place theory, is typically credited with the contemporary concept of a city hierarchy (John, 2012:4).

Extensive research by urban geographers, economists, regional planners, and socialists have been influenced by the concept of an urban hierarchy among specific cities and towns. The urban hierarchy of a region refers to the number and dispersion of the urban population (Zipf, 1941:33).

Urban hierarchy is a complicated system also influenced by factors other than population number and dispersion. According to Christaller (1966:18) and Lösch (1954:520) the order of a city is established by the range of services and products available in the specific city. Alnsour (2016:94) states that the combination of numerous social, economic, environmental, and cultural elements creates a complex object, with important feature properties such as spatial pattern and population scale. According to Arise (2021:1), the urban hierarchy notion assumes that the population sizes and economic functions of urban areas vary considerably.

Taylor *et al*. (2010:2803) states that *"hierarchies have been the traditional basis of understanding external urban relations"*. They are claiming that intercity relations are more than just hierarchies (Taylor *et al*., 2010:2807). Regional urban systems in the Roman world are less focused on individual cities and more concerned with urban hierarchies and interactions in broad geographic areas (De Ligt & Bintliff, 2020:5). Furthermore, according to Pumain (2007:169), the distribution of city sizes is highly skewed due to the hierarchy of cities' complex architecture of social power and influence. This is inextricably mixed within a wide range of political, economic, and cultural networks, as well as within a seemingly simpler statistical ordering of population or economic values. The study of urban hierarchy, according to Arise (2021:1), is largely concerned with the ranking of cities based on a diversity of variables, including population size, economic power, retail sales, and the number of industrial workers.

Arise (2021:1) further indicates that the hierarchy of urban settlements is based on the size of the urban population, arranged from top to bottom. The higher the urban centre hierarchy, the less likely it is to occur spatially, whereas a lower urban centre hierarchy, the more likely it is to occur spatially (Bourne, 1975:13). The provision of more specialised goods or services, causes lower order centres to be theoretically placed inside the tributary territories of a higher hierarchy (Christaller, 1966). As a result of the town's position, size, and space, Christaller developed the central place idea (Pacione, 2009:127). The range of items and services available can be used to rank central places. Lower-ranking central places are more common than higher-ranking central places. A lower-ranking central place will have a limited selection of items and services. Higher-ranking central places will provide the same products as lower-ranking central places, as well as additional specialised services. Higher-ranking establishments have larger service areas. The likelihood of locating more central places in that area is determined by the central place's rank.

John (2012:218) determines that the 'cities' (quotes by author) at the top of the urban hierarchy are distinguished by their size, economic role, and influence, among other factors, which agrees with Renaud's (1981:23) statement that the size of a city is determined by its position within the

urban system's hierarchy. This urban hierarchy can be viewed through at least two different lenses:

- A focus on a worldwide hierarchy of cities, which investigates a city's 'place' (quotation marks by author) on the global stage.
- A national perspective that examines the role of various cities and towns within a country.

Belsky and Karaska (1990:226) and Richardson (1978:11) established a link between the size of a city (as a consequence of its rank and purpose) and its role in establishing its urban system. Rondinelli (1982:357) emphasizes the need of a well-balanced urban system in providing effective central service facilities. Because of the interconnected relationships and functional hierarchy among the elements of the urban system, sudden growth of any of its elements is primarily related to a change in its rank, size, and function within the urban system, rather than occurring randomly, as a result, has an impact on other settlements (Makoud, 2003:1).

John (2012:218) proposed the following ways to determine the urban hierarchy:

- population size entails comparing the populations of cities across the world and ranking them in a logical order. Settlement hierarchy is the result of identifying and organizing various settlements according to their size and shape (shown in Figure 3-5). (Arise, 2021:1).

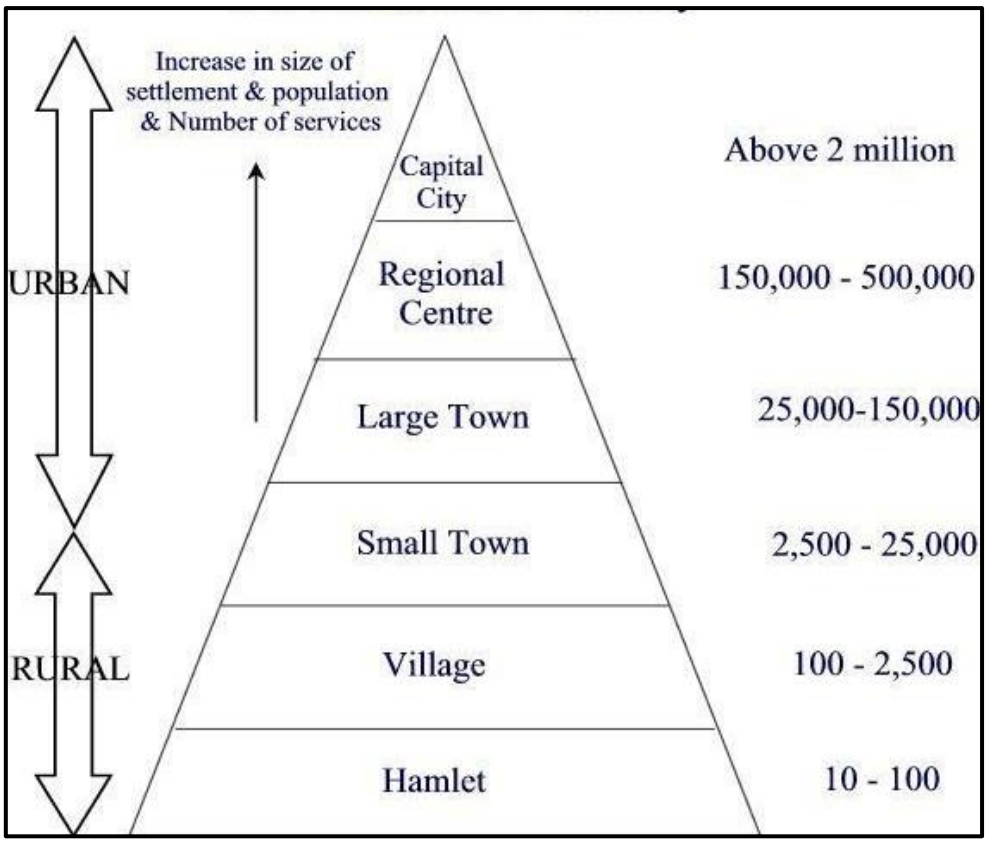
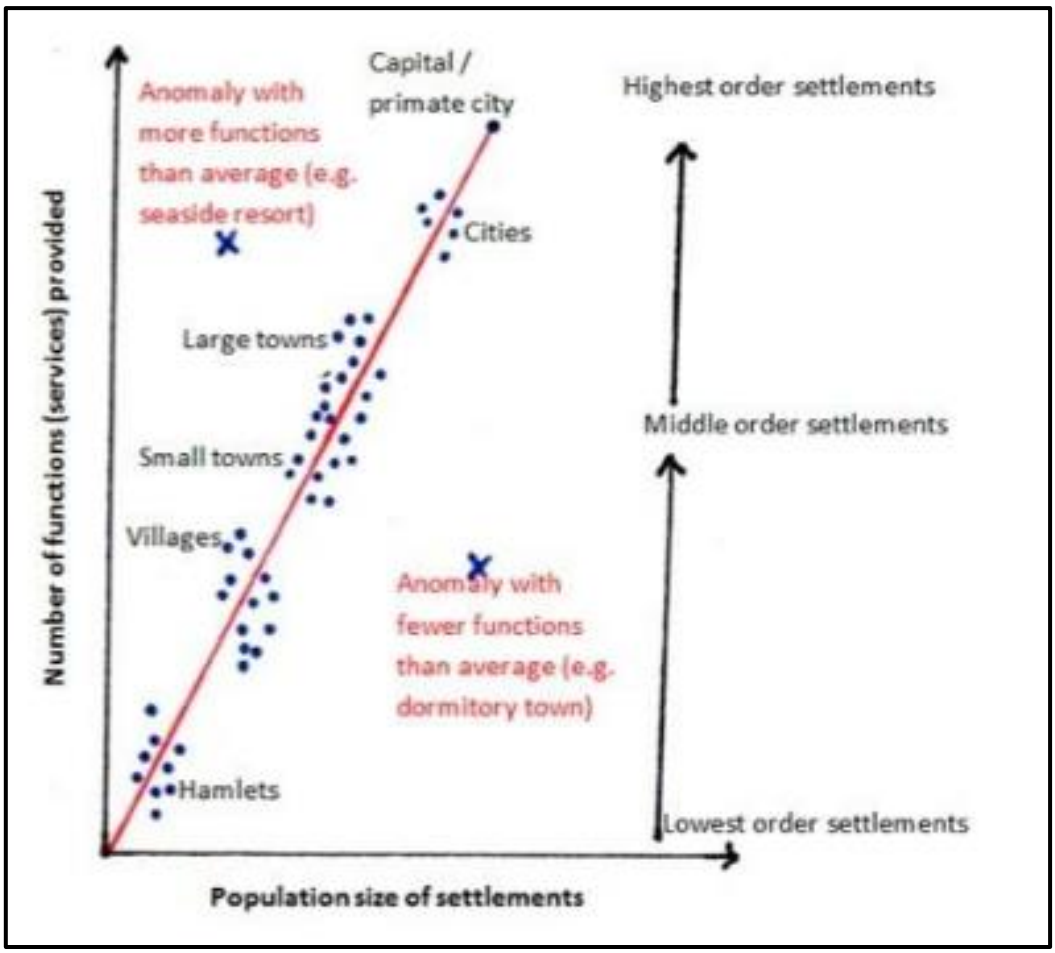


Figure 3-5: Settlement hierarchy

Source: Arise (2021:1)

- function: no global order of cities based on function that is universally accepted, exist. However, the Globalisation and World Cities Research Network (GaWC) has constructed a complex hierarchy of cities that is accepted by the majority of academics and policymakers. World cities, also known as global cities, are at the top of the global city hierarchy (Hall, 2005:6). According to Arise (2021:1), only post offices, doctors, and newsstands will be provided as low-order services in small towns, whereas chain stores, recreation centres, and hospitals will be accessible as both low- and high-order services in large towns, cities, and conurbations.



Source: Arise (2021:1)

Figure 3-6: Functions performed and settlement size

Source: Arise (2021:1)

Arise (2021:1) proposed the abovementioned ways to determine urban hierarchy, but included a third variable:

- Sphere influence: greater communities and conurbations have a far wider influence sphere than do smaller and urban communities. People are attracted from a wider area due to the amenities offered.

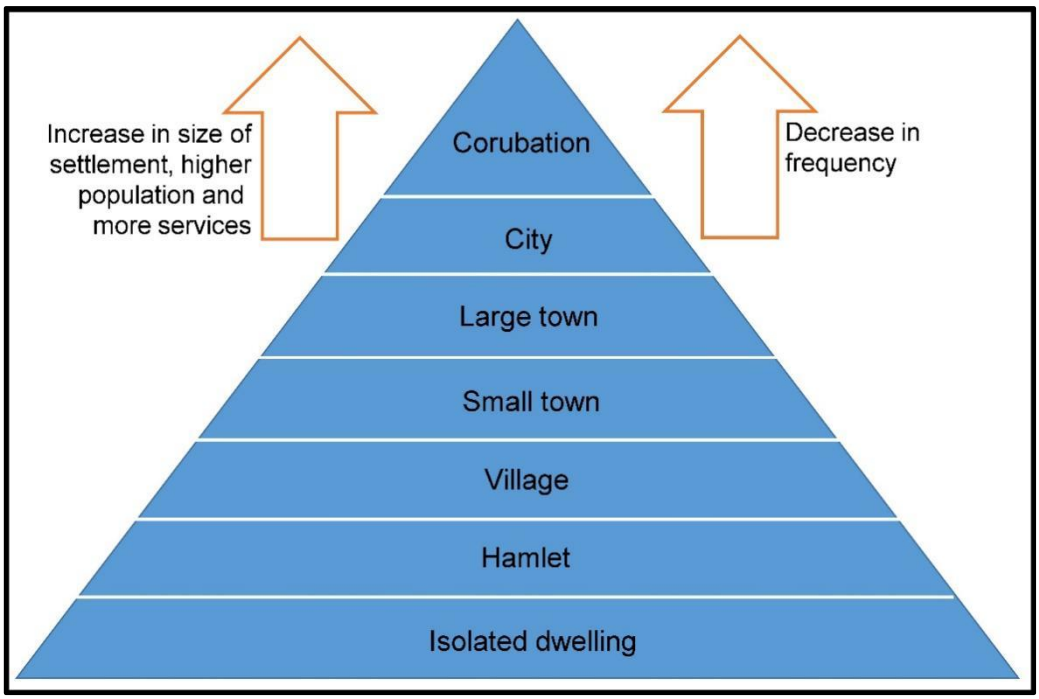


Figure 3-7: Sphere influence and type of settlement

Source: Arise (2021:1)

The interaction and functionality of the urban hierarchy have no bearing on the core urban hierarchy's foundation (Berry, 1969:286). Due to other general causes, distinct towns are based in different locations (Lloyd & Dicken, 1972:30).

Friedman (1986:70) first used the term "global cities." The aim was to pinpoint locations all over the world where market and production linkages, and spatial structure are manipulated by global capital. Friedman (1986:70) produced two main categories of world cities, namely primary and secondary cities proposing that the distribution of cities around the world be classified into distinct rank orders.

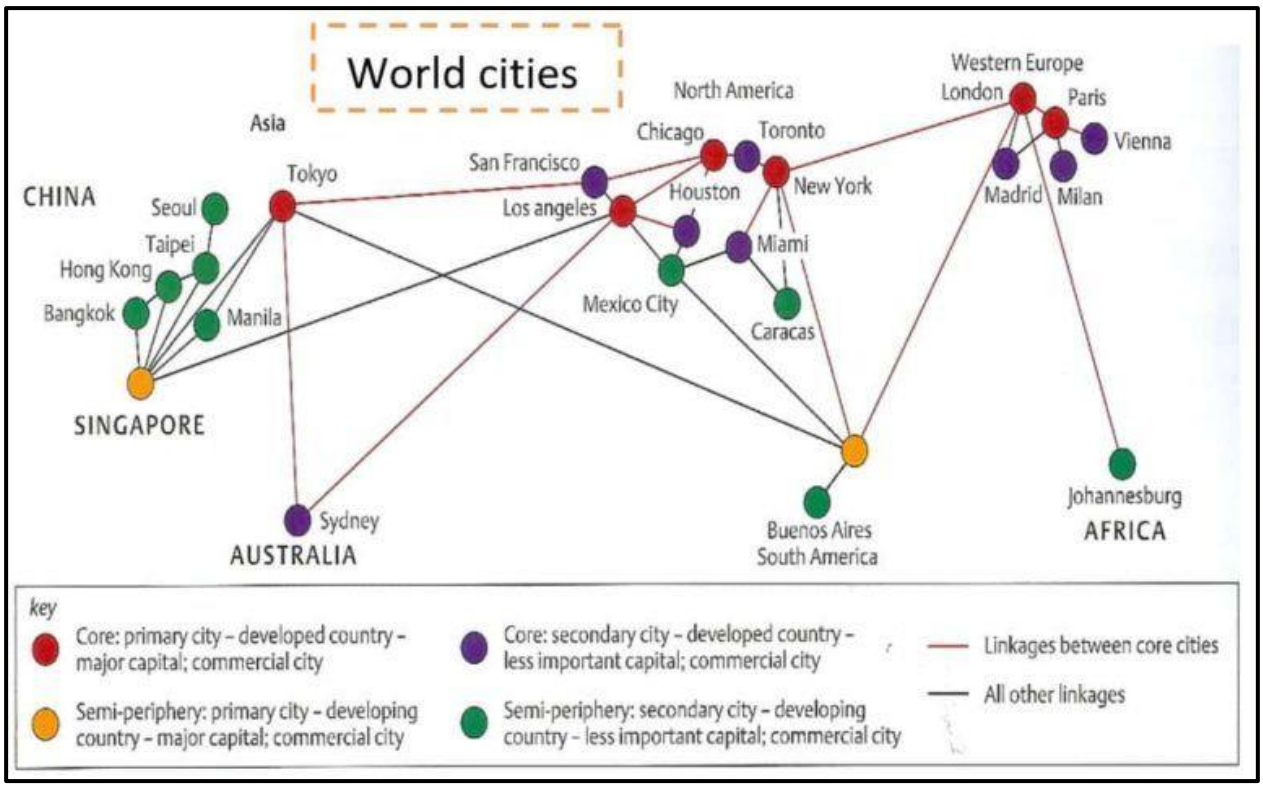


Figure 3-8: World cities network

Source: Smith (2005:175).

Rankings on a national and regional scale are significant because settlements cannot offer all the amenities and services to their residents (Neuman, 2000:122). However, for the purpose of this study, the various hierarchical orders of settlements in urban systems are the only aspects investigated in this research. These settlements can also be classified based according to their functions.

3.5 Levels of urban systems

Urban systems can be understood or applied at different hierarchical levels which causes it too be extremely complex. The methodical interaction of several hierarchical orders within a space to produce growth and development patterns can be characterised as the overall strategy of the urban system (Bourne & Simmons, 1978:421).

Smaller, more specialised systems such as economic, cultural, ecological, technological, and political systems are nested inside national, regional, and everyday systems (Walloth *et al*. 2016:71). The three layers of urban systems are the daily urban system, the regional urban system, and the national urban system, as illustrated in Figure 3-9. According to Bourne (1975:12), the importance of these systems in connection to a variety of activities, functions, and spatial interaction distinguishes them from each other. Urban systems, he continues, are

structures defined by the spatial distribution of production and consumption centres in the private and public sectors of the economy (Bourne 1975:32).

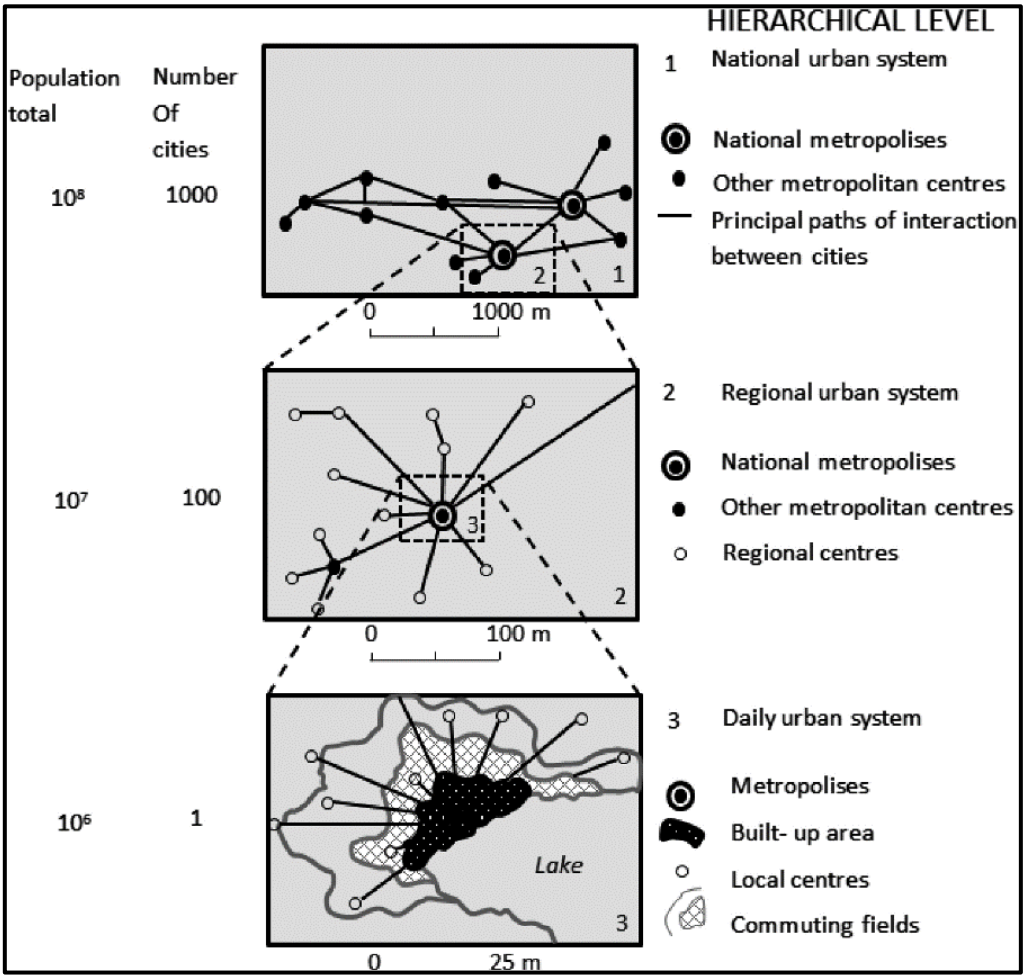


Figure 3-9: Levels of Urban Systems

Source: Derived from Bourne (1975:31)

The essence of this metropolitan network refers to all of the interconnections or ties that make up a modern economy. At different levels in the urban hierarchy, the content and magnitude of these levels will alter. Instead of concentrating simply on an urban core, the study aims to provide the groundwork for a linked system of economic growth and strategic spatial design. An urban system is divided into three types by Bourne (1975:31): national-, regional- and daily urban systems.

3.5.1 National urban system

The number of nodes at each level of the national system, which is dominated by urban areas and has a stepped hierarchy with less large nodes and more tiny nodes as population drops, increases accordingly (Van Aswegen *et al.*, 2019:121). As discussed in section 3.3, the higher the urban centre hierarchy, the less likely it is to occur spatially, whereas the lower the urban centre hierarchy, the more likely it is to occur spatially (Bourne, 1975:13). A group of cities that meet a population threshold constitutes the foundation of a national urban system (Simmons, 1981:136). These points act as a basis for organising the entire nation, or at the very least the ecumene, into functional zones centred on these nodes (Simmons, 1981:136).

It can be observed that the national level may largely involve economic linkages, information exchanges, and idea exchanges at the national level, rather than real movements of commodities or persons. The lower order tiers of the same system may not always be evident, although the national urban system may be obvious. In the long run, these figures are not likely to hold true. The development of urban lifestyles, along with rapid urbanisation, tends to dissolve conventional boundaries between urban and rural, as well as between small and major cities (Bourne, 1975:14).

This idea holds that urban systems go through a primate city in which a sizable portion of economic development and a sizable number of migrants are drawn to one or a small number of important centres. New urban centres are then added to the lower ranks as the national urban system develops and matures, while many of the already-existing systems flourish and move up the urban hierarchy. These developing national urban systems produce diverse strata of territorially organized sub-systems, from the macro to the regional and sub regional to the local levels (Bourne, 1975:13).

A larger study area is not necessary because this area effectively includes all components of the national urban system, including a metropolitan region, cities of intermediate size, and a region on the periphery, with small cities and villages surrounding it.

3.5.2 Regional urban system

A regional subsystem with a similar hierarchical design, often centred around a single metropolitan area and characterized by smaller nodes that shrink more quickly than the national system, is said to be nestled within the national system, according to Van Aswegen *et al*. (2019:123). The urban system is shaped through interactions that consider many spatial and temporal dimensions of observation. For the sake of this study, references to the urban system will be focused on the medium level (regional urban system). According to Berry and Horton

(1970:56), social service links, road traffic, phone call generation, and regional hospital administration may all be dominating at the regional level.

The existence of settlements, according to Christaller (1966:27), is linked to the regional structure and the limited ability to transfer commodities, people, and information. The activities of villages, and hence their hierarchical status, are a result of their placement in an area (Van der Linden, 2014:29). Due to the limited daily mobility of people, the city with the most central location had the most and best functions, and the most well educated and wealthiest citizens of the region. Economic processes are the driving force behind demographic and cultural changes (Van der Linden, 2014:29). The distribution of persons within a region is totally governed by the distribution of functions.

According to Neuman (2000:122), Figure 3-10 below illustrates the hierarchical orders identified in regional scale.

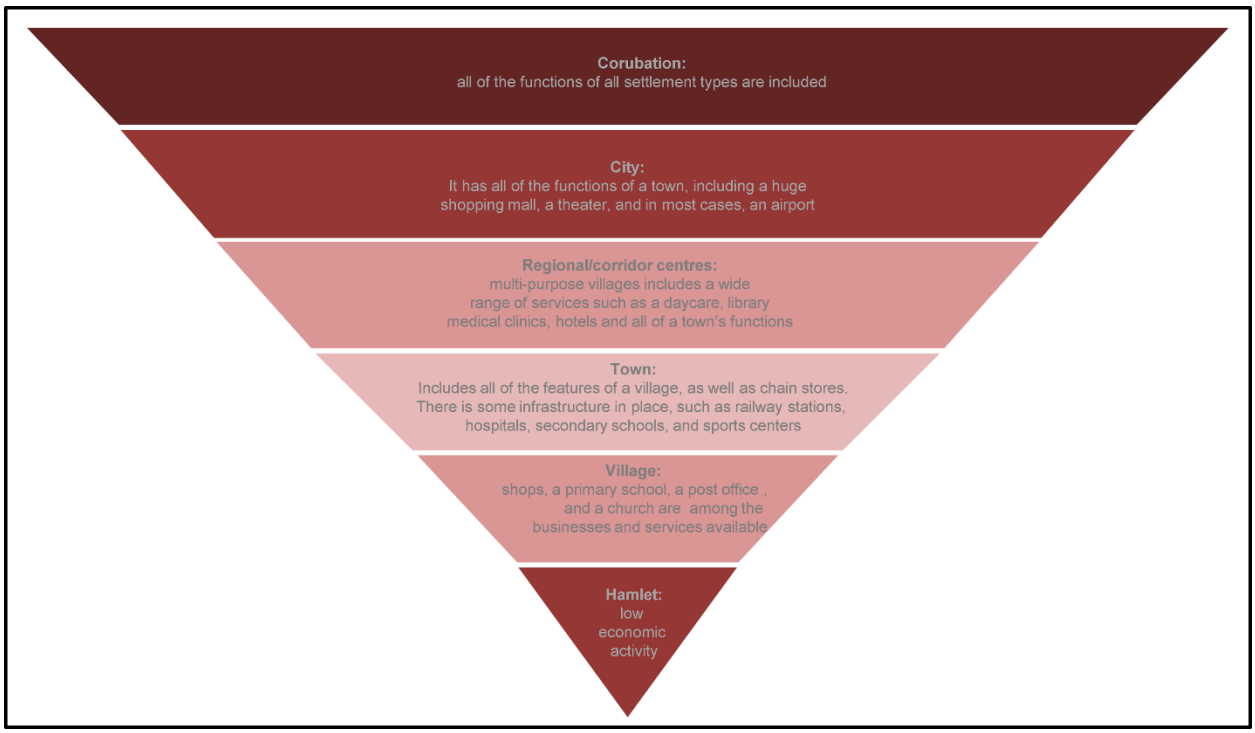


Figure 3-10: Classification of hierarchical orders

Source: Adapted from Neuman (2000:122) and Van der Linde (2019:43)

3.5.3 Daily urban system

Over the last few decades, the concept of the Daily Urban System (DUS) has gained traction as a means of examining and explaining the urban landscape's functionality. The strength of commuter or shopper movements between the system's nodes is commonly used to describe and measure daily urban systems (De Graaf, 2018:107; Verhetsel *et al.*, 2018:633). It is crucial

to remember that these Daily Urban Systems are the result of people go on frequent, repeated excursions to places other than their own (De Graaf, 2018:107). It is further defined by Doxiadis (1968:27) as the area within which each city dweller should carry out their daily activities - in accordance with acceptable conditions and standards.

Local residents move around on a regular basis in the Daily Urban System which is nested within the regional system. Since this type of system is present on a small scale, it is challenging to discern between different order nodes (Van Aswegen *et al.*, 2019:122). The concept of a Daily Urban System, according to Berry (Berry, 2005:148; Berry, 1969:190), explains the pattern of activity in urban areas on a typical working day. The geographic region in which the majority of the nation's population engages in most of their daily activities, like employment, shopping, and social interactions, is referred to as the DUS by Berry (2005:150). Coombes *et al.* (1978:181) advanced the DUS as an additional theoretical justification for urban functional areas, over conventional administrative section's areal reporting units. This concept goes beyond the official boundaries of the municipality (Van der Linden, 2014:24). According to Coombes *et al*. (1978:182), defining a DUS consists of two steps: "first, urban employment centres (cores) are selected, and second, commuter hinterlands (rings) are assigned to each core." Finally, Van der Laan (1998:240) regards the DUS as the typical concept of a city's local network and it became a synonym for the local urban labour market as a result of this process.

The system may thus be defined by the dispersion of social contacts and commuters' daily movements (Bourne, 1975:13).

In terms of city size, functions carried out, and interaction types that characterise each urban centre's role within the larger system, the national, regional, and daily urban systems are hierarchical. According to Van Aswegen *et al.* (2019:125), it is arranged in terms of space. Both the geographical and hierarchical dimensions are linked in a variety of ways, not all of which can be depicted clearly. Rapid urbanisation, along with increased population density and the spread of urban habits, tends to blur conventional urban-rural and small-to-large city distinctions (Bourne, 1975:14).

What is required in this instance is a study of a collection of definitional constructs based on simple criteria, each nested within a larger set but able to be separated from it. This would allow for the simultaneous existence of distinct definitions for different levels of the urban system (Bourne, 1975:14).

3.6 Conclusion

The dynamics of urban systems and urban hierarchy were examined. In order to show the influence and connection that an urban hierarchy might have on the operation of a region and its surroundings. Therefore, the study started with urban system theory. It is very evident that metropolitan areas and the areas around them do not co-exist in isolation but rather engage in interaction with one another. This interconnectedness is critical for the growth and development of the urban system. As the study develops, the geographical and regional importance of urban systems and towns will be determined to potentially achieve improved spatial planning in the South African context.

The dynamic component of this thesis is the focus of the following chapters. The background and justification of the geographical research areas (regional views) should be studied in terms of history, policies, functioning, and dynamics on each level before a quantitative method to physically test data from multiple statistic sources is explored. The next chapter discusses the background on the national topic of research, as well as the general methodology and approach that will be employed from a regional perspective, as well as how growth between nodes occurs.

CHAPTER 4: REGIONAL PLANNING AND DEVELOPMENT

4.1 Introduction

The primary focus of this chapter is on regional planning and regional planning instruments. The first section is a discussion of regional planning in general by pointing to the importance of spatial planning and regional planning policies as it relates to the concept of the urban systems. This will be followed by a review of specific instruments

To demonstrate the connectedness between regional planning in general and various geographic scales, -and the influences on these approached by various causes and regional planning sections are also discussed. In this study, regional planning tools are referred to as "nodes," "corridors," and "planning areas." From a regional viewpoint, the purpose of the urban system in this chapter is to provide regional balance in the relevant region (Gauteng City-Region). To achieve a more spatially balanced zone, the present urban systems and urban hierarchy must be analysed in such a way that the region has a more evenly distribution of different order nodes.

4.2 Regional planning, policy and elements

Botha's opinion (2018:43) is that regional planning should consider a variety of factors, including the region's political and economic situation. It is also discussed by Dickinson (1964:245) who argues that a region's dynamics have a direct influence on its social and economic structure. Glasson and Marshall (2007:42) agree that these factors are still vital but add that the regional planner should also develop a firm awareness of the control dimensions. Regional planning has changed since the 1960s, when governments' influence and socialised economies gained significance. Regional planning in the modern era is becoming increasingly complex as new topics like environmental concerns, various forms of migration and a more complex global economy and other additional issues are considered.

Given the state of the discipline today and the various viewpoints that exist therein, it can be concluded that regional planning's main objective is to achieve sustainable development. This should be done by incorporating and considering social, economic, environmental, and governmental needs in the efficient management and allocation of activities in a region (Botha, 2018:44). Currently, there is a greater demand for regional planning, which is primarily driven by the constantly shifting regional environment. The change in the "pattern of state activity", where governing bodies have an increasingly constrained budget to distribute to various regulatory authorities responsible for the largely privatised industry and production landscape, is another factor contributing to the rise in demand. (Glasson & Marshall, 2007:42).

Huggins (2003:640) compares and monitors areas using "benchmarking activities". Rather than concentrating on the variety and growth of different kinds of benchmarking, it (benchmarking) becomes a generic notion or practice. Benchmarking is described as a portion of processes related with learning by comparison, where regions strive to assess their performance, activities, and policies from the perspective of regional policymaking (Huggins, 2003:641).

Glasson and Marshall (2007:45) maintains that regional planning has traditionally focused on the many regional characteristics. Numerous governing bodies originated and developed a regional policy or framework as a consequence of democratic demands and the necessity for bottom-up initiatives that included all stakeholders. The region's dynamics, as well as the engagement of several stakeholders, have aided in the formulation of regional planning frameworks and policies that include specific details in several sectors. No definite, well-defined regional development plan can be implemented in any general region due to the inherent regional characteristics.

Prior to the 1970s, policymakers' goals were largely about "policy implementation," whereas more contemporary policies emphasize "policy action" (Glasson & Marshall, 2007:139). The plan is only as good as the execution if regions and policies can be benchmarked properly. It differentiates thus between hard and soft planning abilities (Glasson & Marshall, 2007:285). Statistics, which disclose the physical reality inside the areas, as well as input from local communities, local government, and regional economic drivers, are examples of hard planning abilities. Soft planning abilities refer to ongoing monitoring, modifications, and reviews of policy implementation procedures.

The following are the main roles and purposes of regional planning on an urban system level, as well as the subsequent usage of regional planning instruments: (Glasson & Marshall, 2007:80; Botha, 2018:112)

- promotion of social and economic integration through a range of initiatives and resources that increase access to jobs and other possibilities.
- treating a regional planning idea and vision, which includes movement networks, nodes, hierarchy, and other elements.
- creating high-quality, long-term regional ecosystems that foster economic growth.
- reduction of the need for transportation patterns (transport price signals, such as building costs and gasoline prices, offered by the market, mislead users into believing that personal mobility is cheaper than it really is because environmental costs are ignored).

- protection and enhancement of all residents' investment, including limiting unsuitable development that detracts from a region's overall worth and dynamic.

The numerous geographical regions in which regional planning was undertaken were briefly mentioned by Glasson and Marshall (2007:55). It is agreed that a regional plan must be appropriately integrated with the national framework. All plans have an impact on the final national subcontinental size, even though all smaller geographical scales must be directly linked with a larger geography's plan. In the general regional planning process, all eligible regional plans at every geographical level must be considered and acknowledged.

4.3 Regional development

4.3.1 Regional development phases

In the framework of this study, the phases of regional development play a specific role. Although the theme emphasises the value of an urban system as a tool for spatial planning, the research questions and conclusions concentrate on the function of regional development phases in the anticipated integrative process. Regional development phases depict and explain the many stages of development of areas throughout the world. Rostow and Rostow's (1990:4) five economic phases of growth theory offer the groundwork for regions and countries evolving over time to increase productivity, diversify the economy, and focus on secondary and tertiary industries. The five stages outlined by Rostow and Rostow (1990:4) are depicted in the Figure 4-1 below.

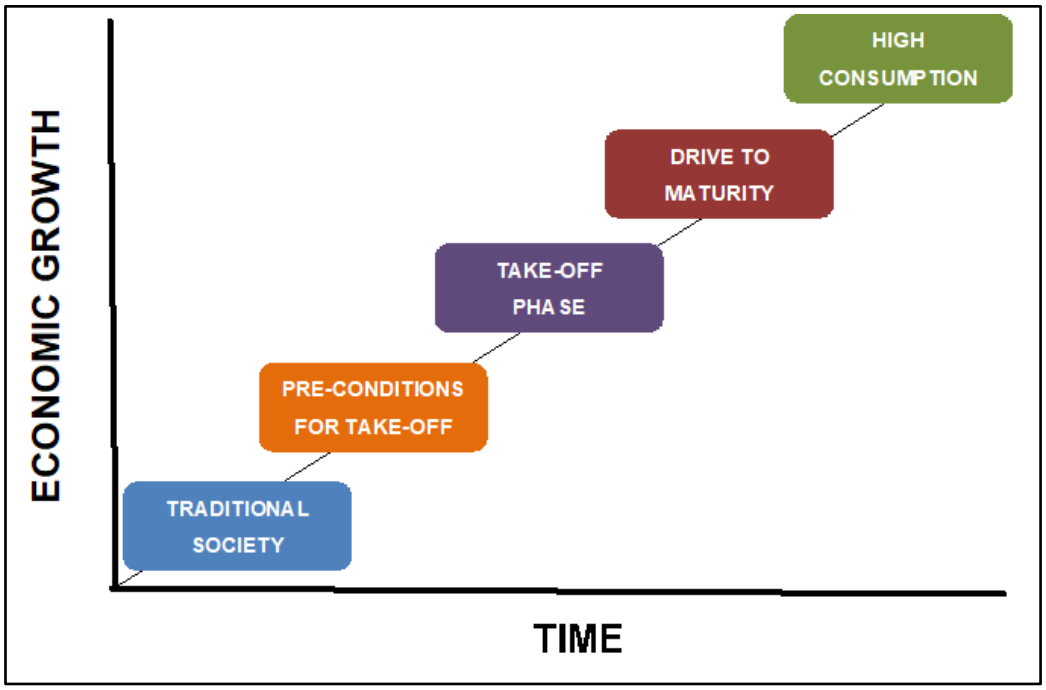


Figure 4-1: Phases of Rostow and Rostow's regional development

Source: Adapted from Rostow and Rostow (1990:6-10)

1. Traditional Society

This is a mostly subsistence agricultural economy in which no or few products are exchanged. The capital stock is restricted in size and of poor quality. It has a negative impact on labour productivity, leaving little surplus output to sell in domestic and international markets. According to Mohr and Fourie (2004:624), population numbers are typically low since few individuals are lured to the region for prospective work prospects. With a small population and a focus on primary economic activities, these areas are predicted to have low per capita income. These locations do not experience strong growth and development due to restricted economic growth, steady and consistent population sizes, and a main economic activity.

2. Pre-conditions for take-off

The preconditions for take-off are a time in which conventional culture alters in ways that allow contemporary science to be used. New agricultural and manufacturing production functions are being created in order to boost productivity while also diversifying global markets and international competitiveness (Vries, 2008:996). Advanced cultures set in action concepts that are a contemporary alternative to conventional technology (Rostow & Rostow, 1990:4-16). As a result, new businesses formed where economic success resulted in greater overall welfare and a higher quality of life. New kinds of businesses, such as banks and other financial institutions formed, resulting in a surge in investment, communication, transportation, and raw material extraction (Rostow & Rostow, 1990:4-16).

3. Take-off phase

Businesses tend to develop swiftly during this era, and a major amount of revenues is spent in new industries. This results in quickly developing industries, which leads to employment creation and additional urban growth. The whole expansion process, as well as the rise in revenue, leads in increased private sector investment (Rostow & Rostow, 1990:4-16). Agriculture employs a variety of creative strategies to boost productivity and reach a commercial level of farming (Costa *et al*., 2016:2).

The take-off phase is the phase that separates many developed societies from less developed areas. This is the time period, according to Rostow and Rostow (1990:5), when numerous development impediments and resistances are overcome, and economic progress takes off. This period may last a decade or two, during which the region's underlying economic, social, and

political structures are modified in order to maintain a constant development rate in general (Rostow & Rostow, 1990:5).

4. Drive to majority

The stage of a normal expanding economy when contemporary technology drives economic activity, is known as the drive to maturity. The economy changes when formerly imported goods are replaced by locally produced goods, and new import requirements emerge. Rather than stifling industry growth with contemporary, efficient production, the growth of industries is encouraged (Costa *et al*., 2016:3). As a result, the stage of maturity may be characterised as the point at which an economy demonstrates the ability to diversify its initial industries by enhancing resource utilisation efficiency via the use of the most modern technology available.

Rostow and Rostow (1990:5) defines maturity as the point at which a region's economy is capable of progressing from its initial industries to newer, self-sustaining businesses based on a diverse set of area resources and sophisticated technical means. The ability to assimilate current technologies across several generations under a typical regional development scenario is what defines regional society.

5. High consumption

According to Rostow and Rostow (1990:6), the twentieth century witnessed changes in the composition of the labour force as well as an increase in per capita wealth in civilisations. During this stage of expansion, the dominant economic sectors shift towards the production of durable goods and services. According to Rostow and Rostow (1990:6), the region's resources are increasingly being oriented toward the manufacture of consumer durables and the dissemination of mass-market services. At this point, major economic players like the United States, Japan, and Western Europe are all working together (Mohr & Fourie, 2004:624). The social welfare state is a sign that a society has progressed beyond its technological maturity (Rostow & Rostow, 1990:4-16).

Once more, in order for any region to go through these phases of development, key development sectors must interact with one another, and agglomeration advantages must be implemented. Friedmann (1966:75) refers to the developing centres of many hierarchies that lead to a functioning and interdependent urban system and hierarchy. It's vital to remember that Rostow and Rostow's (1990:16) five stages of growth are only a categorisation system for various economic patterns. Over time, growing civilisations have a propensity to evolve towards the optimum pattern.

4.3.2 Nodal development

The first regional development theory that has gained a lot of attention from specialists is the *growth pole* concept. Economic space and how it functions in a certain geographic place can be explained using growth poles (Boudeville, 1972:192).

According to Friedmann (1966:36), small urban centres develop around the nodes, where these activities are concentrated, to provide a service and administrative purpose. The accumulation of capital and industrial expansion stems from the concentration of the economy from the periphery to the centre (Raagma, 2003:3). The sectors mature further, resulting in rural regions enduring progressive impoverishment, prompting the national government to establish a regional development program (Jeffrey, 1989:66). Friedmann (1966:36) concludes that during the final phase, the distribution of economic activity should achieve an equitable balance, resulting in regional stability.

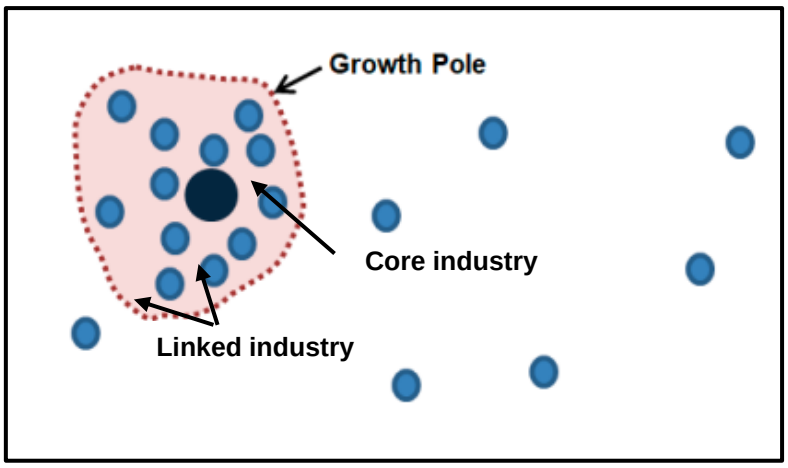


Figure 4-2: Growth Pole theory

Source: Adapted from Perroux (1950)

Cities, particularly metropolitan areas, rely heavily on interactions between diverse nodes in the region that make up the regional network (Berry, 2005:163). Boudeville (1972:19), another theorist, used the growth pole model to Perroux's formulation and placed it in a geographical domain. Growth poles, according to Boudeville (1972:19), are defined by the presence of propellant industries and enterprises that promote long-term regional growth through links with other industries and firms within a region.

The growth pole concept is relevant to this study because it presupposes that economic growth can be observed at the regional level and that the pole can be used as a hub for economic expansion to encourage development in the region around it.

In regional development studies, the *core-periphery* concept is applied in a variety of ways. The core-periphery paradigm, according to Friedmann (1966:75), illustrates how economic, political, and cultural power is physically dispersed between core or dominant regions and peripheral and semi-peripheral regions. The traditional core-periphery development model attempts to depict the establishment of a regional urban system in four major stages (Rodrigue *et al.*, 2020:80) as illustrated in Figure 3-3 and explained below. Friedmann (1966:75) refers to the developing cores of many hierarchies that lead to a functionally linked urban system and hierarchy. The core-periphery model is a foundation theory for urban systems as it explains the interactions within urban systems and the hierarchy thereof. It can result in understanding spatial planning in the different levels of urban hierarchy.

The four stages of Friedman's core-periphery model are displayed in Figure 4-2 and described in detail below.

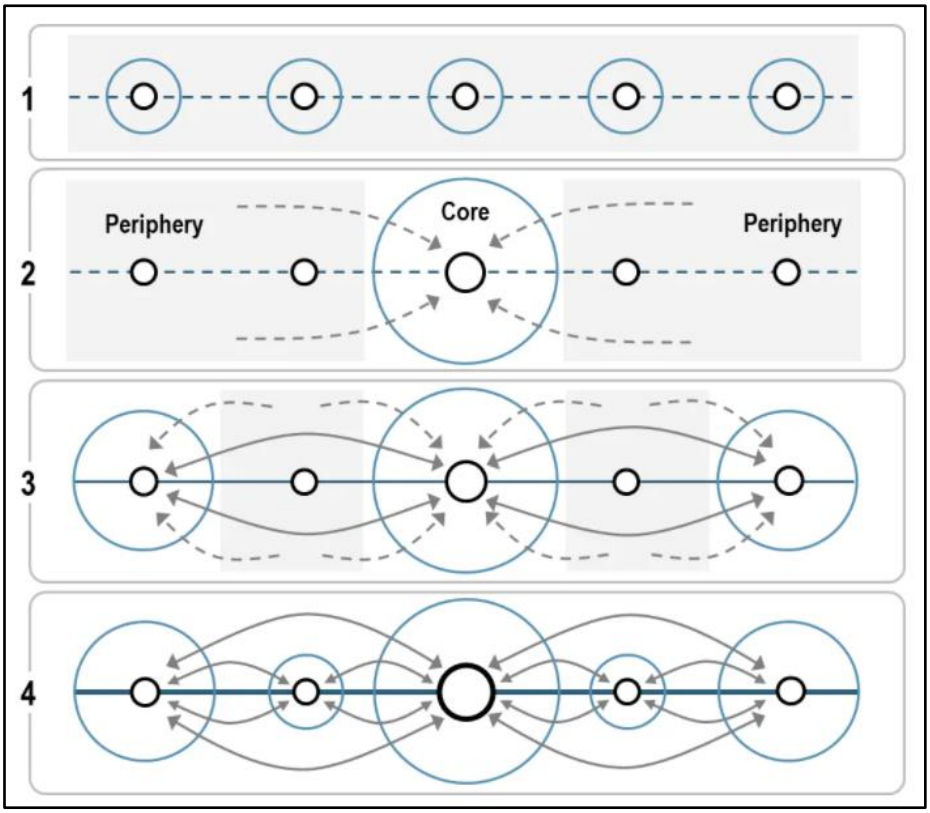


Figure 4-3: Core-periphery stages of development

Source: Derived from Friedman (1966:67)

1. Pre-industrial stage: Cores are self-contained and independent of one another. Society was primarily agrarian and pre-industrial, with modest settlements and regional economies. Each community is fairly remote, with activities dispersed and restricted movement. There are little differences across spatial entities in terms of economic growth. (Friedmann, 1966:69; Rodrigue *et al.*, 2020:80). The region is characterised by sparsely located rural villages during the pre-industrial (agricultural) society phase (Friedmann, 1966:36). Along with the establishment of primary sector activity, these villages are present (agricultural or mining activities). According to Friedmann (1966:36), little urban centres develop around the nodes where these operations are concentrated for administrative and service purposes.

2. Transitional stage: Innovation causes the economy to start to cluster in the main metropolis. Two of the most crucial elements in economic development are capital accumulation and industrial development. Trade and mobility rose even while total mobility remained low, although in a pattern dominated by the core. (Friedmann, 1966:69; Rodrigue *et al.*, 2020:80). Due to agglomeration benefits or the discovery and usage of other resources, one of these centres evolves into a major city. The outlying parts, on the other hand, do not develop as much as the primary core. Industrialisation starts, resulting in a concentration in the area surrounding one or two nodes (Jeffrey, 1989:66). The second phase is another name for the

developmental stage that serves as a transition. Capital accumulation and industrial expansion occur during this period as a result of the economy's concentration from the periphery to the centre (Raagma, 2003:3). According to Friedmann (1966:36), the time period exhibits both an increase in trade and regional labour mobility. He continues by noting that these dynamics lead to an increase in migration from the peripheral to the core as a result of better economic activity in the core.

3. Industrial stage: Economic expansion and diffusion lead to the emergence of other growth centers. Decentralisation's main motivators are rising input costs in the core area (Friedmann, 1966:71; Rodrigue *et al.*, 2020:80). The simple core periphery structure is transformed into a multi-core structure with peripheries emerging between the areas. The sectors mature further in the third phase of this paradigm, resulting in rural areas facing gradual deprivation, prompting the national government to establish a regional development policy (Jeffrey, 1989:66). The regional development policy promotes the economic expansion of the entire region, which leads to the formation of new centres. Deconcentrating has increased as a result of the establishment of these new centres in the area, primarily as a result of a labour shortage and increasing prices in the core (Raagma, 2003:3).

4. Post-industrial stage: The level of geographical inequality significantly decreases as the metropolitan system becomes fully integrated. The spread of economic activities, which is linked to robust flows along high-capacity transportation corridors, leads to specialisation and the division of labour. In this stage, the distribution of economic activities should establish an equal balance, in line with Friedmann's (1966:36) theory, leading to regional stability. This stage incorporates reduced regional asymmetries, national integration, and effective company location and growth (Friedmann, 1966:37). The division of labour in the phase will continue, according to Raagma (2003:5), as distinct sections or nodes in the region specialise in specialised functions. The mobility of the local population will continue to rise as a result of the different areas in the region.

4.3.3 Differential Urbanisation

The theoretical framework for differential urbanisation was created by Geyer and Geyer (2015:4). Development in the evolution of urban systems is based on central place theory (Christaller, 1966:27 as discussed in Section 3.3), locational qualities (Richardson 1973:74), innovation dissemination and innovation diffusion (Berry 1969:283; Pred 1977:310).

In a continuum of development that spans the evolution of urban systems in industrialised and developing countries, the model, according to Geyer (2003:89), describes how clusters of small towns, medium–sized cities, and major metropolitan (an urban system) areas go through multiple periods of fast and sluggish growth.

The differential urbanisation model makes a distinction between three processes in the evolution of urban systems as they approach equilibrium: urbanisation, polarisation reversal, and counter-urbanisation (Geyer & Geyer, 2015:289).

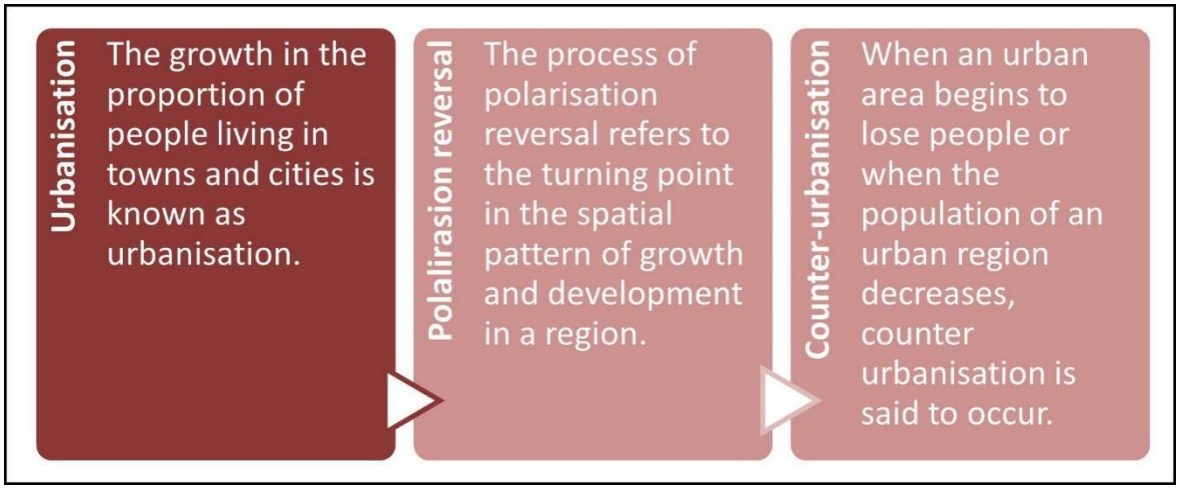


Figure 4-4: Three processes of the differential urbanisation model

Source: Adapted from Geyer and Geyer (2015:289)

In terms of the evolution of urban systems, five propositions are made (Richardson,1973:73).

- A primary city phase occurs in many national urban systems, in which at least one, but often more important centres attract a noteworthy amount of economic growth and a significant proportion of a migratory population;

- As the national urban system grows and matures, new urban centres are added to the lower ranks, while many of the existing ones grow and advance through the ranks.

- As national urban systems grow, different strata of territorially organised subsystems are produced, ranging from the macro level through the regional and sub regional levels to the local or micro levels (Richardson, 1973).

- The sequence of tendencies observed in the development of urban systems, first toward concentration and then toward dispersion or deconcentrating, is not limited to systems at the national level. It can also manifest itself at each of the lower levels of territorially organised

subsystems because the same spatial forces operate at both the national and subnational levels.

- In a growing urban environment, it is more likely that the growth of secondary centres closer to primary centres takes place, unless an outlying centre is situated in a region with distinctive locational features.

Using these five premises as a foundation, an impressionistic geographical description of differential urbanisation was presented, with nett migration flows being used to characterise the model's several phases. According to Drewes (2022:265), metropolitan regions form a specific morphological entity within the spatial planning sphere and follow a development cycle that has been described, among other things, through the differential urbanisation process, as indicated in Figure 4-5 and explained in Figure 4-1.

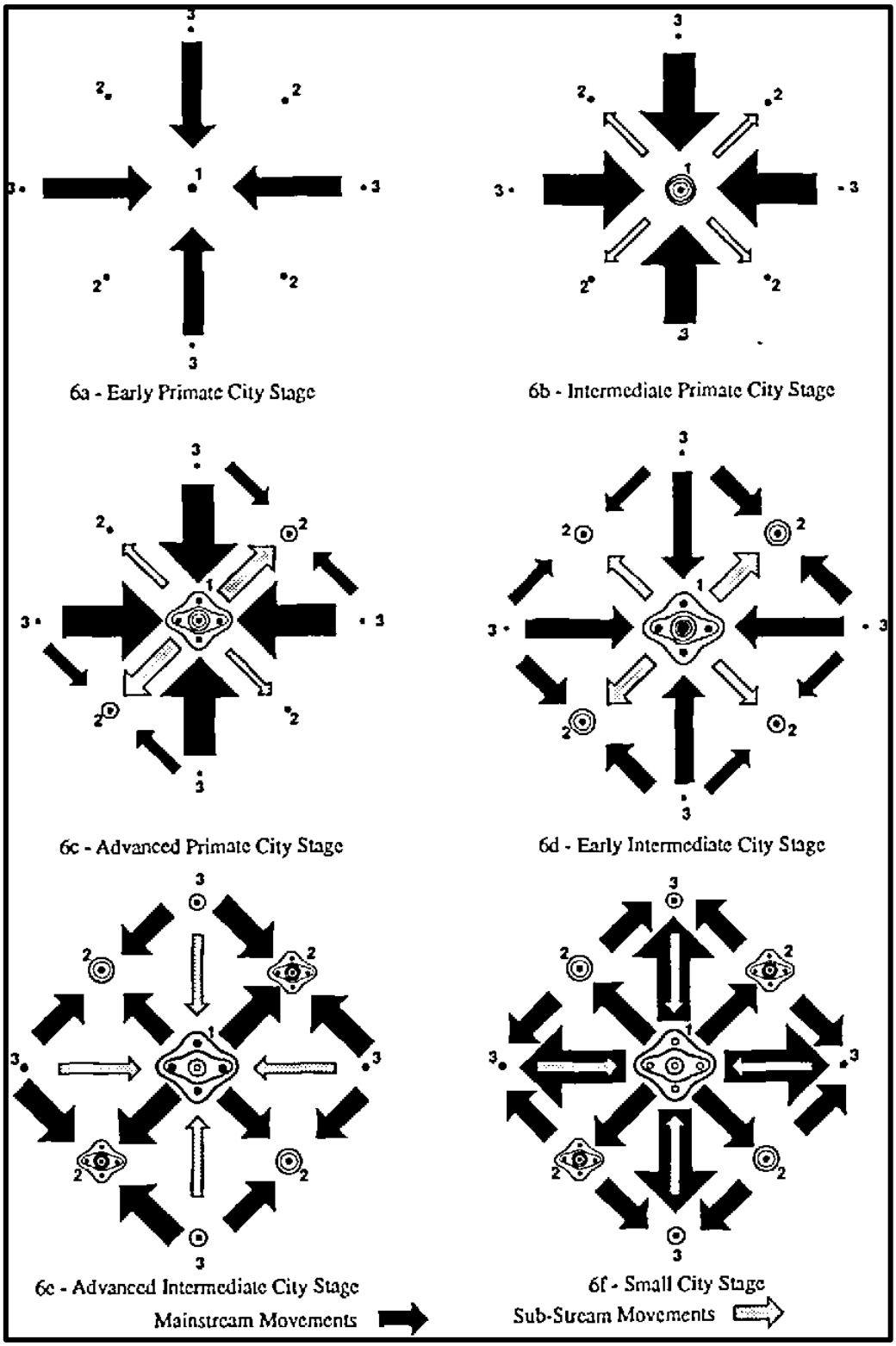


Figure 4-5: Phases of differential urbanisation

Source: Geyer & Kontuly (1993:158)

Table 4-1: Differential Urbanisation process explanation

Phase a: Early primate city stage	As a result, urban systems go through a primate city phase, where key centres draw a large amount of economic activity and migrants.
Phase b: Intermediate primate city stage	As the urban system grows and matures, new centres emerge at the bottom of the urban hierarchy, while many current centres grow and rise up the urban hierarchy.
Phase c: Advanced primate city stage	From the national level to the regional and district levels, these developing urban systems create multiple layers of structured subsystems.
Phase d: Early intermediate city stage	Patterns in urban system development, namely concentration and then deconcentration, is now visible at lower levels of the hierarchy, since similar factors operate at both the national and regional/district levels. The growth of intermediate centres, which are physically closer to metropolitan hubs, is favoured in this evolving urban structure.
Phase e: Advanced intermediate city stage	Within the relevant urban system, the primate city has a polycentric structure that dominates. When there are multiple primate cities in a region, they are usually not at the same stage of development.
Phase f: Small city stage	Polarisation reversal is a phenomenon that occurs in maturing primate cities and is caused by expansion of secondary centres near to the primate metropolis.

Source: Adapted from Geyer & Kontuly (1993:155-158) and Drewes (2022:266)

In ever-decreasing temporal cycles, the above development process will repeat itself. Drewes (2022:266) states that the paradigm of temporal characterisation is accurate in both developed and underdeveloped countries. The temporal model, according to Geyer (2003:91), is a perfect scenario in which urban centres are evenly dispersed throughout a territory with similarly dispersed natural endowments. When assessing the stage of development of an urban system in reality, local circumstances and the history of urban growth and decline in the growth patterns of groupings of cities must be carefully addressed. Applying the temporal model to the Gauteng City-Region (discussed in Chapter 7), it is clear that the development phase must be determined, according to this model, before policy is compiled.

4.4 Regional planning instruments

According to the United Nations (2008:29) in the document on World Population Prospects, all countries require a defined set of regional planning tools to enable policy makers to plan, manage, and execute spatial development effectively at a national level. No matter at what scale spatial planning occurs, the fundamental set of regional planning tools should be used, and the same principles holds true for general regional planning procedures.

A proactive and co-ordinated approach to development planning should be employed, according to the United Nations (2008:29), in order to address broader regional planning challenges. It is possible to draw the conclusion that such papers should involve a high level of strategic approaches and consideration before plans or policies can be put into action after considering the numerous dynamics and role players in regional planning.

4.4.1 Regional planning instruments

Batty (2008:769) states that the interaction between different nodes in the region in terms of trade, migration patterns, commuting, shopping, and other social movements is the source of a region's development and growth. When a given node offers a wide range of economic services, as identified by Batty (2008:769), it draws the attention of other nodes and offers agglomeration benefits to supplemental applications. This support leads to the node's economic and physical expansion, resulting in a larger sphere of influence, which in turn has an impact on the region's growth and development.

Nodes, corridors, and planning regions (Friedmann, 1966) are used in this study to describe planning instruments in the next section of this chapter. Since these instruments are used in so many different ways on a worldwide scale, it's critical to understand the inner workings and dynamics of each one. The overall aim is to review and consider here many writers' analyses of each of the spatial planning instruments on a regional scale.

The city-region has become a key scale for spatial planning both in Europe and globally. According to political-economic theory and policy practice, it has gained traction as a superior scale for achieving economic competitiveness and addressing the growing challenges that cities and regions face. Since they exist outside of, next to, or between administrative territory and statutory planning scales, city-regions are commonly referred to as "soft" planning spaces (Allmendinger & Haughton, 2009:613).

Spatial planning refers to the public sector's methods for influencing the way people and activities are distributed in different types of locations to enhance the built, economic, and social surroundings of communities. Spatial planning is a topic that is covered by many different professions, including land use, urban renewal, regional, transportation, economic, and community planning. At the local, regional, national, and international levels, spatial planning takes place, and it frequently results in the creation of a spatial plan. Various geographic phenomena that are the outcome of processes are found on the earth's surface (James, 1952:197-201). People and products do not remain stationary; they move around and influence processes. These processes are defined as a "series of change consistently related as in a chain

of cause and effect" (James, 1952:197), while a geographic phenomenon is defined as "any event not evenly dispersed over the face of the world" (James, 1952:197). It is therefore crucial to investigate processes that occur in different parts of the world. According to Mulligan (1984:8), a distinguishing feature of regional science, regional economy, and theoretical geography is that each represents a field and is related to a location in which a region can be defined or where each one occurs. Isard's (1956:18) approach to regional science, are described as "an extreme degree of abstraction" that "provides one constructive approach to the development of the concept of the region" (Isard, 1956:18). As a result, the interaction of commodities and activities (processes) between nodes within a space is the driving force behind space development. As a result, a boundary is drawn to aid understanding of the interplay that leads to growth.

Components that link with one another, according to Steyn and Barnard (1976:55), express the interaction that occurs between locales. This can be attributed to the flow of people and things between diverse locations on the earth's surface (Christaller, 1966:14, as discussed in chapter 2). It occurs, according to them, at all levels of the geographic space - locally, regionally, and globally. An implementable plan combining regional planning and development strategy is created with the goal of achieving particular results (Glasson & Marshall, 2007:12). Given the huge differences in regional dynamics, it is critical to comprehend and analyse each region's distinct background in this regard. Dickinson (1964:245) discusses how a region's dynamics have a direct impact on its social and economic structure. Dickinson (1964:245) goes on to say that these factors manifest themselves in varied land uses, economic activity, and a region's socio-economic structure. Regional planning in the current day is becoming increasingly complex as new topics like environmental concerns, various types of migration and a more complex global economy, and issues are considered. Given the state of regional planning today and the various perspectives that exist on the subject, it can be said that regional planning's main objective is to promote sustainable development by incorporating and considering social, economic, environmental, and governmental needs in the efficient management and allocation of regional activities. According to Glasson and Marshall (2007:14), there is a greater need for regional planning at higher scales as a result of the complex extending of spatial links, the impact of new transportation variables, and the ever-expanding reach of economic relations.

The earth's surface contains a variety of features that combine to form interconnected complexes that differ from one another and may thus be divided into regions (Hartshorne, 1959:286). A region can be defined as a significant area of territory with topographical, cultural, or political qualities that distinguish it from other locations (Glasson & Marshall, 2007:8). As a result, depending on what defines them, areas can be defined according to criteria (Glasson & Marshall, 2007:85). An implementable plan combining regional development strategy is created with the goal of achieving

results (Glasson & Marshall, 2007:12). Regional planning must consider a variety of factors, including the region's political and economic situation. As a result, regions can be divided into three types: natural environment (temperature and landform amongst others); complex physical elements (built by persons); and socio-cultural complex (which cannot be replaced by other individuals) (Dawkins, 2003:136). Regions should not be thought of as a neatly defined hierarchy, but rather as a more complex union of spaces, resulting in ambiguous regional boundaries (Glasson & Marshall, 2007:7).

An area changes as a result of numerous processes that take place over time. The processes listed below are what causes regions to form (Haggett *et al*., 1965:56):

(i) Physical processes: could have an impact on among other geology and topography.

(ii) Chemical processes that produces gases and other environmental products that have an impact on geology, vegetation, and climate.

(iii) Social processes evolving over a shorter period of time than other processes and that can be detected by a clustering of people who interact socially in the same region.

(iv) Biological processes are all biological activities in an area that are necessary for survival, such as vegetation and natural life.

(v) Economic processes encompassing all of the preceding processes and is most likely what defines a region's development.

The use of nodes, corridors, and planning regions as regional planning tools is depicted in figure 4-6 below. The use of these instruments is connected to various classifications at the geographic levels depicted. Through the use of an urban hierarchy as a supplement spatial planning tool, this study intends to demonstrate the potential of regional planning instruments in an integrated manner. The three regional planning instruments described in this section are summarised below.

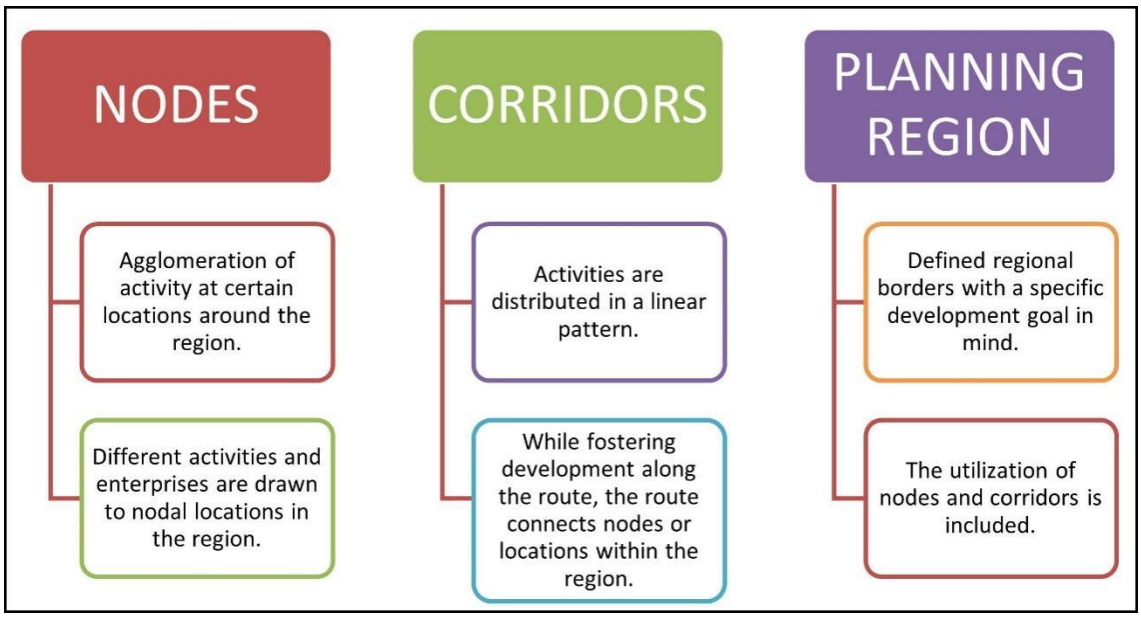


Figure 4-6: Regional planning instruments summary

Source: Own compilation from Friedmann (1966)

4.4.2 Nodal development as regional planning instrument

The initial step in regional planning and development is the identification of nodes in a spatial system or an area. A region's delineation, structure, and performance is directly impacted by the development and interaction of various nodes in a spatial system. Economic growth and the clustering of facilities are concentrated at nodes in a region. According to Jason Preston (Maher *et al.,* 2018:1) a node is a place with activity and infrastructure, such as residential, business, and retail structures, as well as public transportation alternatives. David McCaroll (Maher *et al.,* 2018:1), continues that it also has a high density and employment options, preventing it from becoming a dormant suburb.

Nodes can also be described as a concentration of economic sector operations, and it be associated with primary (mining or agricultural), secondary (manufacturing or processing of raw materials), or tertiary (other types of economic activity) regional economic activities in the service sector, such as healthcare or retail sales (Weber, 1909:34). The expansion of economic activity and enterprises inside the region is linked to the development of the region or node. This assertion is shared by Roberts and Fisher (2006:371), who confirm that growth plans centred on nodes have been beneficial in supporting economic growth by bringing new enterprises to a region. Nodes have traditionally been an essential regional planning tool and a key component of regional organisation. Interaction between distinct areas or points across a geographical area is facilitated by the closeness of nodes in a spatial system. As a regional planning tool and spatial structuring element, nodes have the capacity to reshape a region's dynamics by increasing activity and

interaction among diverse places. Nodes must be included in the assessing criteria as a result of this influence, as these places in the spatial system are directly related to the urban hierarchy. It may either stimulate higher investment, activity, and relationships across regions or it can help to identify the primary role players in the present hierarchy by recognising nodes and any gaps between nodes in the research area. As a node develops and grows into a larger node with more functions, its influence on a region grows considerably (Neal, 2010:1). Growth nodes can emerge as a result of increased economic growth and development (Glasson & Marshall, 2007:140).

Many factors influence the creation and development of nodes, according to Roberts and Fisher (2006:370). Only a few of these factors include population size, relationships with other nodes, accessibility to natural resources and development infrastructure, the placement of activities, functions, and other forms of networks, as well as the physical, economic, political, and cultural environment. Economic growth policies and management methods, according to Roberts and Fisher (2006:370), are some of the primary role-players in the economic development in areas. The creation and growth of a dominant industry can have a significant impact on economic growth, primary economic sectors in the case of non-central places.

The ability to deliver agglomeration benefits that attract commercial and economic development, such as shopping, work, social and cultural possibilities, and public transportation facilities, is a feature of larger and more prominent nodes (Alcácer & Chung, 2009; Richardson, 1973; Glasson & Marshall, 2007:140). These newly drawn activities are linked to the creation of new infrastructure, a greater workforce, and interactions with foreign economies (Lasuen, 1969:137).

4.4.3 Development corridors as regional planning instrument

Nodes are the first and most significant aspect in the assessment criteria, therefore it is critical to incorporate corridors as an equally key role player in the evaluation criteria. The many regional planning instruments discussed in this chapter are inextricably linked to one another. It should be remembered, however, that the nodes and corridors are the two most fundamental instruments and are inseparably linked (Hauptfleisch *et al*., 2010; Anderson & Burnett, 1998).

Corridors are the tools that are used to encourage contact between nodes in a spatial system, and are also crucial in the formation of an urban hierarchy. Corridors are also connected to urban hierarchy since they stimulate interaction by focusing diverse activities on significant urban nodes, enhancing and assisting the creation of an urban hierarchy. The degree of planning that has been done is the key difference between corridors. Corridors form on key movement routes of significant actual or potential movement alternatives, according to Harrison and Todes (1996:70). This conclusion is closely related to the role of corridors in the Roman Empire. Predicted

development, according to Harrison and Todes (1996:70), happens along key regional attractors that connect large cities, towns, and mobility networks producing economic activity.

The way corridors were used in the criteria was primarily focused on the Gauteng City-connection Region's network. National and provincial highways connecting key nodes in the province were assessed and weighed based on the type and function. National highways, for example, were given a larger weight than provincial roads when connecting various order nodes in the urban hierarchy. As a result, the combination of nodes and corridors played a crucial role in building the urban hierarchy and guiding the process of using it as a regional planning tool.

Nodes and corridors can be seen as the early stages of the spatial system analysis of the studied region. This would show which nodes in the current hierarchy may already be incorporated in the process of creating a more balanced spatial system using the function of an urban hierarchy as a spatial planning tool. Social and economic indicators would be the focus of the second part of the selection criteria for proving the function of an urban hierarchy. To determine whether the nodes identified in the first phase already have a foundation for future development, the inclusion of the second phase and eventually social and economic indicators is made.

The development of relationships between nodes in a region is referred to as connecting distinct nodes in a region. The contact and relationship between the nodes result in mutual benefit and node growth. The next task is inextricably tied to the role of corridors as connectors. The actual purpose of a road or road network between distinct nodes is fulfilled by corridor development. Williams and Marshall (1996:5) support this viewpoint by arguing that the interaction of transportation and land-use activities is the primary dynamic of a corridor. In tne existing infrastructure, access between communities in the region improves, and the possibility for new economic opportunities begins to emerge. With new business opportunities emerging along these pathways, the existing regional economy is supplemented and expanded, resulting in increased regional economic vitality.

Dewar and Watson (1990:21) explain corridor development by focusing on potential economic prospects as well as the typical geographic features of the local area. Andersen and Burnett (1998:2) describe corridor development by focusing on the transportation role and supporting activities in the immediate area, but also include a regional viewpoint. In the context of regional planning, the terms "corridor" and "corridor development" are frequently employed. Although corridor development is a popular spatial planning tool, it can be referred to in a variety of ways depending on the context of the spatial system.

When different settings and conditions for corridor development are considered, the fundamental characteristics and purpose of a corridor in the spatial system remain more or less constant. Corridors are used as a crucial regional planning tool that directly influences the organization and development of an area in every spatial context and at every level of planning (Hauptfleisch *et al*., 2010; Geyer, 1989; Friedmann, 1986). The main purpose of corridors is to promote communication between nodes and regions within a specific area. A region's degree of development is greatly influenced by the interaction of its nodes and the significance of these links or corridors (Friedmann, 1986:70).

4.4.4 Planning region as regional planning instrument

According to James (1952:203), a planned region may be formed by controlling and managing numerous components of a region or delineated area in order to attain a certain purpose or target. Before the actual execution and natural development, a planned region is conceptualised. The population, economic sectors, and planned corridors and nodes are some of the components that may be utilised to control the outcome of a region's growth (James, 1952:203).

The interaction inside the delineated limits is the emphasis of planned regions, which ignores the implications and interactions with other areas (Glasson & Marshall, 2007:78). A region can be designed to incorporate the influence of other places, or it can be planned to focus and reserve the growth of the region around selected nodes and corridors, depending on the aims or objectives for that region (Glasson & Marshall, 2007:78). Planned regions may thus be thought of as a regional planning tool that focuses on a bigger geographic area that includes nodes and corridors. Planned regions can also be planned and executed across administrative regional boundaries, in which distinct governing bodies collaborate to accomplish a common regional goal.

The notion of a planned region was developed by John Friedman (1966) as a means of addressing and improving several planning difficulties in various locations or regions. The strategy was to construct or design a new planned region in order to address general planning issues that arose in diverse regions. The planned region may be divided into smaller sections, each having its own distinctive and important function in the area. Friedmann (1966:40) stated that the planned region's centre is surrounded by growth and transitional changes. The benefits and resources available in the core region are largely responsible for the growth and development of these regions. The outlying areas grow and develop in tandem with the centre in terms of population, economics, and commercial operations.

When the target area grows and develops into a new geographic region, a new source of development may be discovered. In some places, a second core of the desired region may form.

When new resources are detected in the current core of the region, the creation of activities and people will start there and spread along a corridor to the origin where the discovery was made. Once the link between these locations is established, a mutual interaction and reliance start to develop inside the boundaries of the planned region (Glasson & Marshall, 2007:79).

Regional planning entails a combination of existing features, dynamics, and processes that must be adjusted to the needs of the region in order to reach the desired goals (Bryson & Roering, 1987:10). The overall goal of regional planning is to enhance the spatial organisation of activities or uses (Hall & Tewdwr-Jones, 1975:3). Glasson & Marshall (2007:15), is of the opinion that regional planning has traditionally focused on a range of regional characteristics and issues.

The interaction within the delineated limits is the focus of planned regions, which ignores the impacts and interactions with other areas (Glasson & Marshall, 2007:78). Depending on the goals or objectives for a region, planning in that reqion has to consider the effects of other locations, or the planning should concentrate on and reserve the development of the region around specific nodes and corridors (Glasson & Marshall, 2007:78). Thus, planned regions can be viewed as a method for regional planning that concentrates on a larger geographic area that includes nodes and corridors. In situations where several governing organizations co-operate to attain a common regional aim, planned regions can also be proposed and implemented across administrative regional boundaries.

Planned regions can be divided into smaller sections, each having its own unique and important role in the area. The planned region's core is the area with the highest population density, concentration of activities, and strong growth rates (Friedmann, 1966:40). A large influx of individuals from surrounding areas is concentrated around the region's centre.

4.4.5 Application of regional planning instruments

Regional planning entails a mix of existing features, as well as the dynamics and procedures that has to be modified regionally to meet specific goals (Bryson & Roering, 1987:9). This method relates to the control and management of a region's growth in general (James, 1952:203). Underdeveloped regions that require a predetermined approach, such as scheduled regions, may benefit from regional planning. A programmed zone, according to Glasson and Marshall (2007:78), focuses on internal interactions while excluding external affects and interactions. Despite the fact that these regional planning tools mainly result from natural growth and interaction, it is crucial to take the impact of these processes and factors on a region's overall growth and development into account. Considering the effects of these tools, it can be stated that

nodal and corridor development should be employed effectively in regional planning around the world, to aid in the achievement of strategic planning goals.

Combining the area's development idea, which consists of movement, networks, nodes, hierarchies, and surfaces, is the most frequent technique employed in regional plans or area development plans (Glasson & Marshall, 2007:14). The regional planning instruments' combination and unity are made up of predetermined or pre-identified variables in the region that influence and drive the region's overall spatial structure, as well as its growth and development orientation. It is also worth noting that a region's spatial structure is influenced by natural, physical, and psychological barriers as well as regional planning instruments.

According to Lloyd and Dicken (1972:262), when constructing a regional plan, it is important to distinguish between the various geographical focus levels of the regional plan. In general, regional planning must take into account the interaction and mobility of people and goods within a region. The relationship between nodes of different functions is represented by movement patterns, networks, and corridors, fostering interaction within a region (Hauptfleisch *et al*., 2010; Andersen & Burnett, 1998; Roeseler & Von Dosky, 1991; Boudeville, 1972; Michaelson *et al*., 2008). Connecting elements with other nodes in the area thus give certain nodes particular responsibilities and functions.

The creation of regions, nodes, hierarchies, and growth trajectories can all be influenced by the regional planning tools. Depending on the types of results and goals set for a region, these instruments can be employed in particular regions of various geographic scales to guide regional development towards its objectives (Albrechts *et al*., 2003:122; Quinn, 1980). Each regional planning instrument supports the regional plan in its own way. Depending on the purpose that has to be reached, regional planning instruments may be utilised in isolation (Bryson & Roering, 1987:10). Where several instruments are combined, it is possible that it may cause a greater overall impact on the region (Wilkinson & Appelbee, 1999:92).

4.5 Regional delineation

As described in section 4.6, regional planning focuses the development and expansion of an area on specific objectives and goals via the use of various spatial planning instruments. The precise area of concentration in the region must be defined before the regional planning instruments can be applied. The demarcation of a territory in regional planning may have a big influence on the development goals that have been set. A region's limits can be pre-determined (as in the case of a municipality or province), or regional planning tools can be used to assist in determining the region's boundaries.

Due to complicated agglomeration and spatial arrangements, a great number of regional development theorists throughout the world try to find an appropriate strategy for regional demarcation. The process of regional delineation has a direct influence on the structure of an area, as well as its dynamics and interaction. The regional boundaries might possibly alter the region's interaction, depending on distinct regional dynamics and interactions. The interconnection between different nodes in the area might have an influence on the hierarchy of nodes in the region, depending on the scale and structure of the region. Various factors can also influence regional demarcation. This might be as a result of the planning tools stated in the introduction, or it can be influenced by a variety of other external factors such as politics or the sub-continental economic climate.

This research explores the distinct areas defined by a variety of variables and impacts (Harmse, 2009:60). The focus is on the many strategies used in regional planning that might have an influence on overall regional dynamics and interaction for the purposes of regional planning. Different existing procedures made valuable contributions to the delineation process, with still other delineation methods added. The gravity model (Gray, 2014:15; Huff, 1964:35), the enhanced field model (Wang *et al*., 2014:754), and the Voronoi model were all commonly used in the delineation process (Boots & South, 1997:521). A region's delineation is not usually based on a single model, but rather on a holistic approach that considers factors such as the economic climate, politics, and natural terrain. The mathematical models as well as holistic methods are discussed in the following sections.

Finally, appropriately delineating a territory will increase the region's interaction, organisation, cohesiveness, and development. As a result, when outlining a territory, it is crucial to select the appropriate factors.

4.6 Strategic spatial planning

4.6.1 Historic perspective

The history of modern city- and regional planning as a public duty date back to the second half of the nineteenth century, when foresighted urban planners attempted to mitigate the negative consequences of fast industrial expansion (Schmitt & Wiechmann, 2018:22). Since the 1960s, spatial planning has been a part of third-world development. The main spatial development approach during most of the 1970s was based on growth pole and growth centre theory (Mitchell-Weaver, 1991:419). According to Kaufman and Jacobs (1987:23), the private sector adopted strategic planning in the 1950s. Early in the 1970’s, American government leaders began to show

a growing interest in strategic planning as a result of difficult developments, such as oil crises, demographic changes, shifting values and, an unstable economy. (Bryson & Roering, 1987:10).

Strategic spatial plans and the planning process that go with them are techniques for selective determinations about future activities based on defined existing geographic areas for a particular population, which is typically controlled by a government administration (Morphet, 2011:287).

There is no consensus on what constitutes a strategic spatial plan's content. According to one viewpoint, it is a tactic intended to promote a region's future economic development (UNHABITAT, 2009:152). Identifying change drivers in complex economic, social, political, and environmental systems is another justification for the use off these techniques (Healey, 2006:120). According to the authors, strategic spatial plans can be viewed as a future vision for the urban form that is utilized to influence land use management decisions, combining the aforesaid opinions of UNHABITAT (2009:152) and Albrechts *et al.* (2003:120).

According to Kaufman and Jacobs (1987:87), the private sector adopted strategic planning in the 1950s. Its origins were connected to the necessity for quickly changing and developing enterprises to plan for and manage their futures efficiently at a time when the future itself was becoming increasingly unpredictable, as well as rules for use of the land in various locations.

4.6.2 Strategic Spatial Planning

Strategic spatial planning principles and, more generally, the application of strategy in planning are both ill-defined (Sartorio, 2005:27). As numerous scholars have noted, the term "strategy" has its roots in the science of combat (Salet & Faludi, 2000:155). Its meaning is crucial for my argument even though this origin was never explicitly translated into theories of spatial planning because it combines two distinct "souls" that occur in planning theory and practice in opposing directions (Sartorio, 2005:27). The terms "strategy" and "strategic planning" were originally used in discussions on structural planning, which have been of interest to planners in the UK, the Netherlands, France, and Germany since the 1960s, with diverse sources, implications, and outcomes (Sartorio, 2005:27).

Most urban planning systems around the world today do not successfully handle sustainability, liveability, environmental, spatial, or equity challenges of any kind (Erkan, 2009:90). A study by Healey *et al.* (1999:341) confirms that the processes of economic and social development affect spatial planning practices, which give birth to demands for space, location, and place characteristics. Social marginalization, migration, spatial segregation, and red lines are all on the rise in many cities (Saka, 2009:91). In the vast majority of cities, spatial and transportation issues have become increasingly important, and are linked to health issues and the feeling that life

quality is deteriorating (Erkan, 2009:91). People are relocating from city centres to the suburbs, and businesses are transferring their operations from the centre to outlying areas, resulting in decentralisation and conurbation (Erkan, 2009:91). Meanwhile, increasingly disadvantaged or marginalised people are settling in metropolitan cores (Erkan, 2009:91). According to Healey *et al.* (1999:340), strategic spatial planning should be supported since it highlights the features and relationships of places. Spatial planning techniques may provide a frame of reference, vocabulary, and metaphors for concentrating and organising the actions of the various parties involved in urban regional developments if designed selectively (Healey *et al.,* 1999:340).

In order to create a unified vision for guiding the medium to long term development of cities, strategic spatial planning is gaining popularity around the world. However, because it is multifaceted, rooted in socio-political and institutional complexity, and highly context-dependent, it is challenging to understand theoretically and conceptually. It is mostly a well-researched American and European planning strategy (Healey, 2006:72, Albrechts, 1992:198, Faludi, 2009:15, Van den Broeck, 2008:268).

In the 1980s, neoconservative disdain for planning and postmodernist scepticism, both of which tend to view progress as something that cannot be planned if it occurs, fuelled strategic planning (Healey, 1996:220). In contrast, projects and land-use regulations were the main focus of urban and regional planning techniques (Motte, 1994:100), notably for reviving blighted sections of cities and regions.

Despite the fact that the scope and methods of operation of urban planning systems differ, all of these has three purposes (Saka, 2009:92):

1. Long-term strategic planning creates a unified vision for the future based on a comprehensive assessment of strengths, weaknesses, opportunities, and threats.

2. The European Commission Expert Group on the Urban Environment defines plan-making as "providing frameworks through development strategies and plans at various geographical scales," including national, regional, city, neighbourhood, and specific sites (European Commission Expert Group on the Urban Environment, 2013:1). The plan covers a broad range of topics to achieve social equity measures, economic decisions, and investment.

3. Development control refers to municipal legislative or administrative procedures that regulate the site and type of development, as well as changes in usage inside buildings.

One feature of strategic planning is that it must concentrate on a small number of strategic critical issue areas (Bryson & Roering, 1987:18). In order to identify strengths and weaknesses in the context of opportunities and challenges, it must critically examine the environment (Kaufman & Jacobs, 1987:23). It looks into trends, pressures, and resources outside of the organization (Poister & Streib, 1999:308); it identifies and gathers key stakeholders (public and private). It enables a wide range of participation (public, economic, and civil society) in the planning process; it generates a realistic long-term vision or perspective, as well as strategies (Mintzberg, 1994:12,13) at various levels (Albrechts *et al.*, 2003:118). To some, this may appear to be an overly broad interpretation of strategic planning (see Mintzberg, 1994:13), but this broader viewpoint is supported by the numerous experiences that are discussed in the planning literature (Albrechts *et al*., 2003:126; Healey *et al*., 1999:342). It also implies that spatial planning is not restricted to a single idea, method, or tool. In effect, if desired results are to be achieved, a collection of ideas, techniques, and tools must be accurately tailored to the particulars of the scenario at hand (Bryson & Roering, 1987:20).

"Strategic plans are defined as frameworks for action". - Albrechts (2004:747)

Using ideas of institutional potential for regional development and the significance of social capital as a resource, strategic spatial planning may be regarded as a social process for creating and upholding territorial relationships infused with shared values (Putnam, 1993; Innes *et al*., 1994). Spatial planning is a broad term that encompasses a variety of concepts, procedures, and tools. In fact, if desired outcomes are to be accomplished, a set of concepts, procedures, and instruments must be carefully customised to whatever situation is at hand (Bryson & Roering, 1987:22). Process, institutional design, and mobilisation are all important aspects of strategic planning, as is the creation of substantive theories. Healey *et al.* (1999:340) define spatial planning as the process of establishing frameworks and rules to govern the construction and placement of physical infrastructure.

The circumstances surrounding a strategic spatial planning system affect its capacity to produce the desired results in addition to the system itself (Mintzberg, 1994:14). A number of elements, such as public and professional attitudes toward spatial planning (both in terms of content and method), and the political will of the institutions participating in the process' inception, affect planning systems' capacity to implement the selected solutions (Granados Cabezas, 1995:176). The following definition of *spatial planning* is used in the Wales Spatial Plan (Welsh Assembly Government, 2004: 3): "What can and should happen there is considered in spatial planning. It looks at how diverse policies and practices interact throughout regional space, as well as the significance of locations in a larger context. It goes well beyond 'traditional' land-use planning and

establishes a strategic framework for future development and policy interventions, whether or not they are subject to official land-use planning control."

4.6.3 Strategic Spatial Planning approaches

Salet and Faludi (2000:164) identifies three key approaches to strategic spatial planning:

(a) institutional approach to planning (Healey *et al.*, 1999:340);

(b) communicative turn in planning; and

(c) interactive approach to planning.

Even in these varied aspects, all of these different forms of strategic planning still co-exist today to some extent (Sartoria, 2005:28).

4.6.3.1 Institutional approach

An institutional approach that advocates two primary directions: one aimed at legitimising planning activity, and the other considering institutionalisation as a primary means of putting plans and programs into action. According to Salet and Faludi (2000:157) this approach is more of a mode of thinking than a methodology, and it aims to add a reflexive dimension to a primarily pragmatic field. A further explanation by Salet and Faludi (2000:158) is that interrelationships between multiple planning subjects are seen in interactive techniques. Three levels of institutional cognition and activity have been distinguished by Mayntz and Scharpf (1995:20):

(a) social norms and religious systems;

(b) formal rules of governments (constitutions, the structure of the economy; and

(c) policy systems), and institutional reflection in action.

<u>Social rules and system of belief</u>

Salet and Faludi (2000:160) argues that it is not always uncomplicated to figure out which social groups, or even entire societies, have particular norms and deviations from these kinds of institutional standards. It may often immediately become obvious, thus prompting retaliation from those who value the overall norm. The interpretation of what can be considered a general rule is frequently influenced by the specific circumstances or events that prompted the need to expressly query the general principles and establish an interpretation (Salet & Faludi, 2000:160). The dynamic of social rules is typically raised inductively as a discovery trip, and it continues through

their application in constantly changing contexts (Salet & Faludi, 2000:5), who further states that social and cultural rules are an integral aspect of planning theory.

Formal rules of regimes

For Salet and Faludi (2000:161) normative domains or regimes are terms used to define this group of institutional regulations and three types of formal regimes are considered for spatial planning.

(a) *"The structure of the legal and political system"* (Salet & Faludi, 2000:161), which refers to the constitutional and administrative foundations of political institutions, as well as norms managing citizen-state ties, constitutional underpinnings for ensuring the rule of law, and regulations governing interdepartmental connections.

(b) *"Fundamentals of the economic system"* (Salet & Faludi, 2000:161), which refers to the norms and rules that govern the markets and submarkets that are so important to spatial planning.

(c) *"Spatially relevant policy systems"* (Salet & Faludi, 2000:161), which refers to the ground principles for topics such as housing policy, transportation policy, and spatial policy, as well as how the various public and private players' abilities are distributed.

The institutional approach, according to Salet and Faludi (2000:162), is mainly concerned with the interpretation of fundamental principles and the distribution of tasks among all role players. Plan-making practices are described by Healey *et al*. (1999:343) as social processes in which a diverse collection of people from different institutional affiliations and positions come together to determine plan-making procedures and produce content and strategies for spatial change management.

Institutional reflection in practise

The level of institutional analysis, which governs planning practice and policy, is by far the most essential, according to Salet and Faludi (2000:166). This is also the level of abstraction where policy objectives and real issues confronting planners and policymakers are at stake (Salet & Faludi, 2000:166).

4.6.3.2 Communicative/Collaborative approach

A rising number of planning theorists have taken a "communicative turn" in the recent decade (Healey, 1996:221). According to Voogd and Woltjer (1999:836), communicative planning appears to be taking precedence over traditional instrumental rationality in modern planning, whose professional approaches are frequently criticised as technocratic. Communicative planning is defined by a long-term perspective on planning in which the attention is not only on the planned object, but also on the process as a whole, and on communication rather than computations (Sager, 1994). According to Mannberg (2005:410), the ideal of deliberative democracy has shifted the planning ideal towards collaborative or communicative planning in planning theory. Mannberg and Wihlborg (2008:36) means this process considers, and is based on, “citizens' interests and participation options”, and as a result, engaging with citizens and other stakeholders becomes an important part of the planning puzzle. Mannberg and Wihlborg (2008:36), argue that there is a significant chance that the communication process will take precedence over the strategy itself. When that new communication is then prioritised, the conventional form of representative democracy is challenged. The term "shared decision-making," which emphasises the use of co-operative, consensus-based procedures in all spheres of life, including government, environmental regulation, physical infrastructure, and community sustainability, is what is also named the collaborative method (Healey, 1996:225).

Hall and Imrie (1999:410) defines communicative planning as "a powerful conception in legitimising a managerial response to the planner's concerns." Allmendinger (2002:80), on the other hand, takes a different approach to the planner's theoretical position as a "managerialist," the central character in the process.

The premise of communicative action is twofold: it could both "liberate" planning theorists from studying the depressing reality of planning in societies that are becoming more and more divided, and engage them in poststructuralist and multicultural discourses on the nature of knowledge, ethics, and justice (Yiftachel & Huxley, 2000:908). Yiftachel and Huxley (2000:907) have two main arguments. At first, the understanding of planning is one of several modern methods for theorizing planning, and, secondly, some aspects of the communicative method are problematic as a theoretical basis for planning, mainly because they draw attention away from the political and material processes that shape cities and regions.

Planning, which had been viewed as the domain of technocrats and so-called experts for decades, saw a substantial shift as policies were widely criticised and debated by a varied spectrum of state and non-state actors (Gunton & Day, 2003:6). As a result, planners invited diverse stakeholders to participate in the process and allowed for the democratic selection of guiding aims and ideals (Gunton & Day, 2003:6). This caused increased focus on participation, engagement approaches such as workshops, advisory committees, and public hearings that have developed (Gunton & Day, 2003:6). Allmendinger (2002:80) divides communicative planning into two parts:

(a) Communicative action, the planning process itself is referred to as a learning process, and even a fostering process, among those participating, with the goal of establishing mutual understanding and consensus; and

(b) Communicative rationality, which refers to an individual's ability to make reasonable decisions that benefit the entire community.

Possible threats have been presented by Goodin and Dryzek (2006:225) that planners need to be aware of when using this approach.

(a) Planning for the process rather than the plan;

(b) Challenging the balance of power – decreasing democracy;

(c) False legitimatization;

(d) The ambiguity of consensus.

Mannberg (2005:413), added that despite the fact that it aims to achieve long-term objectives, it is not considered goal oriented. Mannberg (2005:413) continues that communicative or collaborative planning is constructed on a non-hierarchical social system intended to foster democracy based on reciprocal communication and trust. Not much academical research on facing the challenges on communicative planning adding to the gap in communicative research, has yet been done.

4.6.3.3 Interactive approach

Russell Ackoff (1981:355) created interactive planning to let stakeholders build a desired future for themselves, their business, and their residential environment (Ocak, 2015:1634). The notion behind interactive planning is that in order to arrive at a desirable future, one must first establish a desirable present and then devise ways to resemble it (Haftor, 2010:360). Interactive planning

is a participatory way of dealing with a collection of linked issues where it is thought that unless something is done, a desired future is unlikely to materialise. On the other hand, if proper action is taken, the chance of such a future may be improved (Ocak, 2015:1634). Ackoff (1999:3) states that the goal of proactive planning is to shape the future. It is founded on the concept that an organisation's future is determined as much by what it currently does, as by what it will do in the future (Ackoff, 1999:3). This type of planning entails creating a desirable present and selecting or inventing means to get as close to it as possible (Ackoff, 1999:3). It creates its own future by constantly shrinking the gap between where it is at present and where it wants to be in the future (Ackoff, 1999:3).

A communicative and discursive strategy that emphasizes framing and sense-making, suspended in a technocratic tension, aimed at improving connections between public and private organizations in order to improve planning performance (Mannberg & Wihlborg, 2008:43). The objective of interactive planning is to swiftly arrive at an ideal state (Ackoff, 1981:354). This state is defined as a design for the system that the existing system's stakeholders would use if they had the option (Ackoff, 1981:354). A system like this should be able to learn and adapt quickly and effectively, and it should be both technologically and operationally feasible (Ackoff, 1981:355). Interactive planning promotes democratic control by enabling and encouraging the active involvement of many stakeholders in the conceptualisation and implementation of programs, initiatives, strategies, and procedures (Ocak, 2015:1633). As a result of this empowering transformation, stakeholders can become more devoted, engaged, and grounded decision-makers (Ocak, 2015:1633). Interactive planning "expands participants' idea of what is feasible and demonstrates that the biggest impediments to realising the most desired future are often self-imposed limits" (Ocak, 2015:1633).

According to Flacke *et al.* (2020:49), interactive planning fosters ownership and, in due course, encourages stakeholders to participate actively. It further aids in the mapping of the organization's existing position in relation to its planned future state. As a result, interactive planning allows the organisation and its members to be reflective and self-critical as it evolves and grows (Facke *et al.,* 2020:49). Ackoff (1999), established three unique characteristics of interactive planning:

(a) interactive planning works backwards from where an organization wants to be today to where it is right now;

(b) interactive planning is ongoing and never stops;

(c) through interactive planning, company stakeholders can take part in the planning process.

4.7 Conclusion

This chapter reviewed the importance and functions of current regional planning and regional planning tools. The early sections covered regional planning, including its objectives and dynamics. In order to achieve the intended goals, regional planning involves a variety of current features, dynamics, and practices that must be modified to the demands of the region (Bryson & Roering, 2018:209). Regional planning's overarching objective is to enhance the spatial organization of activities or uses (Hall & Tewdwr-Jones, 1975:3). Regional planning has historically concentrated on a variety of regional issues and characteristics, as claimed by Glasson and Marshall (2007:15).

Regional economic growth is important since it can either help or hinder national growth and development (Lloyd & Dicken, 1972:262). Economic growth may be boosted and regulated by putting in place appropriate regional planning tools. Combining these tools will ensure that pro-active and co-ordinated development planning strategies are used to broad regional planning challenges (United Nations, 2019:9). Regional development does not always continue consistently or as anticipated, leading to a diversity of forms and consequences for regional development objectives, regardless of the efforts and implementation of these instruments in a region.

Spatial planning is primarily a role of government, that aims to influence future spatial allocation of activities. Its objectives include creating a more logical geographical arrangement of land use and how it relates to one another, balancing the need for development with the need to protect the environment, and achieving social and economic objectives. Spatial planning strives to co-ordinate and enhance the effects of various sectoral policies on land use in order to provide a more equitable distribution of economic development within a given region than would otherwise be produced by market forces.

SECTION 3: EMPIRICAL ANALYSIS

CHAPTER 5: EMPIRICAL STUDY: INTERNATIONAL CASE STUDIES

5.1 Introduction

This chapter will focus on international case studies with a particular focus on urban systems used as strategic spatial planning tools. The first part will focus on the methodology employed in the empirical study so that the reader could understand why the case studies were assessed the way it was done. The significance of this chapter lies therein what it examines several case studies to discover strategies and policies that have been adopted by various countries to increase the efficacy of strategic spatial planning.

The following diagram (Figure 5-1) depicts the structure and outline of chapter 5.:

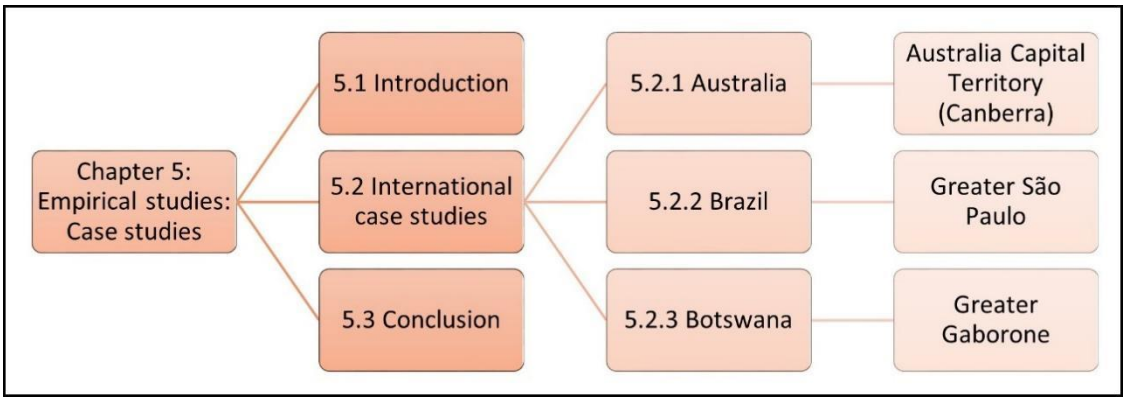


Figure 5-1: Chapter 5 structure

Source: Own compilation

5.2 International Case studies

This section looks at the way developed and developing countries have implemented urban systems as a strategic spatial planning tool. The reason behind the usage of foreign case studies for both developed and developing countries, is to provide a measure against which South Africa (particularly the Gauteng City-Region) may be measured, with a focus on urban systems and their role in strategic spatial planning. The first part concentrates on the laws and policies of a developed nation, such as Australia. The second section focuses on the laws and policies of a developing nation, such as Brazil, which shares many of South Africa's geographical characteristics and natural resources which causes it to be alike. Apart from the fact of geographical similarities, Botswana was included in the study because of the SADC membership, which creates a common ground in using general statistics for the preliminary assessment. The

selected capital cities share many of the same features as the Gauteng City-Region like dense capitals, economic performance, and development objectives. The cities have a regional impact, allowing for potentially relevant comparisons.

Australia Capital Territory and Greater São Paulo were chosen because of their significant growth and improvement in regional development, which can add value to Gauteng City-Region, as discussed in Chapter 7.

When referring to urban systems, the case studies will focus on population distribution; and policies or legislation implemented to promote spatial planning in the various urban systems. The goal of this chapter is to assess the various policies and processes that have been implemented to promote spatial planning in the various metropolitan systems. The focus will then move to some of Australia's characteristics, the geographic distribution of cities and towns, and policies that have been adopted or will be implemented to strengthen spatial planning.

5.2.1 Australia

Australia has no country borders and is bound by the Pacific and the Indian Oceans, as indicated on below. When it comes to the United Nations Development Programme, Australia is successful, since it was placed eighth in their Human Development Report in 2019 (United Nations, 2019a:1) . Australia is classified as a developed country and has one of the strongest and most sophisticated economies in the Organisation for Economic Co-operation and Development (OECD). It has a generally steady economy. Australia is one of the world's most urbanised countries, having big metropolitan centres and a second level of cities with populations exceeding 200,000 people (Budge & Butt, 2007:281).

Figure 5-2: Location of Australia on world map

Source: King and Cole (2018:1)

5.2.1.1 Background

In the 1850's, gold was discovered in New South Wales and Victoria, resulting in a gold rush that attracted people from all over the world. A continued increase in the trend level of either aggregated production in the Gross Domestic Product (GDP) or average GDP per person, can be defined as economic growth and sustainability (Fourie & Burger, 2009:13). The large metropolitan centres of Sydney, Melbourne, Brisbane, Adelaide, and Perth, the capitals of their respective states, dominate Australia's urban structure (Searle & Bunker, 2010:164).

New South Australia, Queensland, South Australia, Tasmania, Victoria, Northern Territory and Western Australia are the seven states that make up Australia. Then, sub-regions are created within each of these regions.

The busy capital of Sydney, the country's largest metropolis, is located in New South Wales (Tourism Australia, 2019:1). The Northern Territory is located at the top of Australia, with Darwin as its capital. Queensland is renowned as the 'Sunshine State' in Australia, Brisbane is the state capital. South Australia is located in the bottom of the country's central region where Adelaide is the state capital. The island state of Tasmania, isolated from mainland Australia by the Bass Strait, is a microcosm of the island nation, with Hobart as its capital. Victoria is Australia's booming cultural heartland, centred on Melbourne, the state capital. The best environment and culture are combined in the Australian Capital Territory, which contains Canberra, the country's capital.

The six regions and their locations within Australia are depicted in Figure 5-3:

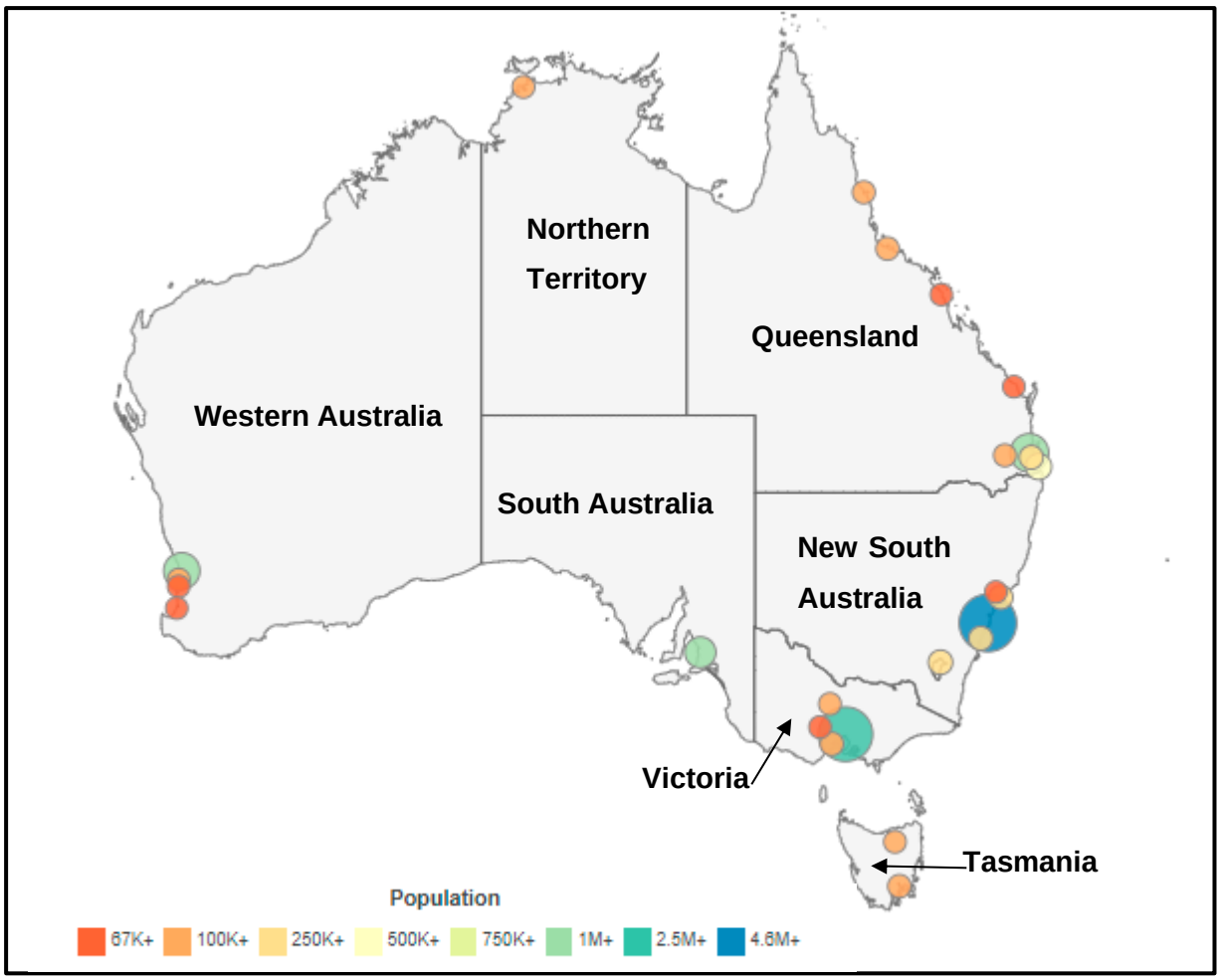


Figure 5-3: Map Australia states and population

Source: Adapted from Australian Bureau of Statistics (2022:1)

Table 5-1: Australia as developed country

Developed ranking	Country	Human Development Index (HDI)1	GNI per Capita2 (World Bank, 2022)	2021 Population
8	Australia	2,1	53,690	25,739,256

Source: Own compilation

[1] The Human Development Index (HDI) is a measure of social progress that considers three factors: life expectancy, educational attainment, and living conditions and income.

[2] GNI per capita is calculated using the World Bank Atlas technique, which divides the gross national income by the midyear population (World Bank, 2022).

Australia is a developed nation with a high-income economy, being the thirteenth largest economy, the tenth highest income per capita, and the eighth highest Human Development Index worldwide, according to the Australian Bureau of Statistics (2021:1).

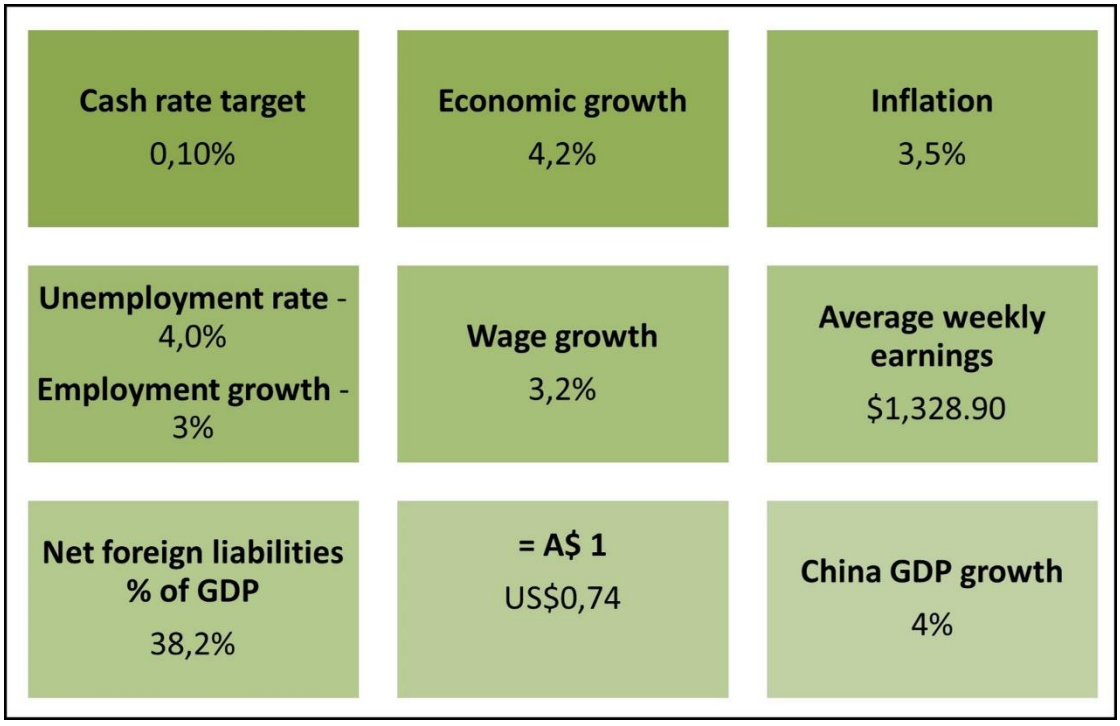


Figure 5-4: Australia economic summary

Source: Australian Bureau of Statistics (2021:1)

According to the World Bank (2022:1), Australia's GDP is 1,331 trillion USD. Australian economy is expected to increase at a rate of 2.7 percent each year, up to 2050 (Australia Department of the Environment and Energy, 2017:9-11). Increased demand for energy and other resources, as well as increased waste output, will almost certainly accompany economic growth, with all of the associated environmental implications for resource development, emissions, and waste management (Australia Department of the Environment and Energy, 2017:14). Economic growth, on the other hand, may be largely disconnected from the growing resource usage and waste. In recent decades, improvements in resource efficiency have resulted in a weakening of the relationship between economic development and energy use (Australia Department of the Environment and Energy, 2017:24).

The focus is on the efforts in the manufacturing, service, agriculture, and mining sectors (Department of Foreign Affairs and Trade, 2016:9). More than 60% of the Australian economy's GDP is made up of the service industry, which is heavily focused on financial services and subject to strict regulations (Department of Foreign Affairs and Trade, 2016:18). Mining, finance, health

and education, manufacturing, and construction are the five major economic production sectors, according to the Reserve Bank of Australia (2019:12,100,125,137), as shown in Figure 5-5.

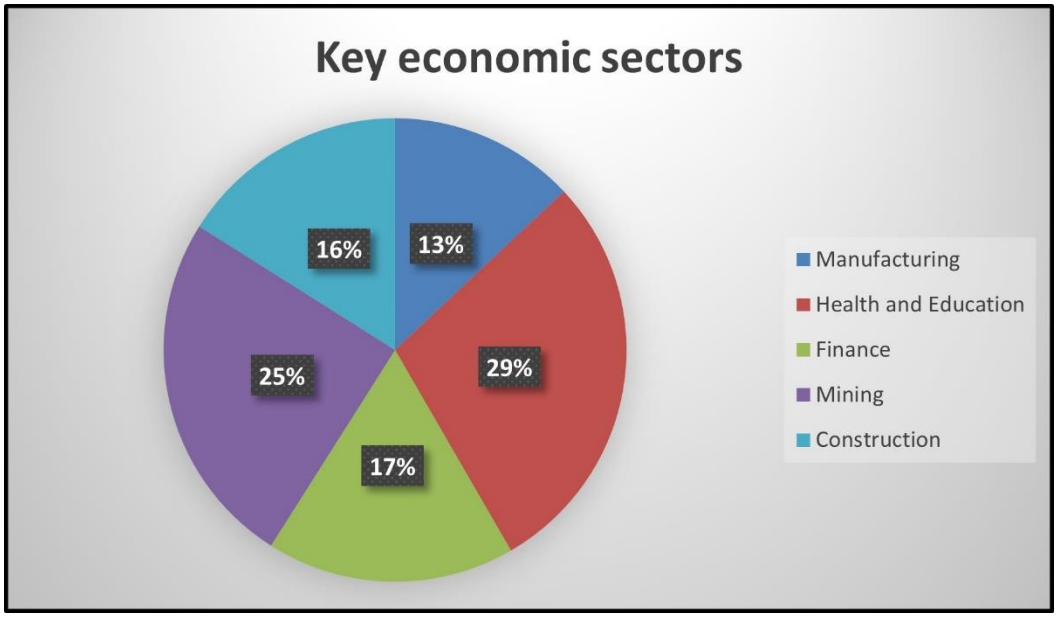


Figure 5-5: Five key economic sectors

Adapted from: The Reserve Bank of Australia (2019)

Since early British colonisation, urban planning in Australia has changed and has been highly affected by contemporary planning trends in the United Kingdom, the United States of America, and Western Europe. Due to Australia's fast urbanisation, urban planning became an increasingly prominent subject, with political, civic, and intellectual debate centred on the coordinated planning and administration of quickly rising metropolitan regions in the early decades of the century.

Australia's population, stood at 25,739,256 people in June 2021 (Australian Bureau of Statistics, 2022:1), and is expected to rise to 35.9 million by 2050 (Australia State of the Environment, 2016). While Australia's population growth has been consistent, the pattern of growth has not been (McCrindle *et al.*, 2021:8). Australia's population has exploded in recent centuries, which had an intense impact on the spatial layout enlarging the nodes of Australia. Australia has grown by four million people due to foreign immigration and another three million due to natural growth (McCrindle *et al.*, 2021:9).

Table 5-2: Population of Australia states

	Population at 30 Jun 2021 ('000)	Change over previous year ('000)	Change over previous year (%)
New South Wales	8 189,3	22,2	0,3

	Population at 30 Jun 2021 ('000)	Change over previous year ('000)	Change over previous year (%)
Victoria	6 649,2	-44,7	-0,7
Queensland	5 221,2	45,9	0,9
South Australia	1 773,2	3,0	0,2
Western Australia	2 681,6	17,4	0,7
Tasmania	541,5	0,9	0,2
Northern Territory	246,3	0,1	0,0
Australian Capital Territory	432,3	1,1	0,2
Australia (a)	25 739,3	46,0	0,2
a. Includes Other Territories comprising Jervis Bay Territory, Christmas Island, the Cocos (Keeling) Islands and Norfolk Island.			

Source: Australian Bureau of Statistics (2022:1)

The coast, inner-city areas, outer suburbs, and urban regions are the locations where Australia's population is growing the highest. Rural areas (which have been hit by drought), mining areas, and inland areas have all had population declines (Australian Bureau of Statistics, 2021:1). The largest population density is near the coast on the eastern side of Australia (Queensland, New South Wales, and Victoria), with other highly inhabited places on the western (Western Australia) and northern sides of Australia (Western Australia) (Northern Australia).

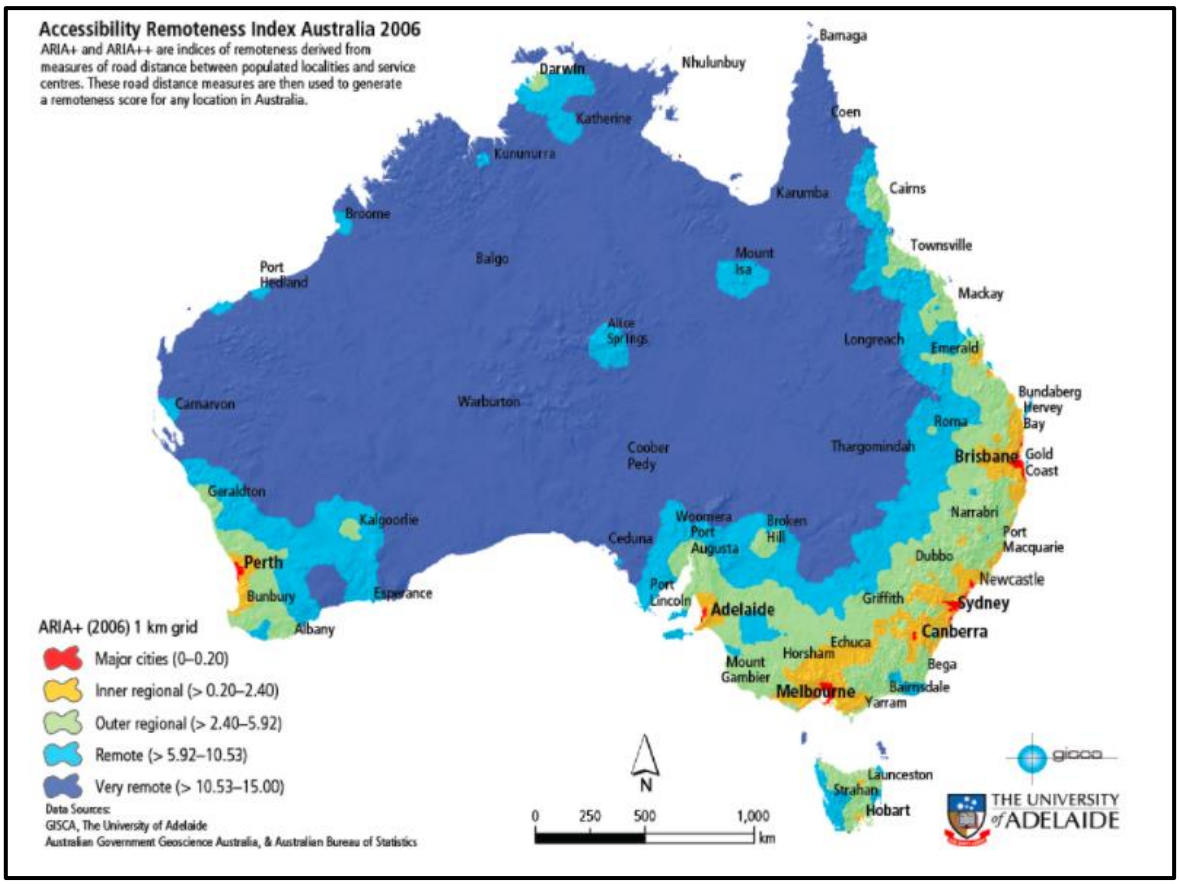


Figure 5-6: Remoteness Index Australia

Source: The University of Adelaide (2019)

The population density of Australia is depicted in Figure 5-6. Looking ahead, three out of every five Australians who do not already live in a regional area (60 %) have pondered migrating to one (McCrindle *et al.*, 2021:18). In fact, more than a third had given it some thought (36 %) (McCrindle *et al.*, 2021:18). The red indicators in Figure 5-6, depicts the seven capital cities designated as Greater Capital City Statistical Centres (GCCSAs), which primarily reflect Australia's major urban areas. The rest of this case study will be about Canberra, being the capital of Australia, with a moderate population density and the economic hub of Australia.

5.2.1.2 Canberra City District

Canberra, which is located in New South Wales, is Australia's main capital. Gauteng City- Region and Canberra have similar densities of population. The Australian capital territory, a small area created to ensure that Australia's capital was not placed in one of the country's five states in order to maintain neutrality, includes Canberra, a planned city that is not situated in one of Australia's states. Canberra is located at the northern end of the territory.

For this case study, further focus will be on the Australia Capital Territory (ACT).

The ACT and surrounding NSW region is made up of Canberra and its rural villages, the City of Queanbeyan, as well as a number of towns and villages such as Yass, Murrumbateman, Bungendore, Sutton, Gunning, Gundaroo, Binalong, and Bredbo (Figure 5-8).

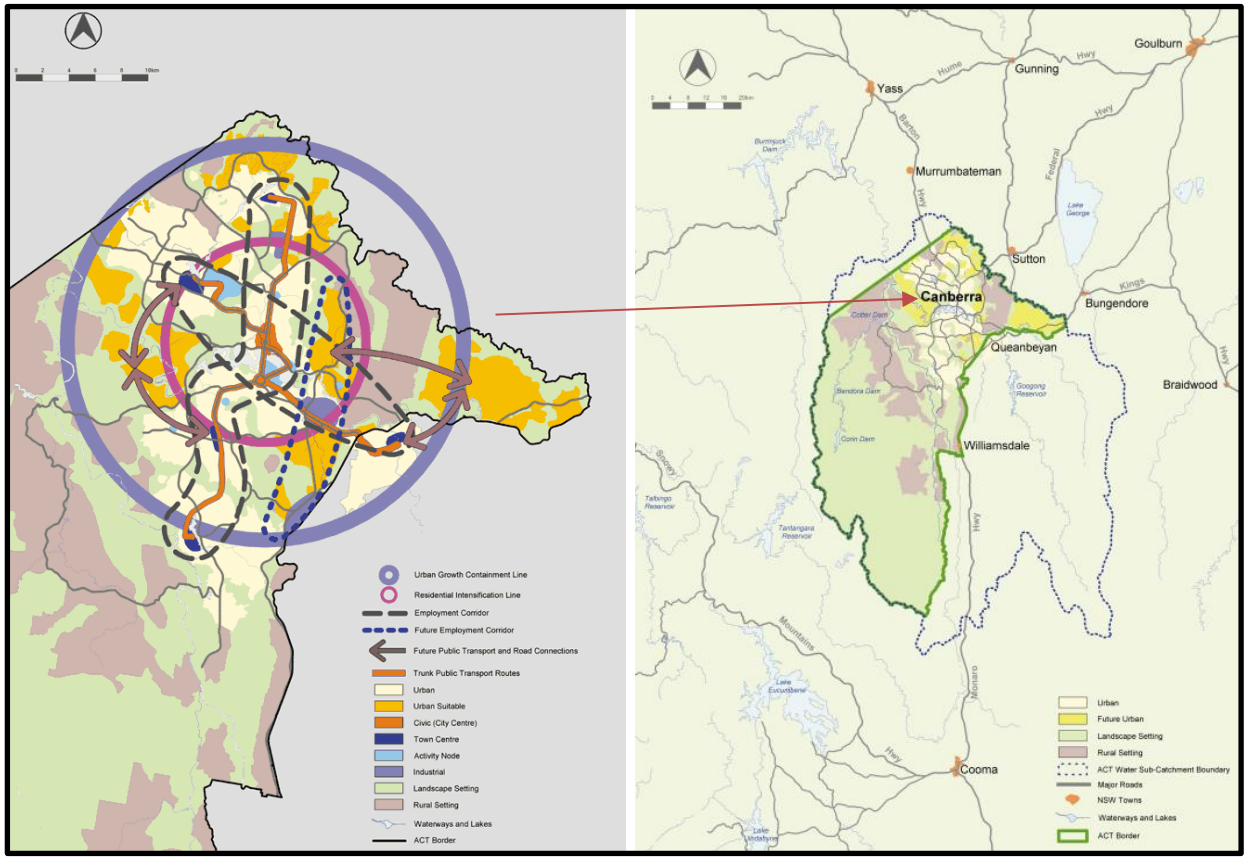


Figure 5-7: ACT and Surrounding NSW Nodes

Source: Adapted from ACT Planning and Land Authority (2004:5)

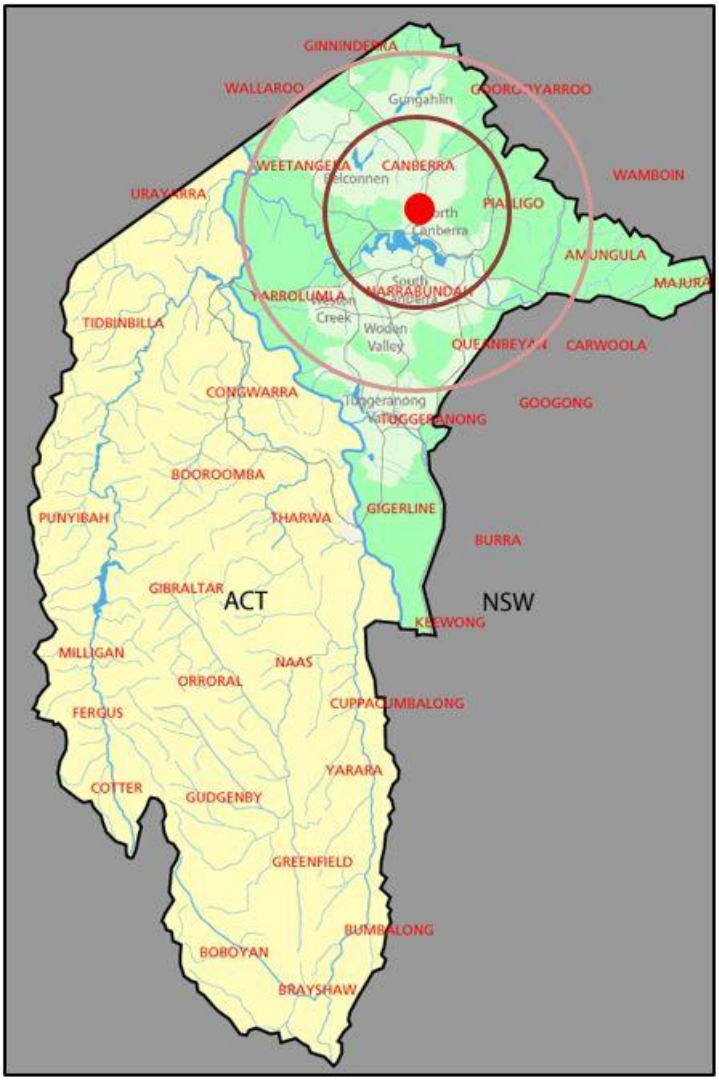


Figure 5-8: Australia Capital Territory

Source: Adapted from ACT Planning and Land Authority (2004:1)

Walter Burley Griffin, a well-known American architect of the twentieth century, designed Canberra as a planned community (Pegrum, 2003:1). Districts, town centres, group centres, local suburbs, and other industrial areas and villages are the hierarchy-based divisions of Canberra's metropolitan regions. The bulk of the seven districts each include a town centre that acts as the centre of social and commercial activities. Each district is further divided into smaller suburbs.

Figure 5-7 and Figure 5-8 clearly indicates that the Canberra District (indicated in green in Figure 5-8 is the major node in the ACT.

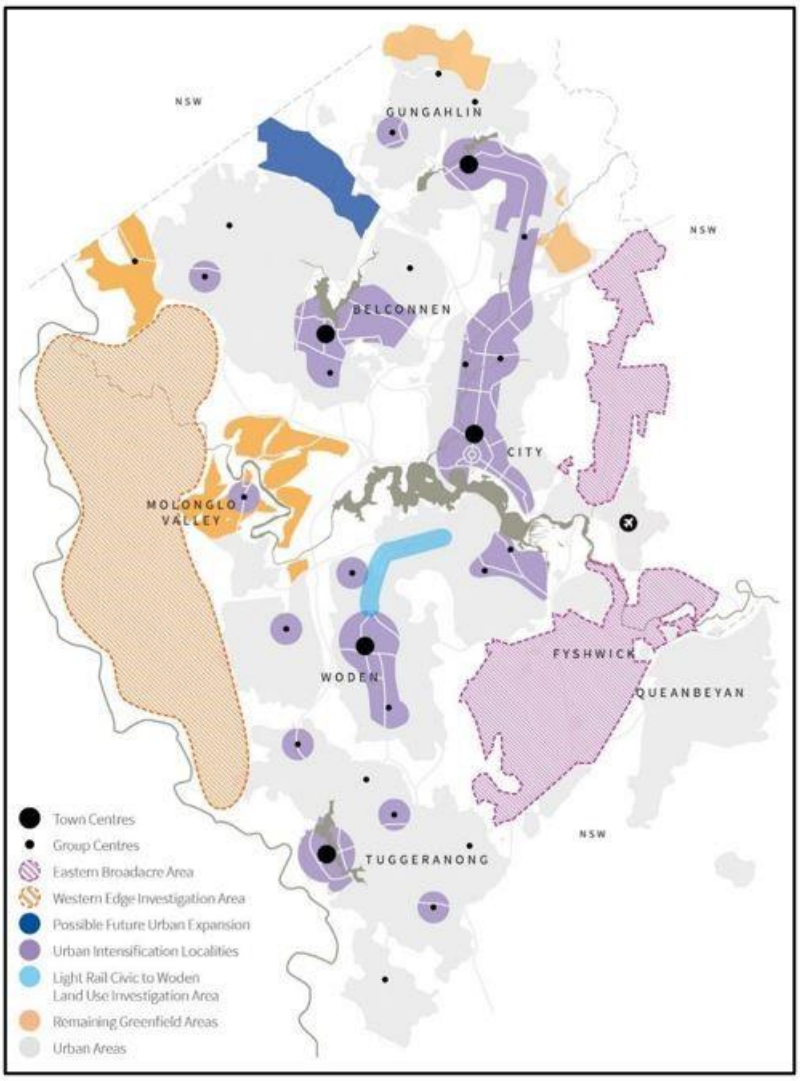


Figure 5-9: Canberra City District

Source: Environment and Sustainable Development (2012:3)

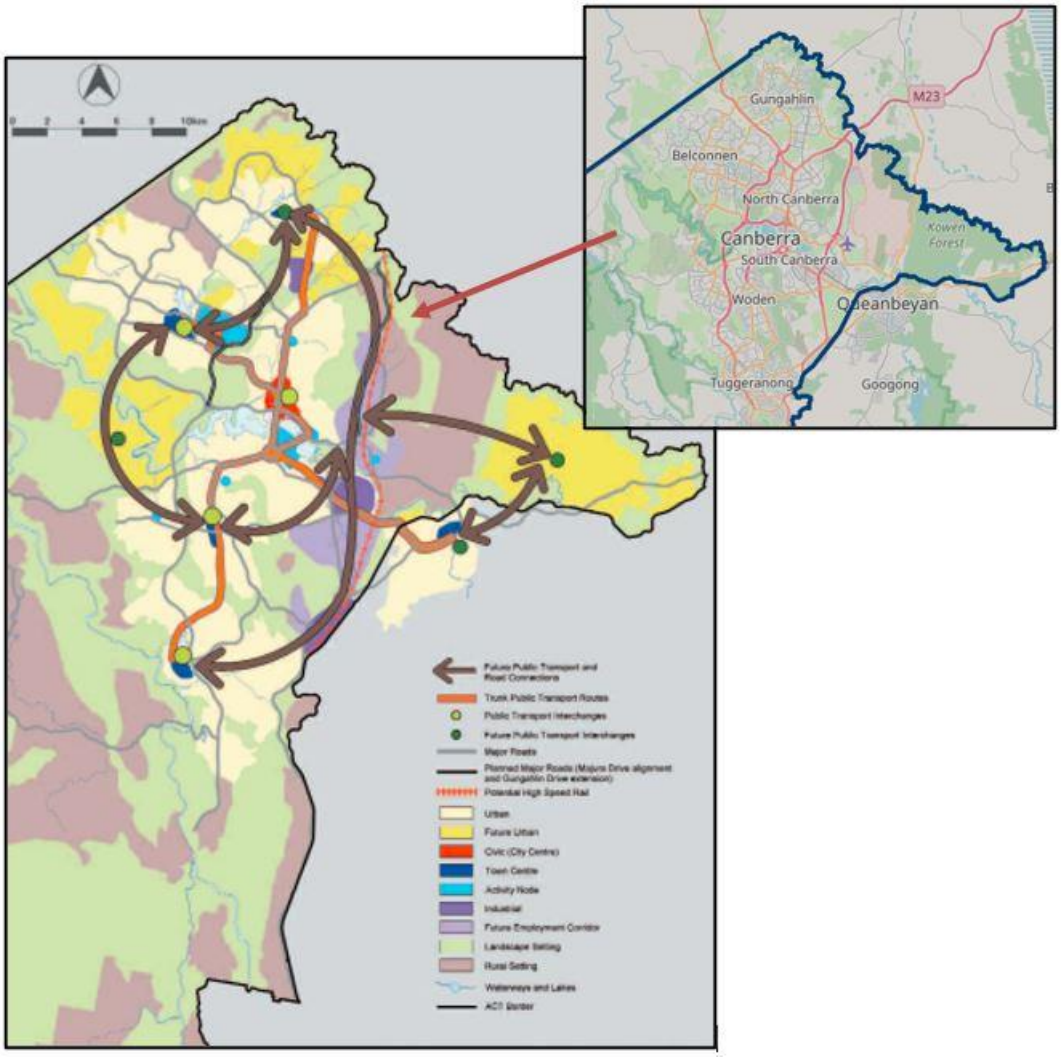


Figure 5-10: Canberra District Corridors

Source: Environment and Sustainable Development (2012:24)

Figure 5-9 and Figure 5-10 indicates the different town centres and the corridor connections within Canberra District. From the figures can be seen that the Canberra District has a small regional footprint, which is not as extent and is mainly situated within the borders of the ACT and the nearby towns and villages in NSW.

There are three major employment corridors:

(a) the east-west axis of activity nodes extending from Belconnen to Fyshwick, the Canberra International Airport, and Queanbeyan via Bruce (home to the University of Canberra and the Australian National University in Acton), Civic, Russell, Campbell, Barton, and Parkes. This corridor links important educational, medical, and recreational amenities with important office job locations in Civic and the Central National Area. Additionally, it has Fyshwick's significant centre;

(b) a key north-south corridor is delineated by a series of well-connected nodes that extend from Gungahlin Town Centre, including areas like Mitchell, through Dickson, Civic, Deakin, and the Woden and Tuggeranong Town Centres;

(c) through the Majura and Monaro Highways, which now comprise the Hume industrial zone, a second north-south route from the Majura Valley to Symonston and the Jerrabomberra Valley.

5.2.1.2.1 Population distribution characteristics

Despite being Australia's capital, Canberra is merely the country's seventh largest city. After the Northern Territory, the ACT has Australia's second-smallest population. Canberra, which is Australia's capital, is also the Northen Territory's capital. The ACT covers only 2,358 km^2 of land, accounting for less than 1% of Australia's total land mass. Canberra has an area of 814 square kilometres.

According to Australian Bureau of Statistics' (2022:1) estimates, the population of the Australian Capital Territory will reach 427,595 by the end of June 2022. The assessment is based on a 1.38 percent average annual growth rate based on the last ten years since 2011.

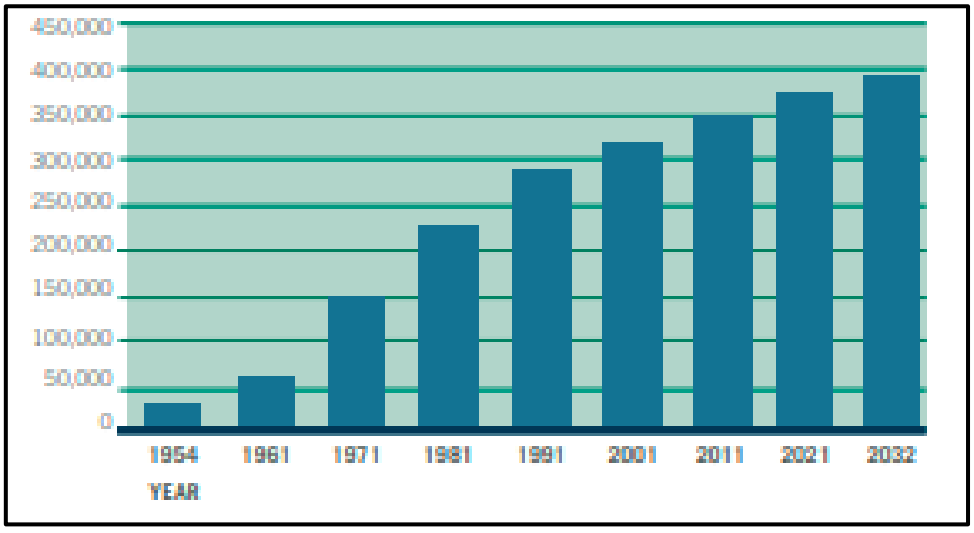


Figure 5-11: Australia Capita Territory projected population growth

Source: National Library of Australia (2003:1)

As discussed in Section 5.2.1.2, Canberra is the district with the 7th largest population in Australia, as indicated in Figure 5-12.

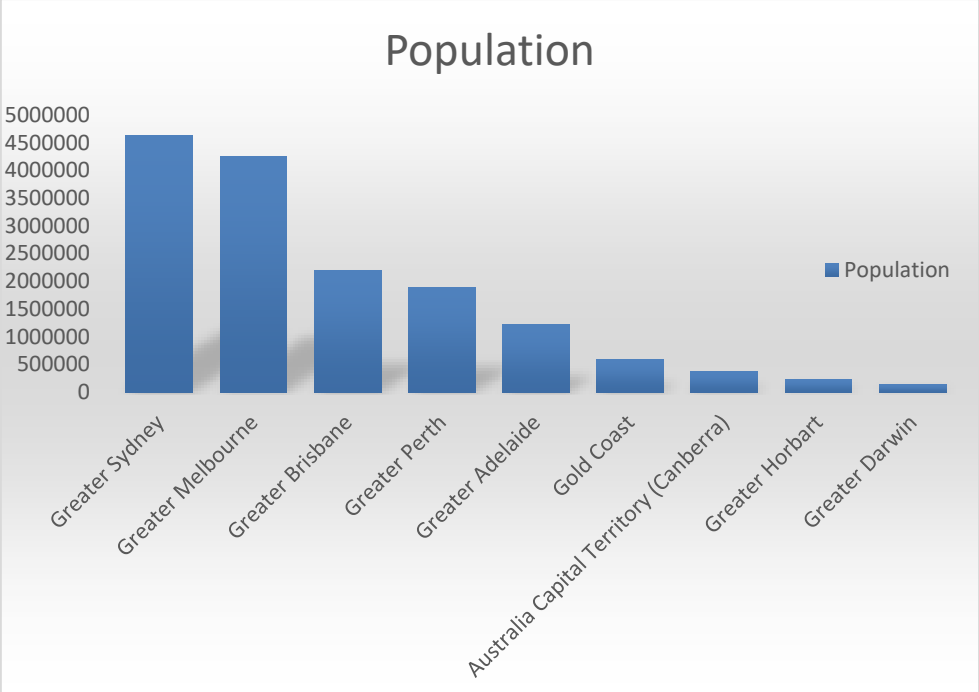


Figure 5-12: Ten largest populated districts in Australia

Source: Adapted from Australian Bureau of Statistics (2022:1)

Even though the population is relatively less than Greater Sydney[3], the population density of the ACT is 151.49 persons per kilometre, making it Australia's most populous state. The population density of the ACT is over seven times that of Victoria, owing to the fact that it has the smallest population but also the smallest area in Australia.

[3] Sydney is the largest district in population numbers.

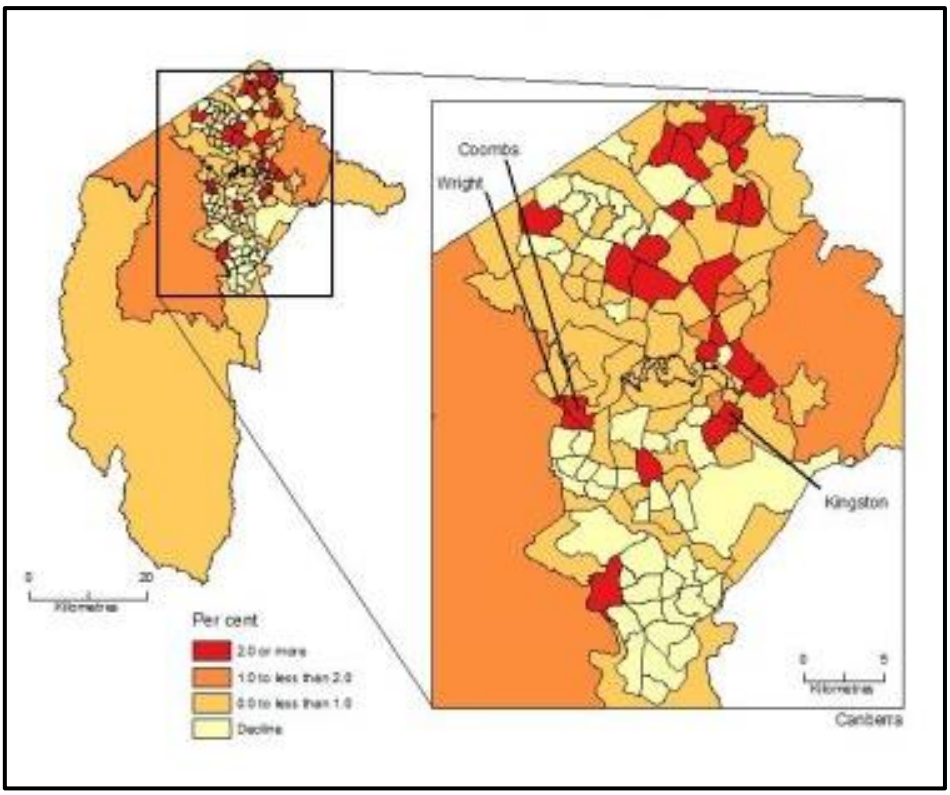


Figure 5-13: Capital Territory Population Change

Source: Whyte (2018:1)

Figure 5-13 indicates the growth rate in Canberra district. It is clear that increase in population occur more to the northern edge with a decline in population in the southern east region.

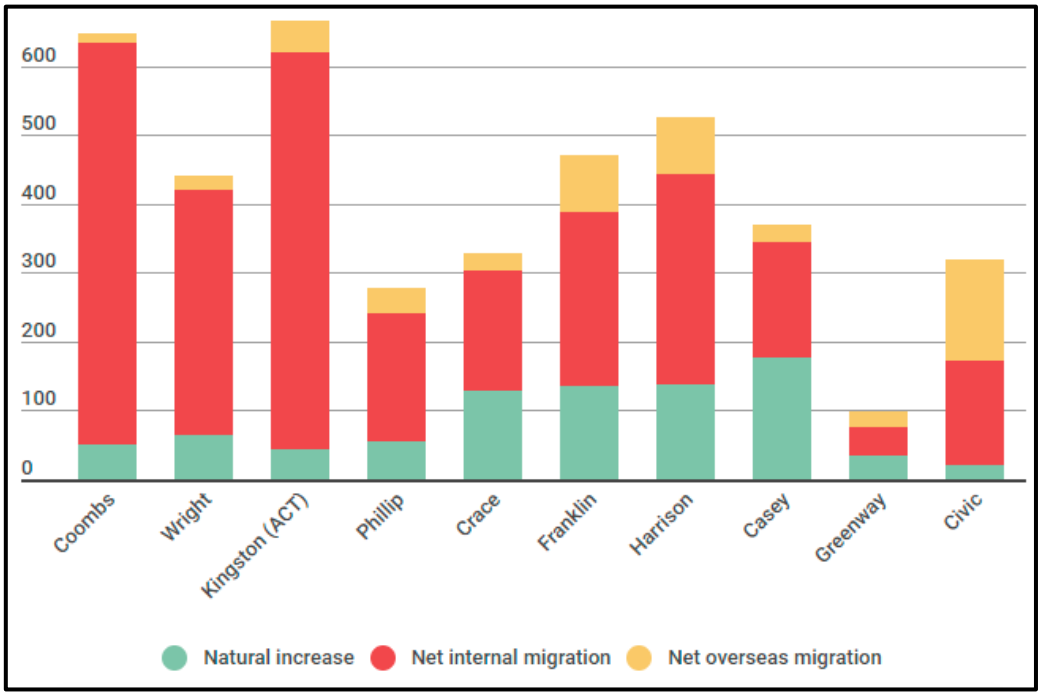


Figure 5-14: Ten fastest growing towns in the Capital Territory

Source: Whyte (2018:1)

The Capital Territory population distributions correlates with the entire Australia, as there are areas with high intense population and then large areas which is not yet urbanised and populated.

When it comes to urban systems, this suggests that the ACT has a well-integrated spatial distribution system. Because the population distribution is typical, this presents excellent potential for economic growth. It shows that the spatial system is balanced across multiple hierarchies and that the city-rural divide is satisfied.

5.2.1.2.2 Economic performance

The Australian Capital Territory is essentially a city-state, with rural areas contributing just a small portion of the GDP. Government and government services provide for over half of all jobs, and many more rely on government purchases. Changes in the rate of increase in government employment and government-funded construction activity affect the economy. The federal government began to cut direct employment around the turn of the twenty-first century. Measures have been taken to attract more private enterprise, and government tasks have been outsourced, resulting in greater private employment. Unemployment rates are frequently lower than the national average.

Canberrans earn significantly more than the national average. The average Australian weekly wage is $577 (R9142,28), but the average income in Canberra is $917 (R14529,42). Canberra[4] residents are also far more educated than the typical Australian. In Canberra, 4.5 percent of residents have a postgraduate degree, compared to 1.8 percent nationally. This, too, underlines Canberra's role as Australia's capital. Education is one of the ACT's greatest exports, bringing in almost $100 million each year, according to the Economic White Paper (ACT Planning and Land Authority, 2004:9).

The Australian Capital Territory employs 227,461 people and generates $78.766 billion (R124,71 billion) in annual revenue (Economic Development Australia[5], 2021:1).

With a 4% increase in GDP, the Public Administration & Safety industry sector contributes the most to regional economic output, accounting for 33.19 percent of overall output at $26,1 billion (R41,3 billion). With 73,912 jobs, the industry sector is also the region's largest employer, with 32.49 percent of overall employment.

Construction is another significant contributor to the economy, owing to huge government-funded projects and a thriving home market. The property market is currently hitting new heights, which

[4] The capital city of the Australia Capital Territory.
[5] Also known as EDA.

is an indication that the ACT is growing daily. The number of dwelling unit starts in the ACT climbed by 51.9 percent to 1,552, which was higher than the five-year average of 1,333 starts.

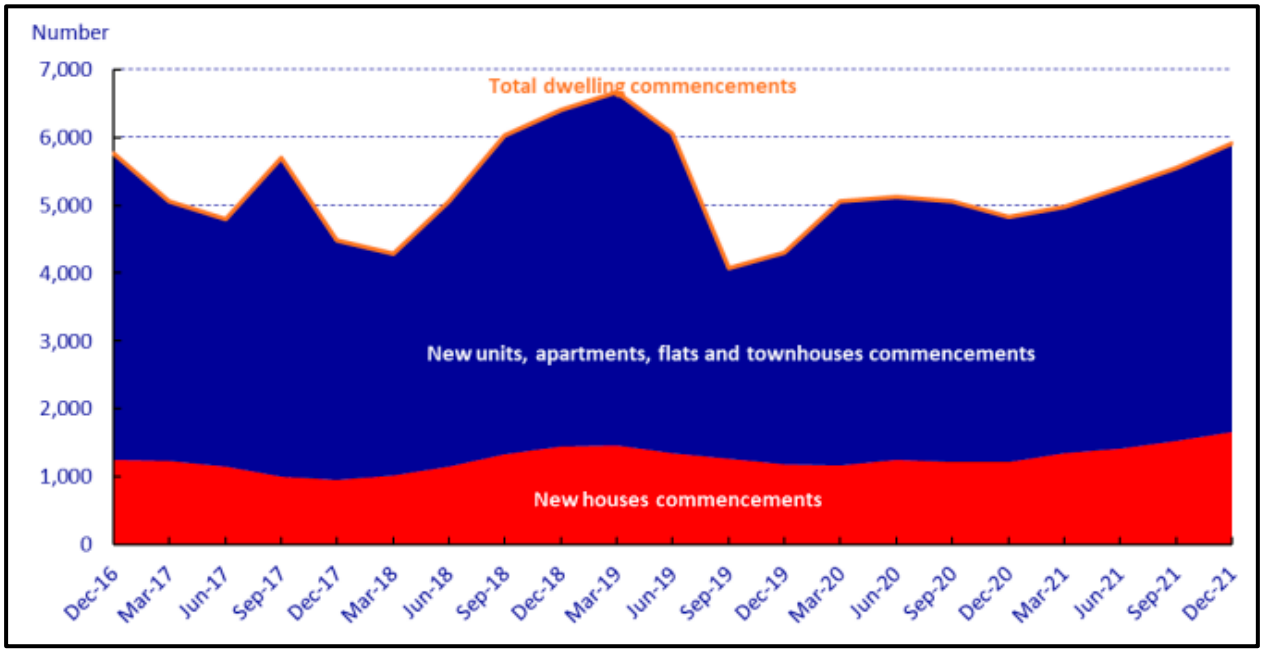


Figure 5-15: Dwelling Unit Commencements by housing type

Source: Environment and Sustainable Development (2012:104)

The ACT sectors and indicators are displayed in Figure 5-16:

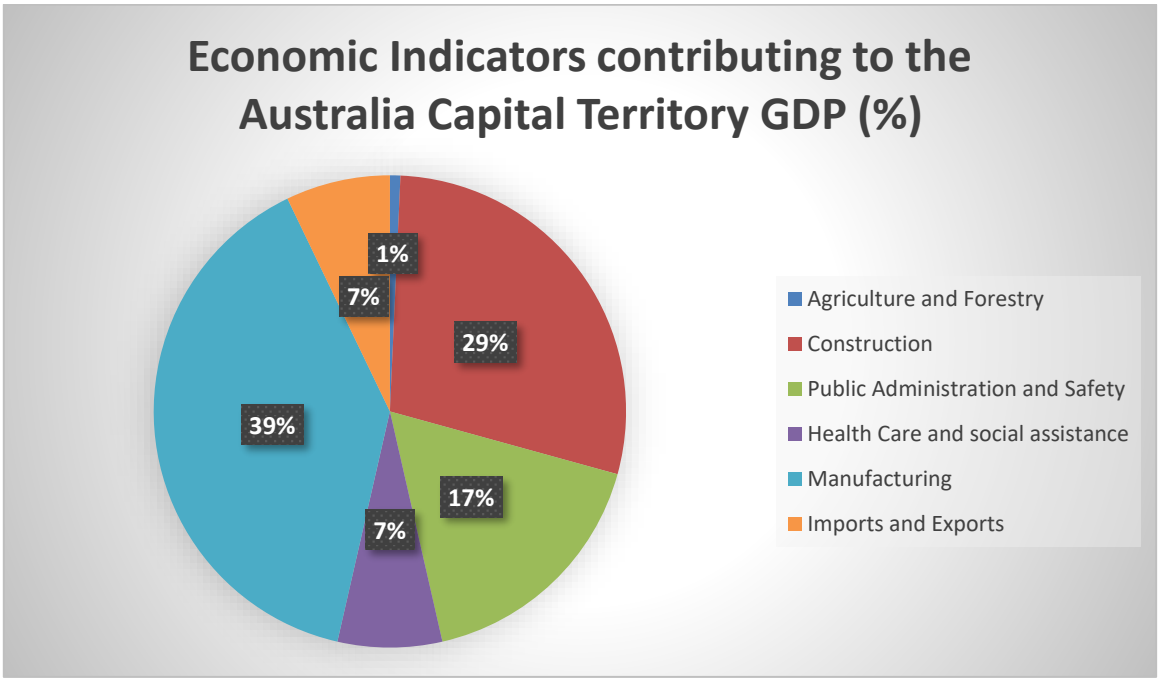


Figure 5-16: Economic Indicators contributing to the Australia Capital Territory GDP (%)

Source: Environment and Sustainable Development (2012:106)

It is clear that manufacturing is still the dominant economic indicator, but as previously mentioned, it is clear that construction and property demand is increasing. Even with a large area set out for agriculture, a very small percentage contribution is made to the GDP by this indicator. The economic state of Canberra is stable and the moderate distribution of various economic sectors, as illustrated in Figure 5-5, contributes to the stable economy.

5.2.1.2.3 Policies and frameworks

The mechanism by which the Australian- and Canberra government develops and implements regional policy is discussed in this section. Itis crucial to this research because it may reveal the way developed countries, such as Australia, formulate and implement their rural policy. With an estimated 89 percent of the people living in urban areas, Australia is one of the most urbanised nations in the world.

State governments are in charge of a variety of economic, social, and environmental issues. In this process local government is a just minor player. As a result of these circumstances, state governments have been able to implement a wide range of policies and programs in the planning and operation of their capital cities (Searle & Bunker, 2010:165). Since 2002, five metropolitan studies have been completed for Australia's biggest cities (Searle & Bunker, 2010:164).

- State and territory governments in Australia play a major role in regional development, with the commonwealth serving as a major investor in infrastructure for regional and urban development (Regional Outlook, 2019:2). Recent policy changes include that "(T)the Australian government has put in place a number of financing programs, such as regional jobs and investment packages, to support rural growth".

Canberra has strong, sustainable policies and frameworks, which contributes to the regional development.

(i) The National Capital Plan (the Plan)

By planning and developing Canberra and the Territory in accordance with their national significance, the National Capital Plan (the Plan), contributes to the strong regional development (Australian Government, 2020:1). Canberra has grown as a collection of distinct but connected settlements that were built in valleys, moulded and divided from one another by an open space system. The National Capital Plan has been implemented to ensure the function of urban, open space and transport systems are coherent planned for and carried out. One of the main goals of the National Capital Plan is to create a sense of hierarchy among various urban centres.

(ii) The Australia Capital Territory (ACT) Plan

The Australian Capital Territory Act 108 of 1988 (Australian Capital Territory Act 108 of 1988) was developed with the intention of building a city that is resilient to change, sustainable, competitive, and equitable, while also respecting Canberra as a city in the landscape and the National Capital. The ACT Planning Strategy has five main themes which are focused on:

- Compact and efficient;
- Diverse;
- Sustainable and resilient;
- Liveable;
- Accessible.

Land-use planning may have a substantial impact on the expansion and diversification of the economy and society, according to the ACT Strategy Plan (2018:52). Due to Canberra's spatial layout, which was based on districts with their own town, group, and local centres, enabled individuals to live close to jobs, shopping, and services (ACT Strategy Plan, 2018:32).

Traditional spatial planning in Canberra has been built on a defined hierarchy of centres dispersed around the city (ACT Strategy Plan, 2018:54). With more people living and working in Canberra, ACT need a planning framework that can accommodate this increase without jeopardizing the city's unique qualities. The goal of a liveable and sustainable city requires a modern planning system. ACT requires a planning system that is focused on providing outcomes for Canberra people, flexible enough to foster improved outcomes, and efficient and simple to use.

The ACT Strategy Plan (Australian Capital Territory Government, 2018:5) will increase density in appropriate sites such as around town and group centres, as well as along main transportation lines, it will also limit urban expansion and accommodate growth. While up to 70% of additional housing will be constructed inside the current metropolitan footprint, other urban regions will be investigated for future demands. ACT sustainability and resilience will be enhanced through careful urban planning. Co-operation with neighbouring councils and regional partners will help to reinforce Canberra's role as the region's centre and promote the ACT region's liveability, economy, and attractiveness.

As part of the Master Plan Program and other local plans, this strategy will be put into practice in the following ways:

- as a framework for policy formulation to guide district planning
- to integrate with the ACT Government Infrastructure Plan and its updates to harmonize major land use and infrastructure planning, in order to:

    a) inform strategic planning and service delivery across government;

    b) link land use, transportation, and climate change adaptation for a resilient and connected Canberra by integrating with the ACT climate change and transportation programs. By publicly presenting the government's growth management policies and infrastructure investment plans, Canberra can attract investment.

(iii) The Canberra Spatial Plan

The Canberra Spatial Plan specifies "what goes where," or where we live, work, learn, and unwind, as well as the city's growth strategy. With the necessary flexibility to adapt to change, the

Canberra Spatial Plan aims to provide clear strategic directions for Canberra's growth over the next 30 years and beyond. It is the Capital Territory's main plan of action to manage urban development and change. This strategy is centred on spatial planning.

The Canberra Plan is made up of three main components: a. Economic White Paper; b. Social Plan, and c. this Spatial Plan.

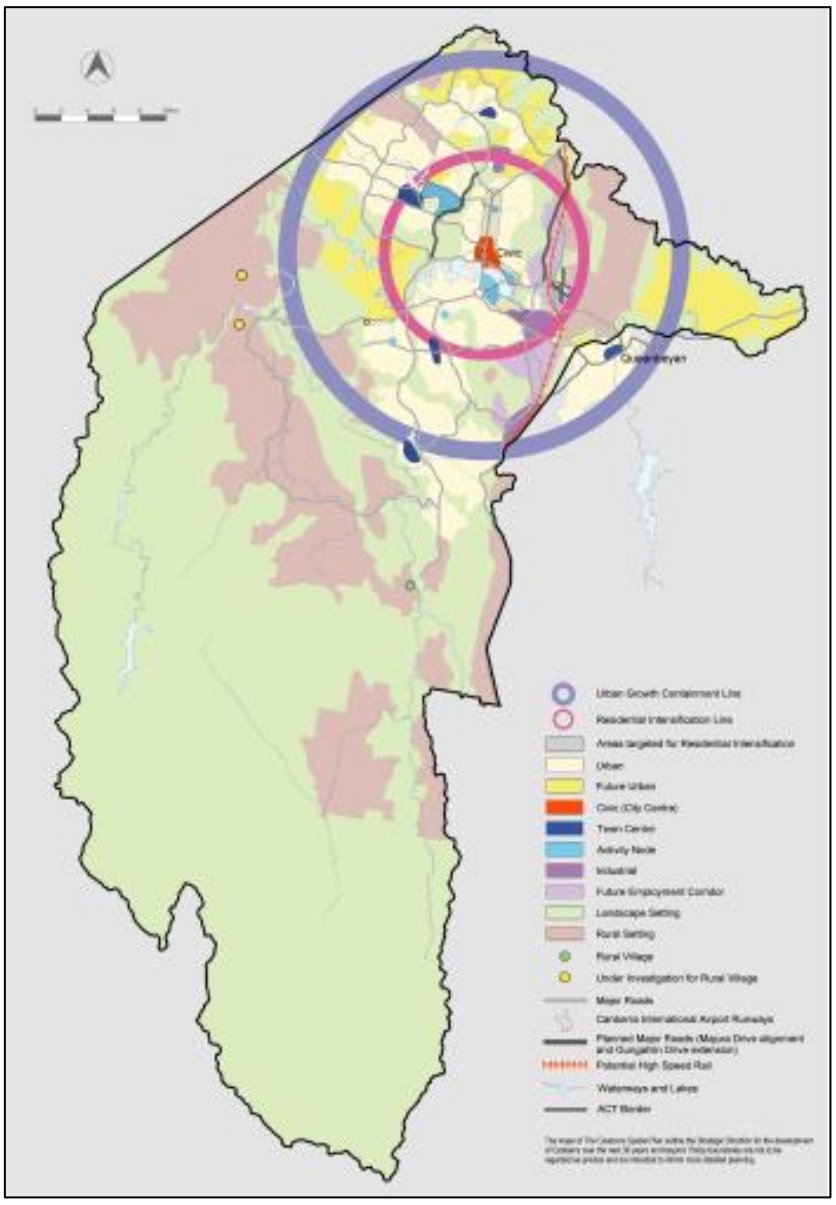


Figure 5-17: The Canberra Spatial Plan

Source: ACT Planning and Land Authority (2004:i)

A new way of planning for Canberra is implemented through district planning.

District planning is a new strategic component of the planning system that gives districts more spatial and policy direction. It allows the development of policy and the indication of future

orientations at the district level, which in its turn allows strategic growth and change management within and across districts. District planning also permits the recognition of each district's individual character to be reflected in the planning system.

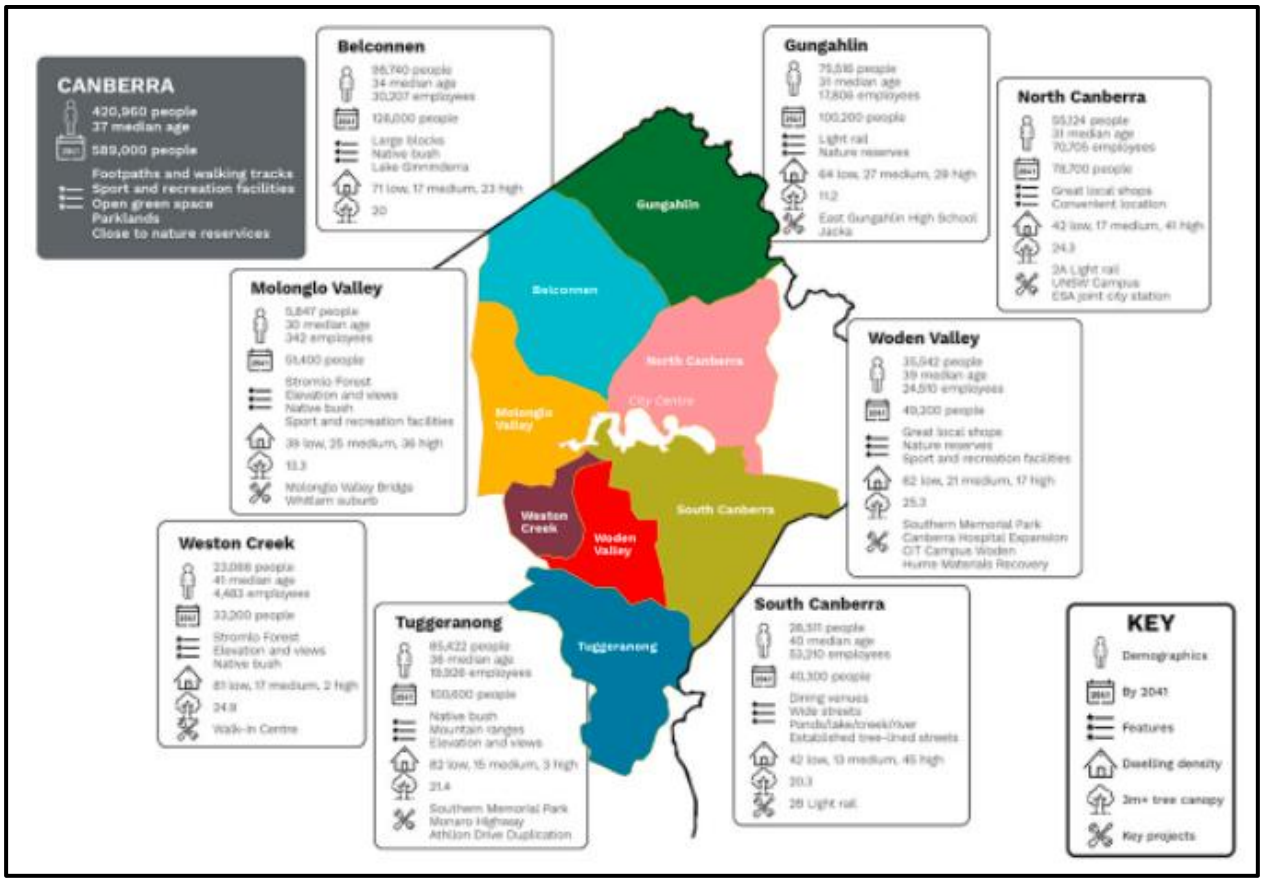


Figure 5-18: Canberra eight districts

Source: Environment and Sustainable Development (2012:106)

Each district in Canberra focuses on the hierarchy of towns in the district. The goal is to develop certain towns in each district, but continuously enhance smaller towns and rural areas. This is in line with the suggestions in the OECD report on Canberra's urban renaissance, which is implemented.

The Central Canberra Implementation Program is a master plan for among others urban renewal sites, land release, infrastructure investment, policy changes to the Territory Plan and the National Capital Plan, additional research, and additional methods will all be used to carry out the Spatial Plan over the following 30 years.

This discussion shows clearly that the strategy plan for the Australia Capital Territory is to do planning by filling open spaces, thereby densifying the current urbanised areas, before developing outwards. The economic focus is within the ACT and especially Canberra, as it is already the main economic centre of Australia. Outward planning to neighbouring regions and nodes will increase the neighbouring regions, definitely not the other way around.

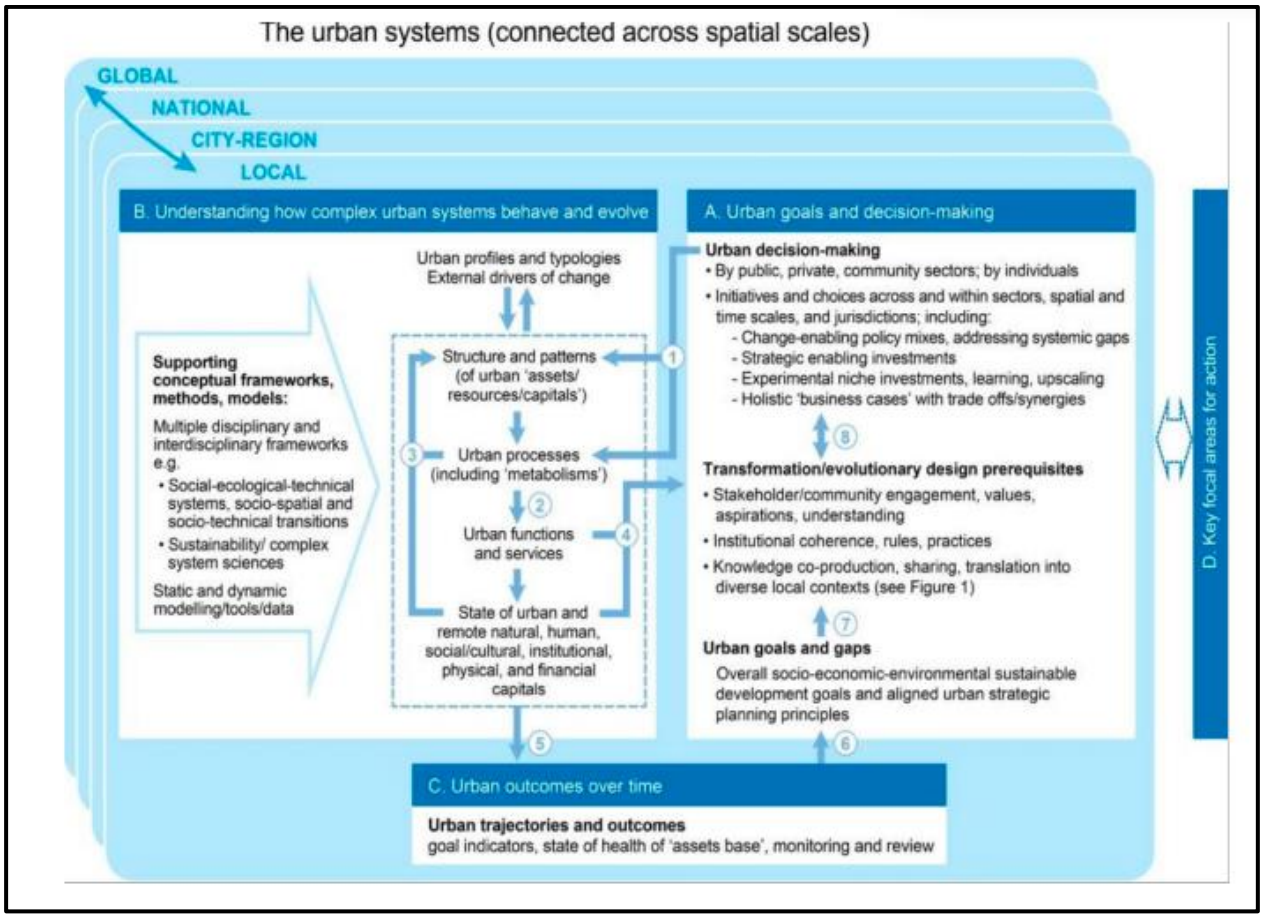


Figure 5-19: Australia's urban systems across spatial scales

Source: Webb *et al.* (2018:61)

This proposed framework, as shown in Figure 5-19, is evolutionary in that it identifies connections between (first) urban decisions at all levels. It has an immediate impact on the spatial patterns and structure of urban areas as well as the urban system (second) the level of functions and services of urban areas. Over time (tertiary) feedback of the functions and services of urban areas identifies the impacts or outcomes of the functions and services over time (fourth) the level of functions and services of urban areas (see number four, five and six). Component A, Component B, Component C, and Component D (explained below) comprise the knowledge framework for sustainable urban development, as shown in Figure 5-19.

- Component A: Urban goals and decision-making

Facilitation of transformative and integrated urban system strategies.

- Component B: Understanding the complexity of urban systems, behaviour and evolution

It should be highlighted that urban areas are open systems with multiple interactions in regions and beyond. As a result, national, regional, and municipal policies should be devised to strengthen the urban system as a whole.

- Component C: Urban outcomes

An urban system's outcome is influenced by a variety of factors, making forecasting a challenge. A top-down, command-and-control style is not always the most effective strategy when it comes to the implementation of frameworks and policies, hence flexible techniques should be implemented on a multi-governance level.

- Component D: Key focal areas that require action

These areas should be recognised as focus points where policy- and decision makers work together to steer sustainable urban transformation successfully.

Looking at the policies of Australia and Canberra, it is evident that until 2006 the focus was more on first (metropolitan cities) and second level (cities) tiers as an urban system, with minimal focus on tertiary level tiers (towns, villages, hamlets) (refer to section 4.3.3) (Budge & Butt, 2007:284). The function and success of regional strategy in Australia is thus best studied in regions with smaller cities.

According to James (2012:3), the legislative authorities involved, exemplifies the intricacy of existing planning procedures. The Commonwealth and the ACT governments shared responsibility for the development of the ACT under the National Capital Plan and its companion Territory Plan. Two of the current metropolitan strategic plans are the National Capital Plan (2009) and the Canberra Spatial Plan (2004), both of which are currently being reviewed.

5.2.1.2.4 Development objectives

Australians care about and want to preserve issues like a healthy environment, equal access to opportunities and services, human rights, inclusive economies, diverse and supportive communities, which are all reflected in the Sustainable Development Goals (SDG's).. Adherence to liberal democracy, the rule of law, equality, and mutual respect are the cornerstones of a strong, just, and peaceful society. Australians already contribute to the SDG's fulfilment through their work in the healthcare industry, volunteerism, protection of the environment, and daily activities (United Nations, 2021).

Australia's policies are aimed at improving economic stability, fostering wealth, and reducing poverty (Department of Foreign Affairs and Trade, 2016:42). The policies are mostly focused on neighbourhoods, since it is believed that this is where it can have the greatest influence. Figure 5-19 shows Australia's investment priorities (Department of Foreign Affairs and Trade, 2021):

Figure 5-20: Priority areas of Australian investment

Source: Adapted from the Department of Foreign Affairs and Trade

The Canberra Spatial Plan Strategic Direction, according to the ACT Planning and Land Authority (2007:1), consists of a number of critical features. These attributes define the geographical relationships that will shape Canberra's future development over the next two decades.

These initiatives include:

(a) residential development with a higher density within the current urban area;

(b) residential settlements in the future;

(c) Canberra's civic and core areas will constitute a strong, active heart;

(d) the focus of employment growth will be civic and existing centres;

(e) employment growth in the industrial, broadacre, and transportation sectors will be accommodated within existing industrial districts;

(f) within urban and non-urban areas, nature reserves and land that provide substantial wildlife habitat shall be managed for biodiversity protection;

(g) major transportation linkages, including public transportation, will connect town centres and civic centres, as well as future urban settlements and major job corridors;

(h) significant locations that provide prospects for the territory's future economic growth will be protected.

The spatial plan introduces tactical strategies to contribute to the long-term development of the Australian region, especially concerning water, biodiversity in conservation, urban form and employment placement, transportation, and service delivery.

Other development objectives identified by the National Capital plan is that 'Metropolitan Canberra' depicts prospective urban settlements in Jerrabomberra–Symonston, the Majura Valley, the Belconnen district, and the West Murrumbidgee region (Austalian Government, 2020:1).

Development objectives for urban areas (Australian Government, 2020:1) includes:

(a) Future growth in Canberra will be handled by the continued development of various, relatively self-contained settlements.

(b) Each town will include a central location that will serve as a focal point for higher-level retail activity, commercial services, offices, and community facilities.

(c) For long-distance freight movements, industrial parks will continue to be built on the outskirts of urban areas with strong access to the national highway network.

"To put into effect a planning policy framework for more sustainable living that draws on the intrinsic features of Canberra and builds a better sense of place, spirituality, and responsibility," is according to the government's sustainable communities initiative (Roseland, 2012:39). The fundamental drivers of change are reflected in the higher-order objectives. The interrelationships between the various parts of Canberra's shape and urban systems are depicted in Figure 5-20.

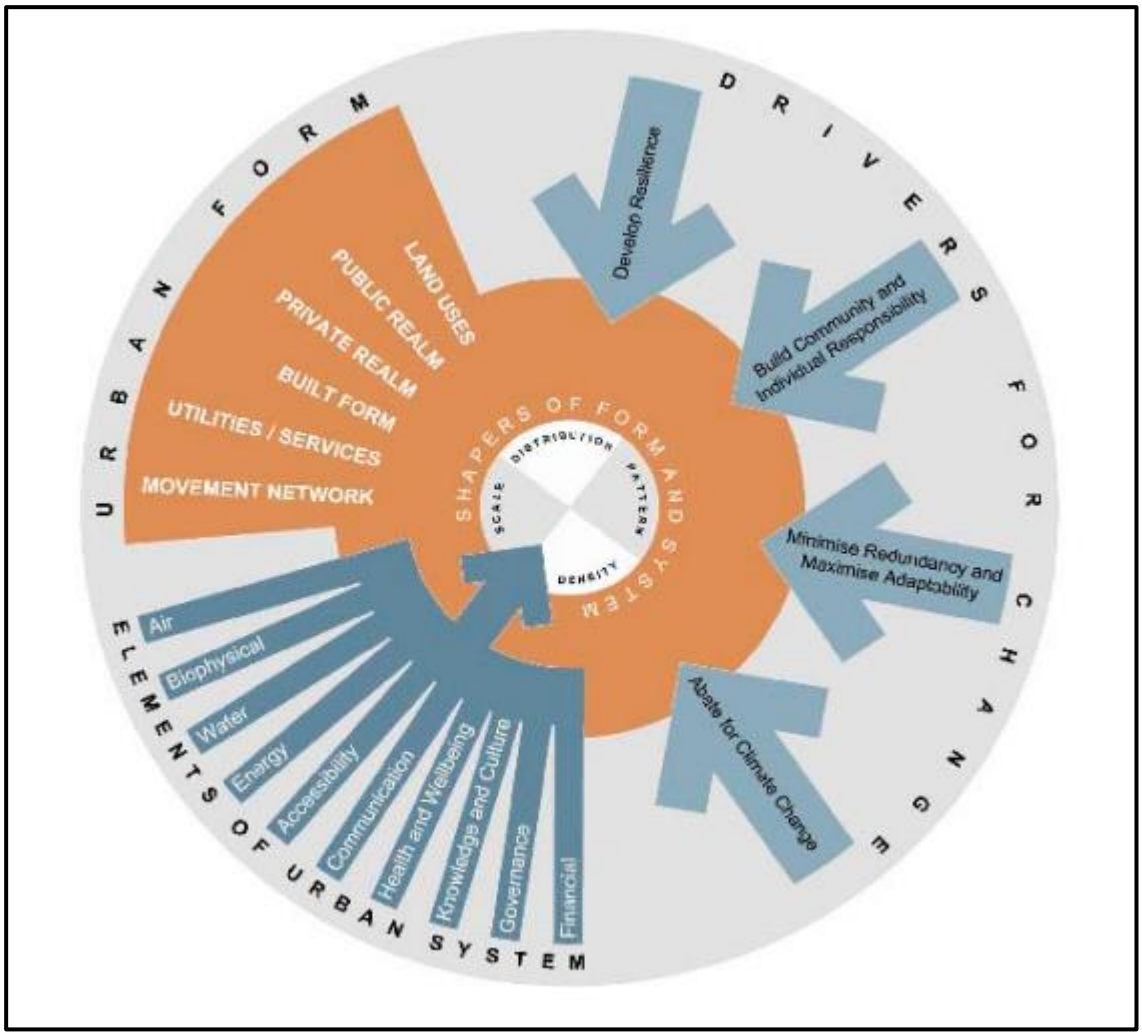


Figure 5-21: Elements of Canberra's form and Urban System

Source: ACT Government 2020

The development objectives for the Australia Capital Territory and Canberra are to densify, current already dense towns (metropolitan or primary cities), and develop town centres in each of the eight districts. Planning to fill open spaces is the main focus of the future for the ACT. An already hierarchical approach will intensify by creating a more diverse hierarchy of cities, towns, villages and rural areas.

5.2.1.2.5 Urban System

Australia is embracing a proactive, bottom-up approach to regional development, as seen by the significant investment in joint research on multiple spatial scales. Investment potential is evaluated against the growth of the entire region, not just a single major city. In addition are the idea of polycentric regions and the interconnection of rural and urban systems also recognised in Australian legislation.

The National Capital Plan (Australian Government, 2020:1) recommends that urban areas should be divided into different and reasonably self-contained communities by hills, ridges, and other important open spaces. A hierarchy of centres has been formed in Canberra's urban framework, with each town having a centre that serves as a focal point for higher order retail functions, business services, offices, and community amenities.

At the metropolitan level, this hierarchical principle means:

(a) Canberra Central is still the most popular location for office workers;

(b) Metro city centres provide retail, commercial, cultural, entertainment, and other services to suit community requirements, as well as serving as venues for office-based jobs.

At each level of the hierarchy, centres serve as the focal point for a variety of retail, commercial, and communal facilities and services, with increasing levels of specialisation.

Figures 5-21 and 5-22 shows the current urban system of town centres of Canberra and the future planned objective of a more developed and focussed urban hierarchy.

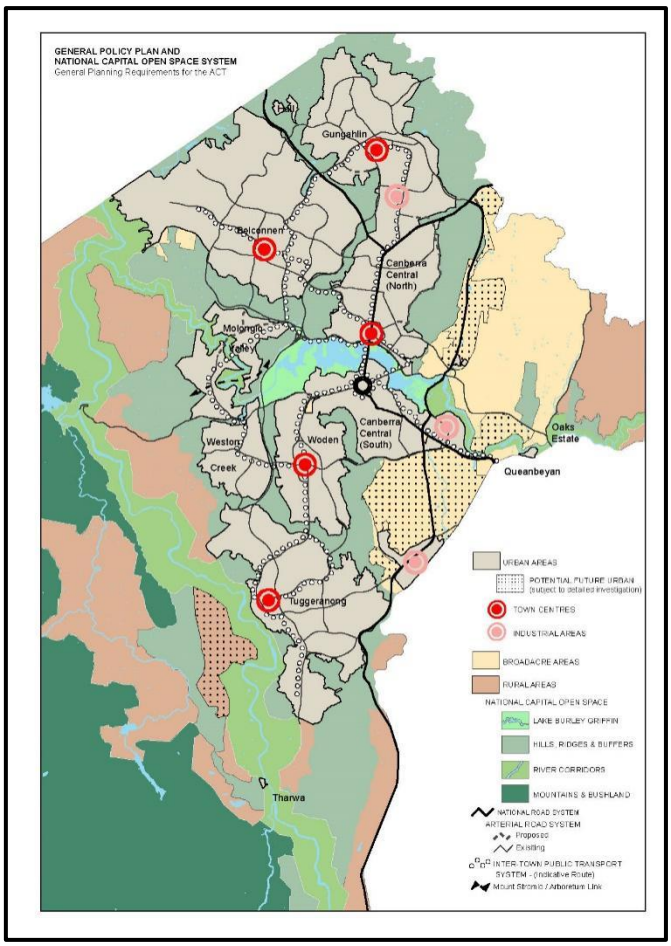


Figure 5-22: Urban centres of Canberra City-Region

Source: Australian Government (2020:1)

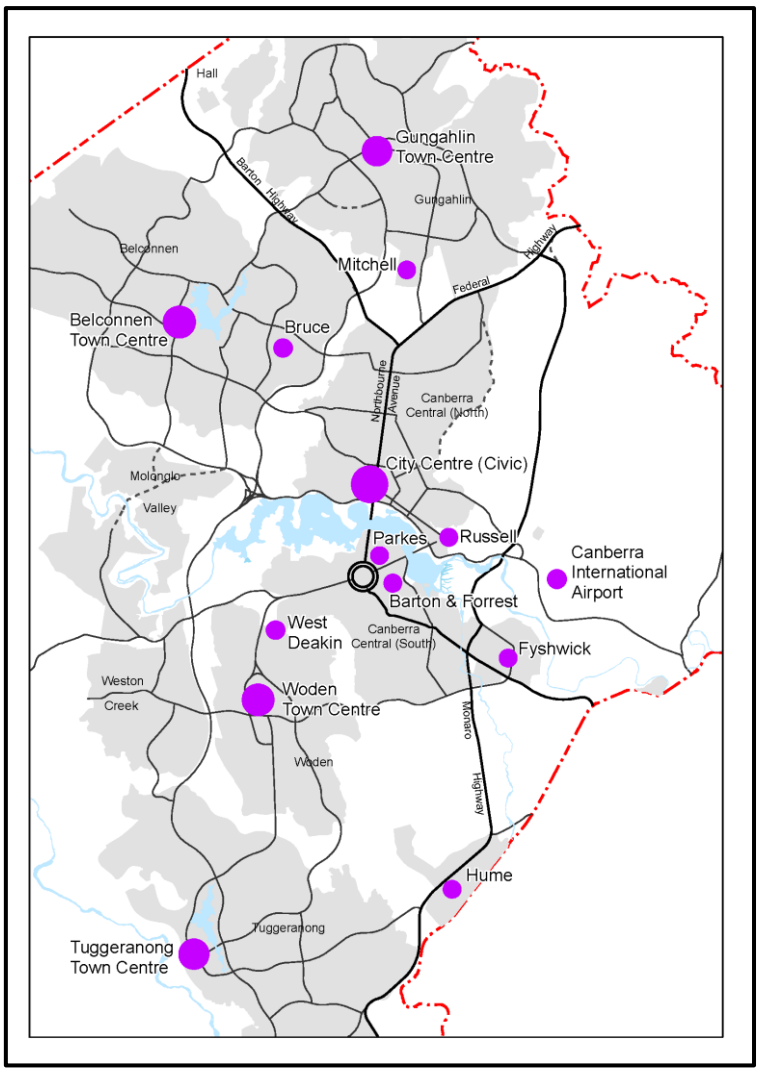


Figure 5-23: Urban hierarchy according to the National Capital Plan

Source: Australian Government (2020:1)

When it comes to urban systems, it is suggested that the ACT has a well-integrated spatial distribution system. The population distribution is typical; therefore this presents excellent potential for economic growth. It shows that the spatial system is balanced across multiple hierarchies and that the city-rural divide is satisfied.

Canberra's city-wide distribution of centres has a clear hierarchy that historically served as the foundation for its spatial design. The structure and purpose of the centres were initially intended to serve the community by providing Canberra currently consists of a clear hierarchy with metropolitan centres at the top and secondary- and tertiary level cities thereafter. Various levels of hierarchy do not exist since the focus until 2003 was only on the large town centres and the city centre. Looking at Figure 5-23, it is clear that from 2003 to 2020 secondary cities has gained more attention to illuminate the large gap between primary cities hierarchy, and secondary and tertiary order cities. This observation indicates that Canberra is continuously implementing the

differential urbanisation process set out in section 4.3.3. The current focus is moving away from the city centre and large town centres, towards secondary and tertiary level cities, towns and villages.

The design of Canberra and the entire Australia are nested upon the hierarchy of urban centres. Australia Capital Territory (ACT) continuously takes new development into account when considering the urban hierarchy, for example the development around the airport. This clearly indicates that urban hierarchy is a key spatial planning tool with success, which conclude that urban systems can be an informative spatial planning tool (discussed in Section 3.4).

5.2.2 Brazil

Brazil is one of the world's most urbanised countries, with even small and medium-sized towns in the countryside developing without sufficient regard for the detailed utilisation of urban territory. Brazil is the world's fifth largest country. The southern section of Brazil is the only part in temperate zones, with the rest of the country being in the tropics. North, northeast, southeast, south, and central-west are the five economic regions of the country. Brazil is a culturally diverse country with significant African, Indian, and Portuguese influences. It is a land of contrasts, natural resources abound, but terrible poverty is also present. According to the OECD (2018:4), Brazil has the seventh-largest economy in the world and is categorised as a developing nation. It belongs to the BRICS (Brazil, Russia, India, China, and South Africa) group, which has been recognized as a major regional and global political and economic force (Morazan *et al.*, 2012:4). Brazil is illustrated on the world map in Figure 5-24:

Figure 5-24: Location of Brazil on world map

Source: (Tokarchuk, 2021)

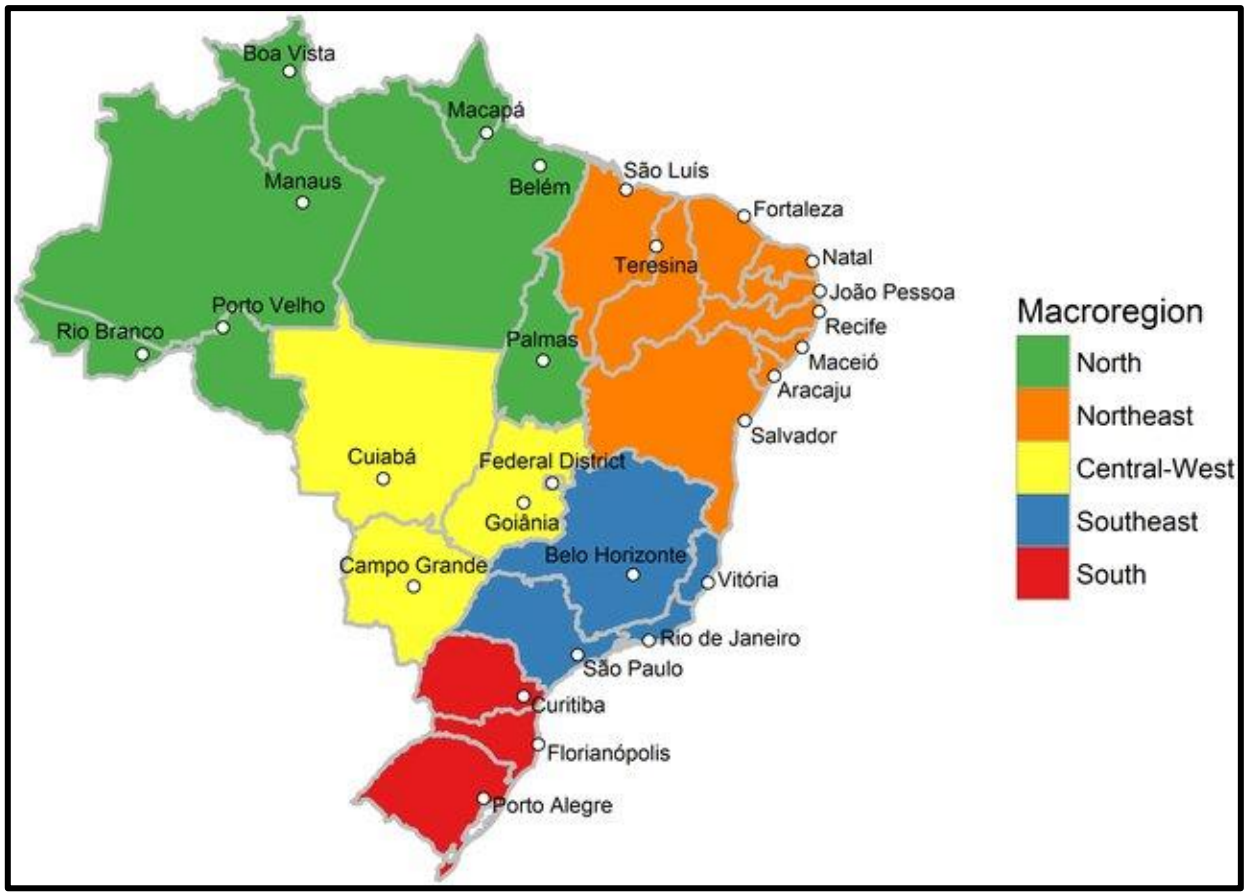


Figure 5-25: Map of regions, states, and capitals of Brazil

Source: Flores-Ortiz *et al*. (2019:220)

Figure 5-25 should be kept in mind because the section on the spatial distribution of Brazil's population will follow after the background of Brazil. As a result, Figure 5-25 is critical for the spatial orientation when reading about Brazil.

5.2.2.1 Background

Coffee and sugar were key exports for Brazil, providing jobs and solidifying the country's place in the global economy (Meyer, 2010:4). Coffee magnates collaborated with a military coup in the 19th century, eradicating imperialism from Brazil and elevating these coffee farmers to the status of important Brazilian powers of the time (Meyer, 2010:4). When the world underwent a major slump, however, the economic prosperity came to an end. As a result, the country became politically, economically, socially, and morally depleted and unstable (Meyer, 2010:4).

Brazil borders on Argentina, Bolivia, Colombia, Paraguay, Peru, Seriname, Uruguay, Venezuela, French Guiana and Guyana. The coastline is a total of 7 491 km long, which contributes to the various natural resources located in Brazil. These natural resources include, but are not limited to, bauxite, gold, iron ore, nickel and platinum. Brazil has a total surface of 8 514 877 square

kilometer which is divided into five regions as indicated in Figure 5-26. These regions are further divided into 28 states and more than 5 570 municipalities, as shown in Figure 5-26.

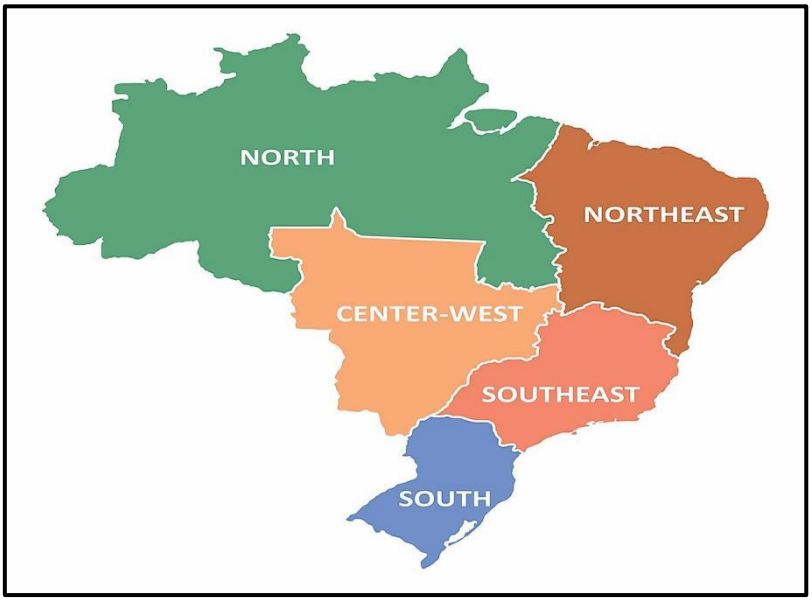


Figure 5-26: Five Regions of Brazil

Source: WorldAtlas (2018:1)

Figure 5-27: States of Brazil

Source: SELA (2020:1)

Brazil has taken significant strides toward improving macroeconomic stability, as well as moving to address the microeconomic agenda. The nation is also buying into this agenda, including a large and diverse economy and little external debt, which are supported by a strengthened political system and democratic institutions.

The mining of minerals and energy resources is one of Brazil's many large industries, along with the manufacturing of cars and other large vehicles. It also has a sizable agricultural economy, making it a significant exporter of coffee and soybeans (Silver, 2020). Brazilhas the world's 12th largest economy, and the largest in South America (Silver, 2020).

Table 5-3: Brazil Economic indicators

Developing ranking	Country	Human Development Index (HDI)	GNI per Capita (World Bank, 2022	2020 Population
84	Brazil	0,765	7,850	212,559,417

Source: Adapted from World Bank (2022:1) and own compilation

Brazil's HDI value for 2019 is 0.765, placing it 84th out of 189 countries and territories and placing it high in the human development category (Human Development Report, 2020:2). According to South East Legal Alliance, abbreviated SELA, (2020:1) the GDP per capita for 2020 was 6815 USD. Brazil has an unemployment rate of 13,5%.

The production patterns and types of goods and services produced by Brazil's cities vary across the urban hierarchy (refer to section 3.2), which affects production costs such as transportation expenses, production technology. As a result, there are many different economic activities in metropolitan areas, and it is clear by looking at socioeconomic indicators that the South and Southeast of Brazil have a more active economy than the North and North-eastern regions.

Brazil's population is projected to be 212 million people (Worldometer, 2021), with an unbalanced demographic distribution. Because a major proportion of the people lives near the ocean, the inland is vast and open. Even if the Brazilian government developed initiatives to encourage people to relocate away from densely populated coastal towns, large cities in Brazil continue to operate as a magnet for people from rural areas (Ignazzi, 2015:8). With a population of more than 200 million, most of whom reside along the coast, Brazil is the fifth-largest country in the world. It is geographically dominated by the Amazon river and the largest rain forest in the world.

With a population density of 24.66 persons per square kilometre, a large portion of Brazil is sparsely populated (62 per square mile). Sao Paulo is the largest city, with a population of around 11.9 million people and a metropolitan population of 21.1 million. Brasilia, the capital, has a

population of 2.8 million people. Figure 5-28 to Figure 5-30 illustrate the population density and population distribution of Brazil with a clear indication of high-density population along the coastal areas of Brazil.

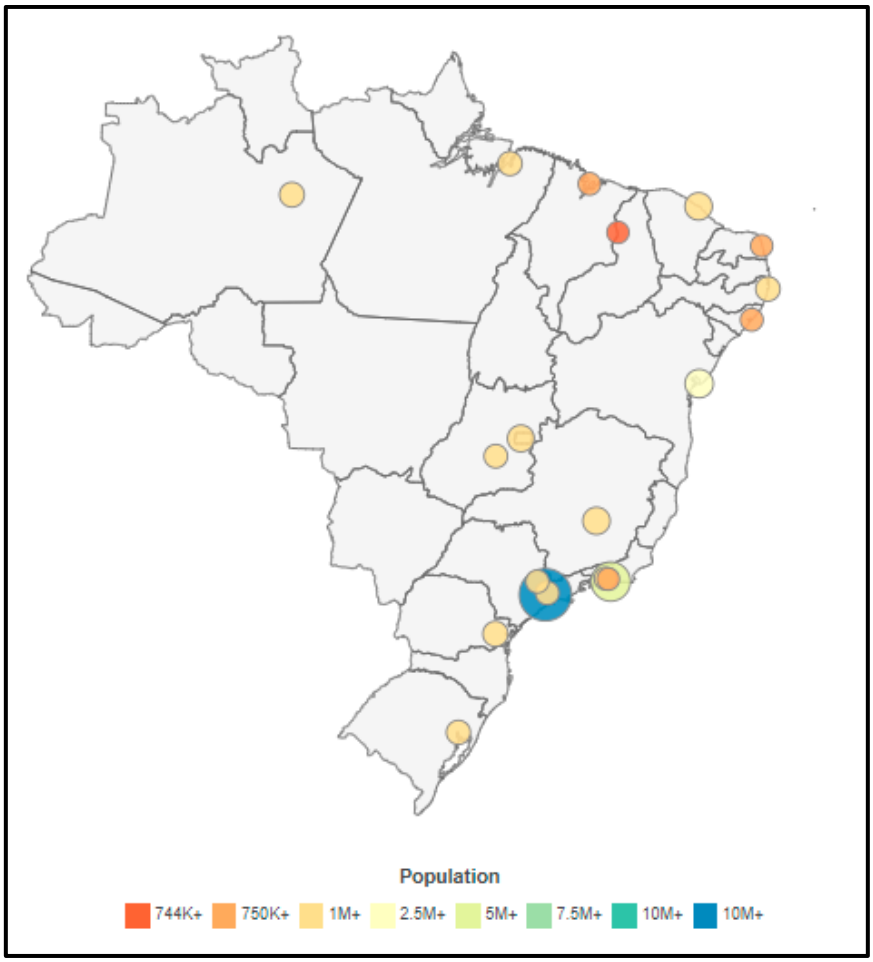


Figure 5-28: Brazil population density

Source: World Population Review (2022)

In Figure 5-29 the ten largest cities in Brazil are categorised, to show the population distribution.

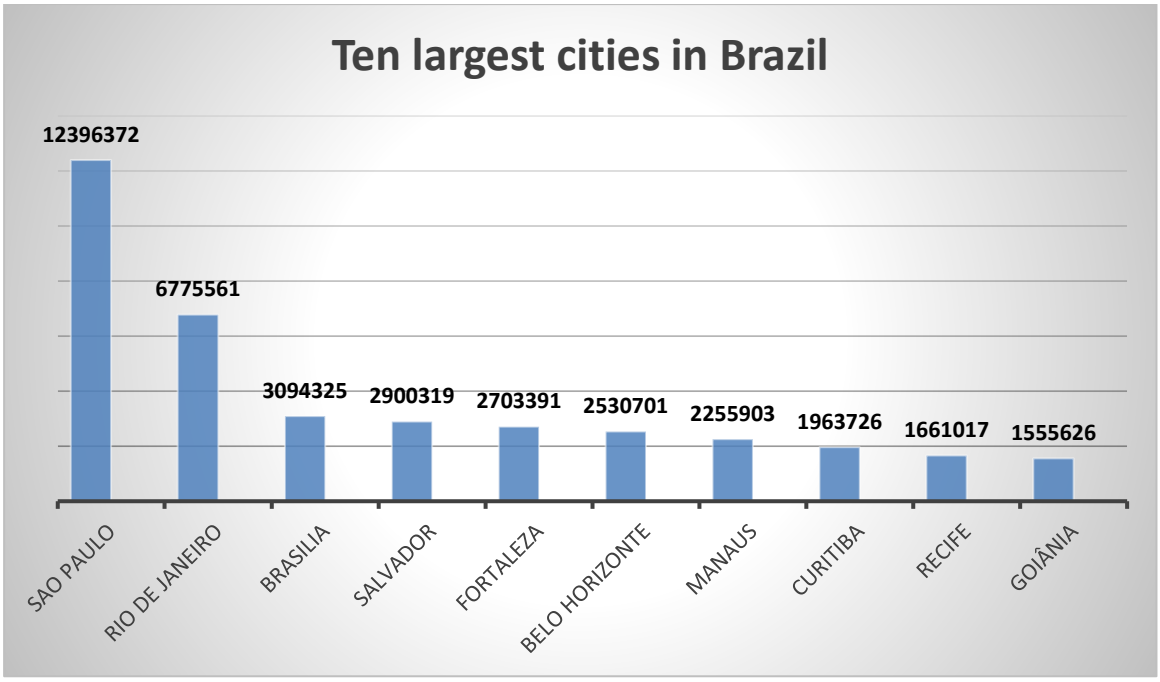


Figure 5-29: Ten largest cities in Brazil

Source: World Population Review (2022:1)

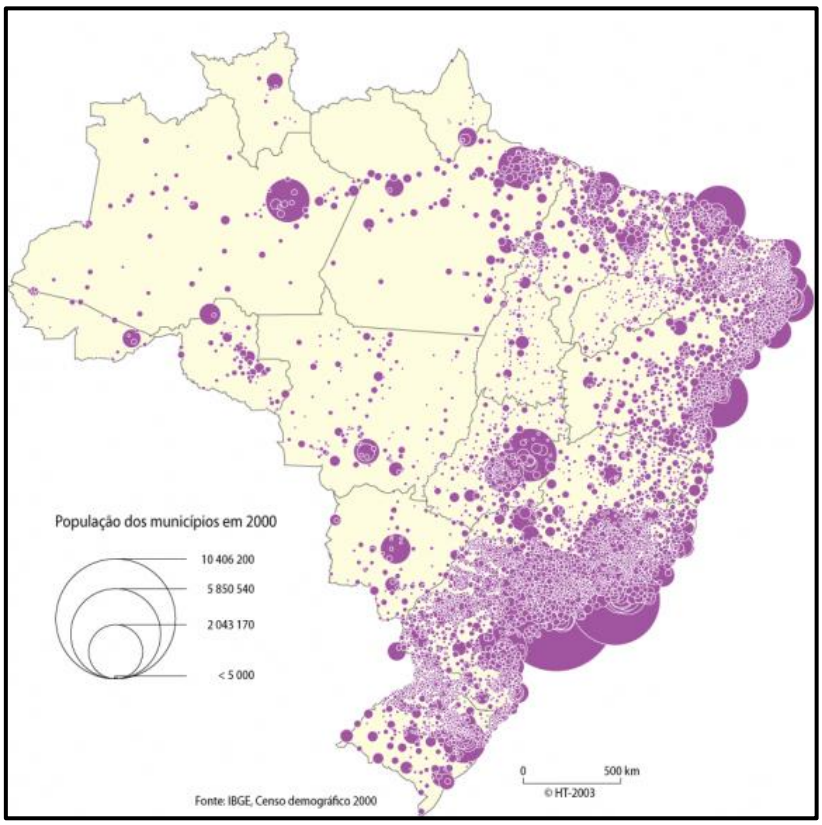


Figure 5-30: Brazil population distribution

Source: SELA (2020:1)

From the figures above, it is clear that the states on the coastlines are highly populated with one of the ten largest cities in each of the coastline states. The city and state São Paulo are more densely populated than any of the other states. For the rest of the case study, the focus will be on greater São Paulo.

5.2.2.2 Greater São Paulo

Greater São Paulo (Grande São Paulo) is a term for the metropolitan region in Brazil's state of São Paulo (as shown in Figure 5-27). Greater São Paulo is divided into six subregions and 36 municipalities. The city is known for its urban sprawl, which makes it an ideal case study to compare with Gauteng City-Region (discussed in chapter 7). São Paulo is not the capital city of Brazil, but can be seen as the economic hub.

São Paulo is a new 'global city' in the making, with large physical dimensions and a huge size disparity. Greater São Paulo within São Paulo state is indicated in Figure 5-31.

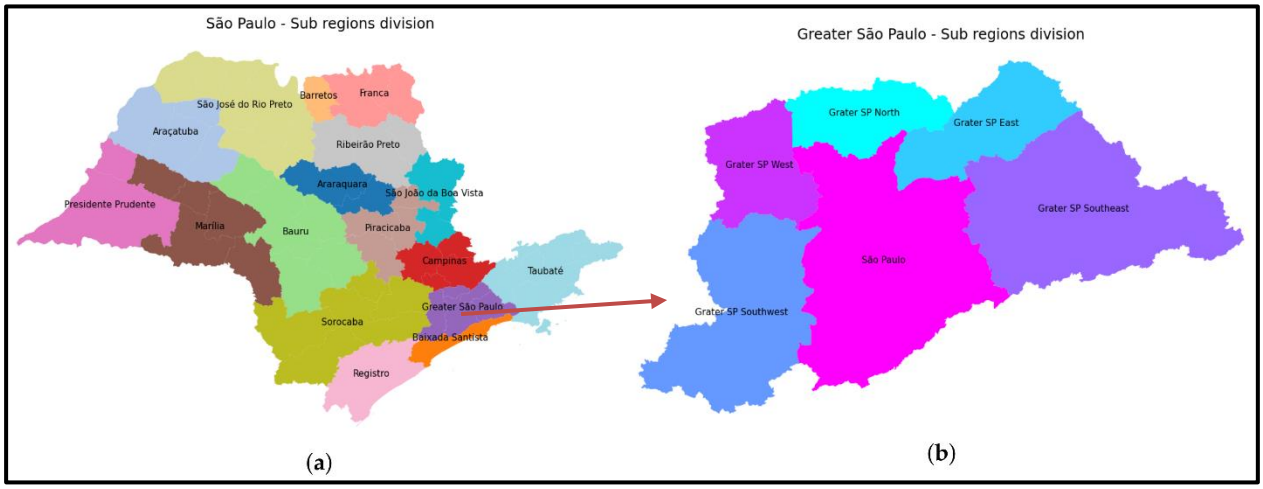


Figure 5-31: Sub-regions of São Paulo the state and close-up of Greater São Paulo
Source: Amaral *et al*. (2021:540)

5.2.2.2.1 Population distribution characteristics

The distribution of the population is used to represent different hierarchical orders and how they are distributed throughout the urban system. With a population of around 21,3 million, Greater São Paulo (São Paulo's metropolitan region) is the largest and most populated region in Brazil, the Americas and the southern, and western hemispheres (WESGRO, 2021:1; São Paulo Municipality, 2021). São Paulo also has the densest population with approximately 7 216 people per square kilometre.

According to the World Population Review (2021a), São Paulo was one of the world's cities with the fastest growth rates from 1950 to 1975. It also has the fourth highest population among the world's urban areas between 1980 and 2000. The core metropolis of São Paulo has increased by more than one million people during the past ten years (World Population Review, 2021a). São Paulo is home to one of Brazil's largest immigrant populations, which is a major contributor to the increasing population. The metro population growth is 0,87% (Macrotrends, 2022:1). Approximately 10% of Brazil's population resides in Greater São Paulo (Institute of Applied Economic Research, 2011:1).

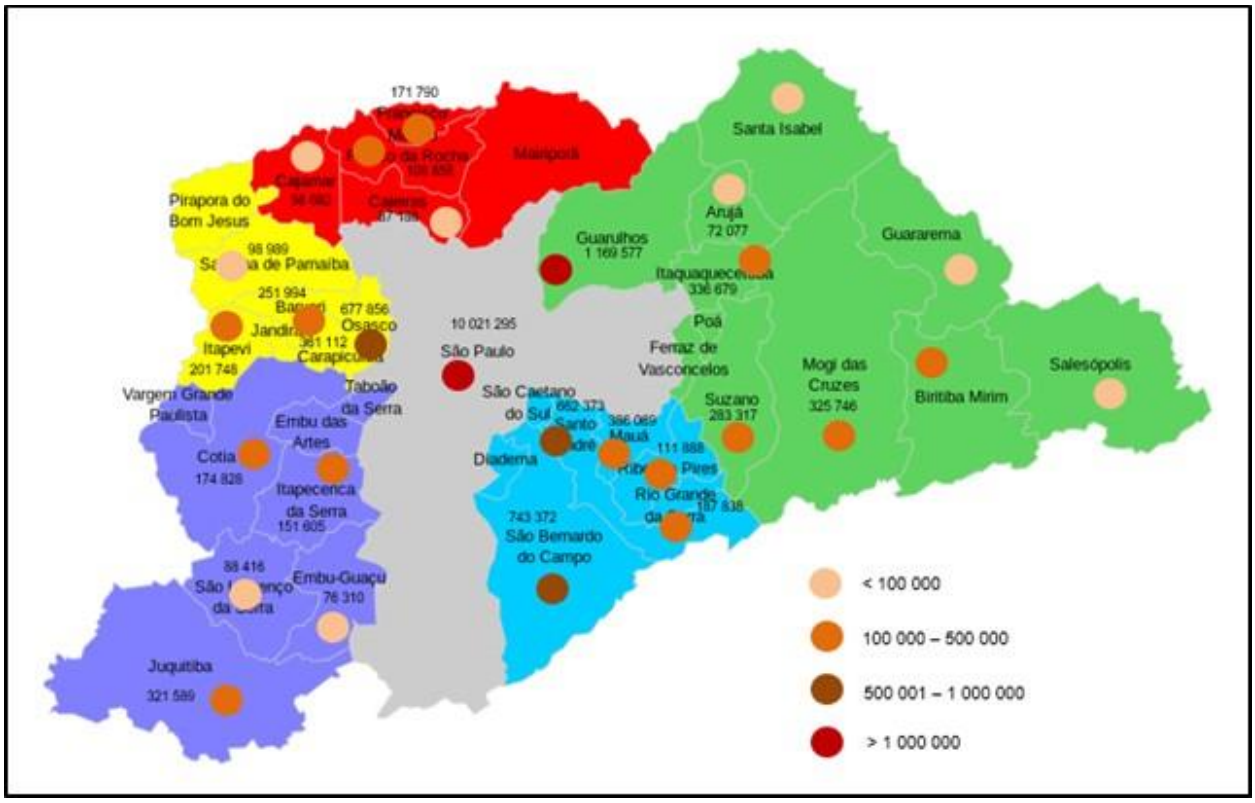


Figure 5-32: Greater Sao Paulo population distribution

Source: Adapted from World Population Review (2022:1)

São Paulo is at the top of the hierarchy, (metropolitan node) as seen in Figure 5-32. Quaruthos, Santo André, Sao Bernardo do Carnpo, and Osasco are the focus of the secondary nodes (dark orange). The orange circle zones could be considered the tertiary level nodes urban hierarchy.

From Figure 5-32 and Figure 5-33, with the population distribution of Greater São Paulo, shows a tendency of higher populations towards São Paulo city and lower population towards the outskirts of Greater São Paulo. More than half of the population (57%) lives in the city proper (São Paulo), with the balance residing in the metropolitan area's 38 smaller municipalities. Favelas (irregular communities) are home to 11 percent of the population, the seventh largest percentage among the 13 major Brazilian metro areas.

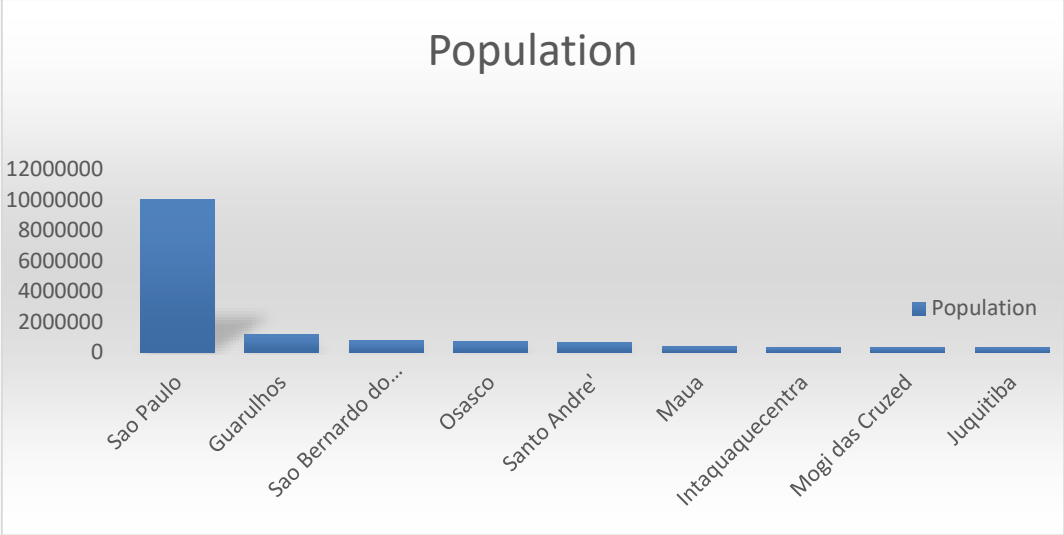


Figure 5-33: Population of the ten largest cities in Greater São Paulo

Source: Adapted from World Population Review (2022:1)

From the above figures, it is clear that the population distribution of Greater São Paulo, is in correlation with Brazil's spatial distribution. There is only one city or state with much higher population numbers than the rest.

Brazil and especially São Paulo, has a high urbanisation rate. 84 Percent of the Brazilian population living in cities and only 16 percent in rural areas (Ignazzi, 2015:8). This puts a lot of pressure on governments, especially when it comes to providing housing and services to people who live in cities.

Judging by urban systems, it suggests that Sao Paulo has a well-integrated spatial distribution system. Because the population distribution is typical, this presents excellent potential for economic growth. It shows that the spatial system is balanced across multiple hierarchies and that the city-rural divide is satisfied.

5.2.2.2.2 Economic performance

Sao Paulo is known as the southern hemisphere's major economic and industrial centre (InvestSP, 2017:1). In 2017, the state accounted for 32% of all service sector revenue earned in the United States (InvestSP, 2017:1). The state São Paulo is Brazil's most populous and prosperous state, with a population of 45 million people. It is home to the country's most modern roadways and major airports, as well as Latin America's largest container terminal, which accounts for 25% of the country's commercial flow (InvestSP, 2017:1). In Brazil, the government owns 25% of all higher education institutions. Furthermore, Sao Paulo is responsible for 69,5 percent of the state government's overall investment in Research and Development.

São Paulo is known as Brazil's financial centre since it is the wealthiest city in the country, having the world's tenth highest GDP. It is where the majority of the country's commerce is conducted, and it is home to significant corporations that keep the economy running smoothly, with 63 percent of Brazil's international corporations (Diniz, 2014:85).

São Paulo has one of the best national records in terms of living circumstances for the population. More than 90% of the country's 645 municipalities have a high Human Development Index (HDI), with 24 of them classified as having a very high HDI.

Wesgro (2021:1) confirmed that São Paulo accounted for 32% of Brazil's GDP (USD 574billion). Investors in São Paulo (2021) claims that São Paulo is both the primary producer and main consumer of a wide range of goods and services:

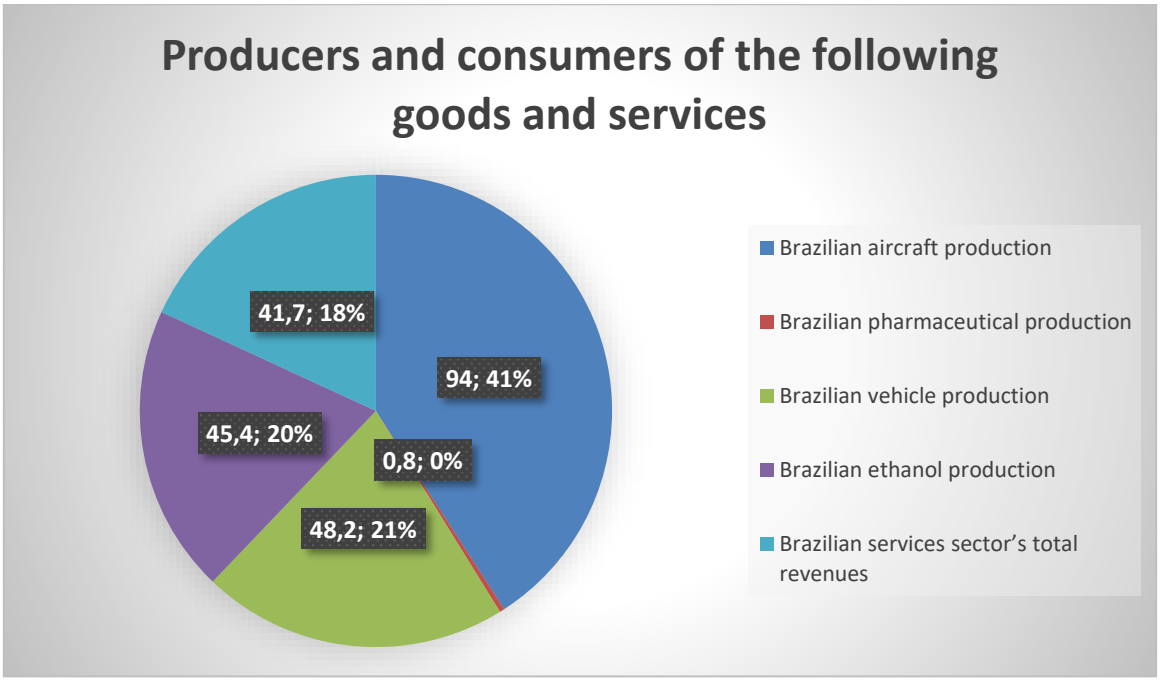


Figure 5-34: Producers and consumers of the following goods and services
Source: Invest São Paulo (2021:2)

Sao Paulo (Brazil's largest state), with a GDP larger than Argentina, is a hub of commerce, dynamism, and innovation. Its GDP increased by 2.6% in 2020, more than double the national average. This significant economic contribution is the outcome of serious initiatives aimed at modernising infrastructure, promoting technological innovation, expanding equitable opportunity, and doubling down on environmental preservation (Doria, 2020:1).

The city's HDI is 0.841 (on a scale of 0 to 1), making it the eighth highest in the state of São Paulo and the 68th highest in Brazil (Diniz, 2014:85). This index assesses progress in terms of life expectancy, educational attainment and a decent standard of living (Diniz, 2014:85).

The sector that contributes the most to São Paulo's GDP in 2018 was the services sector (excluding public administration), followed by industry (9.90 percent) and public administration services (7.50 percent).

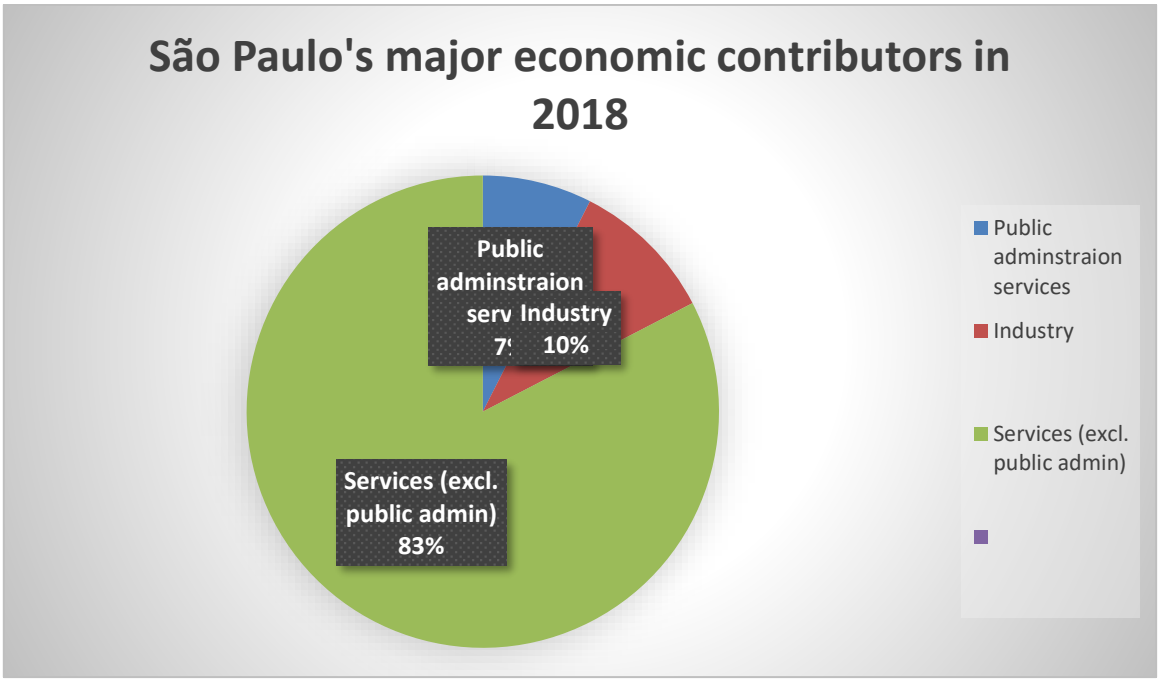


Figure 5-35: São Paulo's major economic contributors in 2018
Source: WESGRO (2021:2)

São Paulo has an income index of 0.843 (the national income index is 0.723), with a per capita income of R32,492 and 96 cents.

5.2.2.2.3 Policies and frameworks

Brazil has a unique regional development history, therefore is the Brazilian government concentrating on putting regulations and frameworks in place with the goal of better distributing resources (Resende, 2013:205). The Brazilian government employs governing organizations to aid in the implementation of programs by shouldering all financial obligations like tax advantages, infrastructure investment, and grants. The purpose of these regional development funds is to encourage economic and social development in Brazil's regions (Resende, 2013:205).

There are five stages to policy formulation:

1. identifying problems,
2. putting them on an agenda,
3. developing policies,

4. implementing policies; and evaluating the policy's success and efficiency to either restart or stop the process.

The Brazilian policy cycle can be summarised as follows.

(a) Agenda Setting: Brazil has several issues in terms of inequality in population spatial distribution within respective regions (see section 5.2.2.1). These disparities had a substantial influence on rural communities, which saw a high level of migration to larger cities.

(b) Design: Theories arguing that market imperfections should be corrected by providing incentives or subsidies to the agricultural and industrial sectors in underdeveloped areas, had an impact on the formulation of Brazilian policy (Resende, 2013:215).

(c) Decision making: The ultimate acceptance of the policy is usually included in the decision-making step, and as previously said, Brazil's government has a lengthy history of trying to influence geographical distribution through urban planning. To encourage population deconcentrating from coastal cities, the Brazilian government established the city of Goiania with a new capital, Brasilia.

(d) Implementation: A key tool for implementing improvements to regional development is funding, and special funds and banks have been established to manage the money allocated to the agricultural and industrial sectors, respectively (Resende, 2013:215).

(e) Outcome evaluation: Discussions moved away from top-down strategies and toward societal engagement as a result of previous policies failing to have the desired effect on Brazil's spatial distribution. As a result, Brazil's urban policies constitute the bedrock for making democracy a reality and addressing socioeconomic inequities. This demonstrates that the policy cycle persisted beyond the outcome review step, moving back to the agenda setting stage.

The city of São Paulo's urban development program and strategic master plan covers the entire city. This plan intends to ensure the well-being and quality of life of the city's residents by completing the comprehensive development of the city's social functions and supporting the utilisation of a socially just, economically balanced, and diverse territory. This law specifies that it should consider the terms of plans and national and state laws relevant to political urban development, such as sanitation, housing, mobility, and spatial planning.

The Master Plan’s main goal is to rebalance the city. This objective indicates that the government wishes to improve the functionality of the urban system, understanding that all levels and participatory sectors needs to align to reach this goal.

The strategy also strives to combine public and private sector efforts connected to urban initiative development, in its turn connecting them with various sectoral initiatives targeted at streamlining and modernizing government activity.

Brazil is a developing country with issues similar to those faced by South Africa (see chapter 7). Different government spheres should formulate policies using a top-down and bottom-up strategy, with sub-funds or governing bodies assisting with implementation.

5.2.2.2.4 Development objectives

Brazil's national policy is still focused on reducing regional disparity and correcting flaws (Brazilian National Policy for Regional Development, 2003). Patria Amada Brasil (2021) promotes the development of territories, cities, and regions by extending productive and urban structuring, as well as public service provision, in order to alleviate socioeconomic disparity on various scales.

São Paulo's development objectives includes the following:

(a) Special zoned areas (ZEIS, or Zones of Special Interest) dedicated to the supply of inexpensive housing, notably for families earning less than three minimum salaries;

(b) Improving the mobility of city dwellers. Infrastructure improvements for non-motorized modes of transportation should be made at a minimum and on a long-term basis;

(c) Improving the city's transportation infrastructure;

(d) Improving the quality of life in urban areas. Avoid verticalisation that is dispersed and large-scale undertakings that lies spread out. Defines incentives for new centralities at the farthest reaches of the city, while also providing urban and public services. New buildings in these core locations are planned to be mixed-use, reducing the distance between employment options and housing, and promoting new urban dynamics, particularly in public spaces.

(e) Managing development near public transportation. The goal is to improve land use in places that are well-served by medium- and high-capacity public transportation.

(f) Reorganising the dynamics of metropolitan areas. The primary infrastructure systems and productive spaces are located in this defined area.

(g) Advancing economic and social progress. The extension and enhancement of the infrastructure network, together with urban and fiscal incentives, will support and foster the development of productive activities in the urban space.

The Brazilian government is currently working on establishing rules and frameworks with the aim of distributing resources more evenly. This is being done because of Brazil's distinctive regional growth history (Resende, 2013:205). Among other things, governing bodies support policy execution by bearing the financial burden of subsidies, infrastructure investment, and tax incentives. The Greater São Paulo region is being encouraged to grow economically and socially, with the support of these regional development grants.

Brazil is similarly categorised as a developing country, and it faces issues similar to those in South Africa. Various government spheres should formulate policies using a top-down and bottom-up strategy, with sub-funds or governing bodies assisting with implementation. This strategy could enhance spatial planning by identifying the needs of enterprises and settlements in urban systems, allowing the relevant government sphere to assist with policy design and execution to assist with the issues the regions are currently facing.

5.2.2.2.5 São Paulo State: Urban System

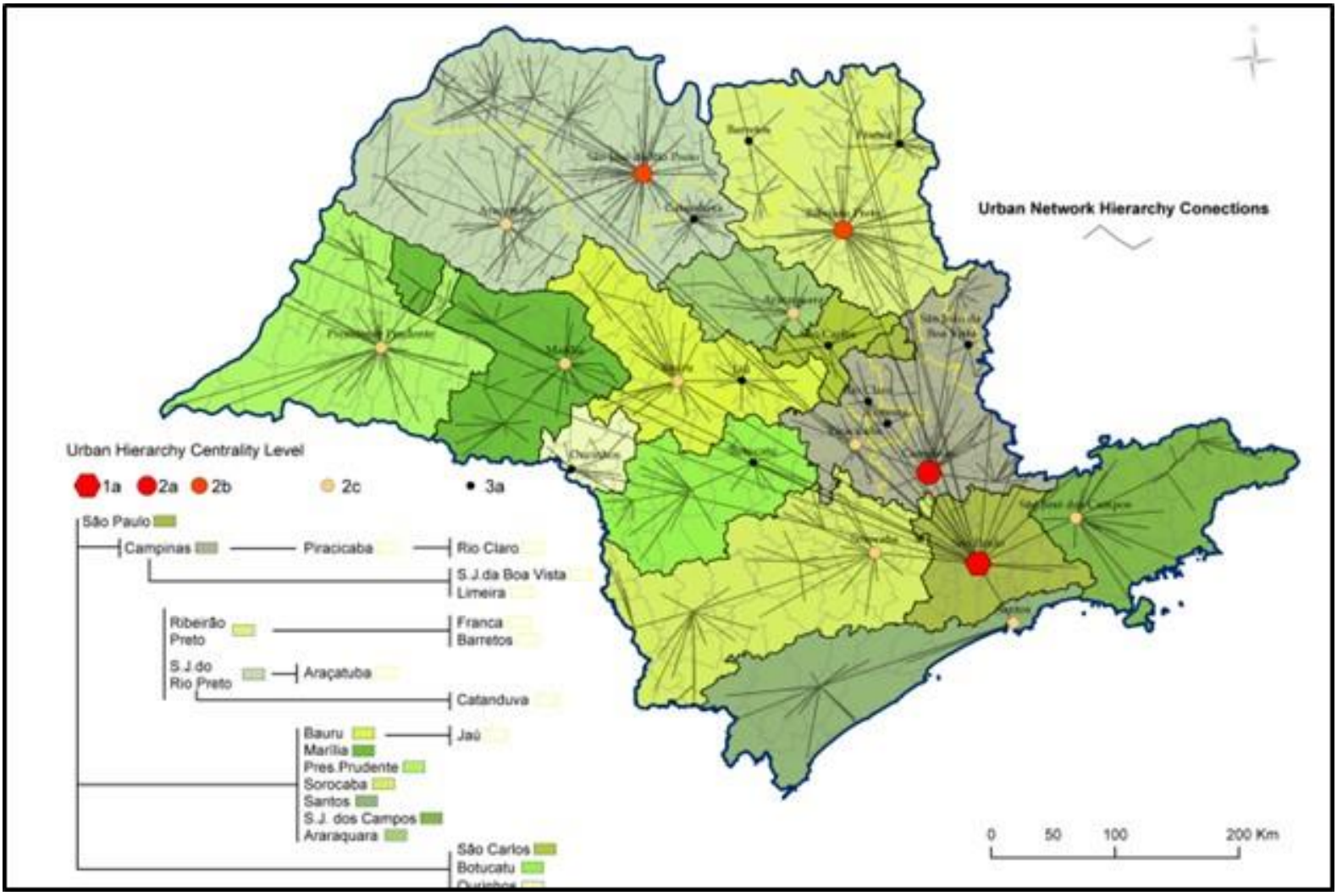


Figure 5-36: Levels of urban hierarchy find at São Paulo State

Source: Fortaleza *et al.* (2021:8)

De Lima and Rueda (2018:17) states that Brazil is one of the world's most urbanised countries, with even small and medium-sized towns in the countryside urbanising without sufficient regard for the orderly utilisation of urban territory.

São Paulo State has five levels in its urban hierarchy: metropolis, regional capital, subregional centre, zone centres, and local centre. The lines that split the land (the yellow and black borders), in Figure 5-36, illustrate the cities designated areas as level 1, 2, and 3 of the urban hierarchy, and the tree diagram schematises the hierarchy of the major cities.

Although São Paulo categorises different hierarchical levels, there is no clear indication that São Paulo's spatial development plans are driven by the urban system as a concept.

Brazilian cities are part of a system that emerges from interactions between cities (Pumain, 2006:295). Brazil exhibits an urban structure that is strongly hierarchised and created through a self-organising process. The system as a whole is characterised by a separation between cities that are developing faster than others, although this is completely expected when dealing with a nation that is notable for its tremendous territorial expansion. Large urban areas, particularly those in São Paulo, clearly dominate the system, with this city consistently at the top of the ranking.

The urban hierarchy of Greater São Paulo is highly dynamic, and large urban areas are magnets that draw people from their "natural reserve" of small towns, and for this reason we should not undervalue the importance when examining the evolution of the entire system. The Brazilian city system is characterized by the inherent dichotomy between small and large. São Paulo's emphasis on urban systems is not yet pertinent because it is placed more on the smaller (secondary level), rural (tertiary level) districts rather than gradually elevating the entire hierarchy.

5.2.3 Botswana

Botswana is regarded as Africa's most successful country, in terms of the fastest growing economy (Thakur *et al.*, 2020:1). It has been one of the world's fastest-growing economies for the past 40 years, thanks to an impressive record of prudent macroeconomic policies and good governance that has propelled the country from one of the world's poorest at independence in 1966 to its current upper-middle income range rating (Maipose, 2008:2). According to Thakur *et al.* (2020:1), the country is rapidly urbanising, with approximately 60% of the population now living in designated urban areas.

Figure 5-37: Location of Botswana in Africa

Source: Tubs (2011:1)

5.2.3.1 Background

It is believed that the people of Botswana are descendants of king Mogale, who ruled over the Magaliesberg mountains in the Gauteng province of South Africa. Since its independence, Botswana has been proud of its strong democracy, efficient government, impartial judiciary, and overall peace and stability (Embassy of the Republic of Botswana, 2019:1). Botswana is a semi-arid country with a population of 2,3 people per square kilometre that spans 582000 square kilometres, almost the same area as Kenya and France (UN High Commissioner for Refugees, 2005:1). It is a landlocked country in the midst of the Southern African plateau, with a mean altitude of 1000 meters above sea level (UN High Commissioner for Refugees, 2005:1)[6].

There are nine districts in Botswana, called Central, Ghanzi, Kgalagadi, Kgatleng, Kweneng, North East, North West, South East, and Southern.

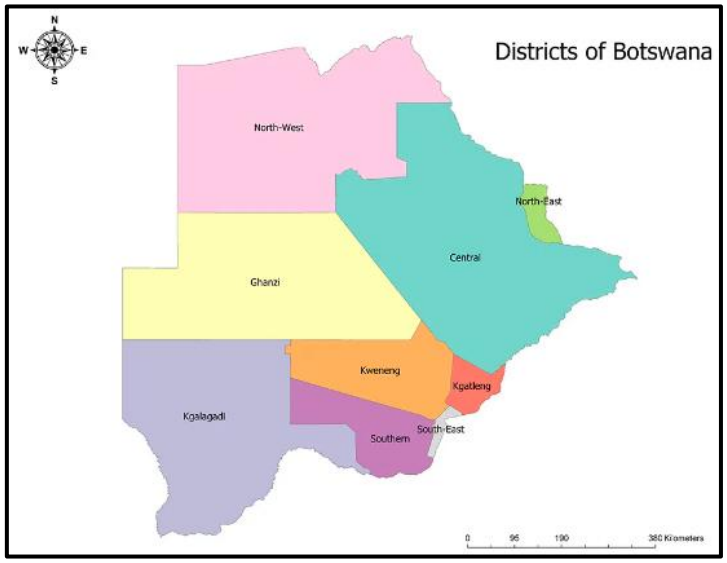


Figure 5-38: Regions of Botswana

Source: 2021

Each of the districts has their own municipality and in total there are 16 councils responsible for the development, growth, organisation and maintenance of the area.

[6] It is important to take note that Botswana is a developing nation, and data is not as freely available as in developed countries such as Australia.

The macroeconomic policy framework in Botswana is built on effective macro-economic policies and good governance, asserted by the World Bank (2022:1). The lack of economic diversification and declining commodity revenues, notably diamonds, are two factors contributing to the economy's poor growth.

Table 5-4: Botswana Economic indicators

Developing ranking	Country	Human Development Index (HDI)	GNI per Capita (World Bank, 2022)	2020 Population
100	Botswana	0,735	6,202	2,449,262

Source: Adapted from World Bank (2022:1) and own compilation

Botswana's HDI score for 2020 is 0.735, placing it in the high human development category and 100th out of 189 countries and territories (Human Development Report, 2020:1). The GDP per capita for 2020 was 6,710.99 USD (World Bank 2022:1), which is much lower than Australia and almost equal to Brazil. Botswana also has an unemployment rate of 22,70&, which is much higher than Australia and Brazil.

Botswana seemingly has a politically, fiscally, and macro-economically stable environment. The nation's development has been steered in such a way that it has mostly avoided the Dutch disease, the resource curse, and the "mineral-led economic syndrome" (Maipose, 2018:2). Rapid economic growth is essential for overall development, and to achieve a rise in average living standards, economic growth must outpace population expansion (Maipose, 2018:2). Redistribution schemes cannot be sustained without economic development. Strengthening infrastructure, diversifying output and markets, and increasing ownership of policy or program initiatives are all part of achieving economic independence.

The mining sector, especially the diamond industry, which has been strategically led, influenced and managed by the state. It is supplemented by foreign aid to a lesser extent within the overall institutional context of a liberal market economy and multi-party democratic government. It was the driving force behind Botswana's rapid economic growth and general development. This was Initially based on agriculture and heavily dependent on foreign aid (Maipose, 2018:4). Utilising the nation's mineral resources and investing the proceeds in bettering social and economic circumstances creating new economic possibilities were and remain key components of Botswana's economic development plan, which also promoted foreign aid and private (foreign) investment.

Botswana's population is projected to be 2,45 million people (Worldometer, 2021), with a demographic distribution that is unequal. Botswana ranks 145th according to population in the world's population. The total land area of Botswana is 566 730 square kilometre which projects the population at approximately 4 persons per kilometre. Botswana is one of the most sparsely populated countries on the planet. Mongolia, the Falkland Islands, and Iceland are among the 12 sovereign states and dependent territories with a lower density.

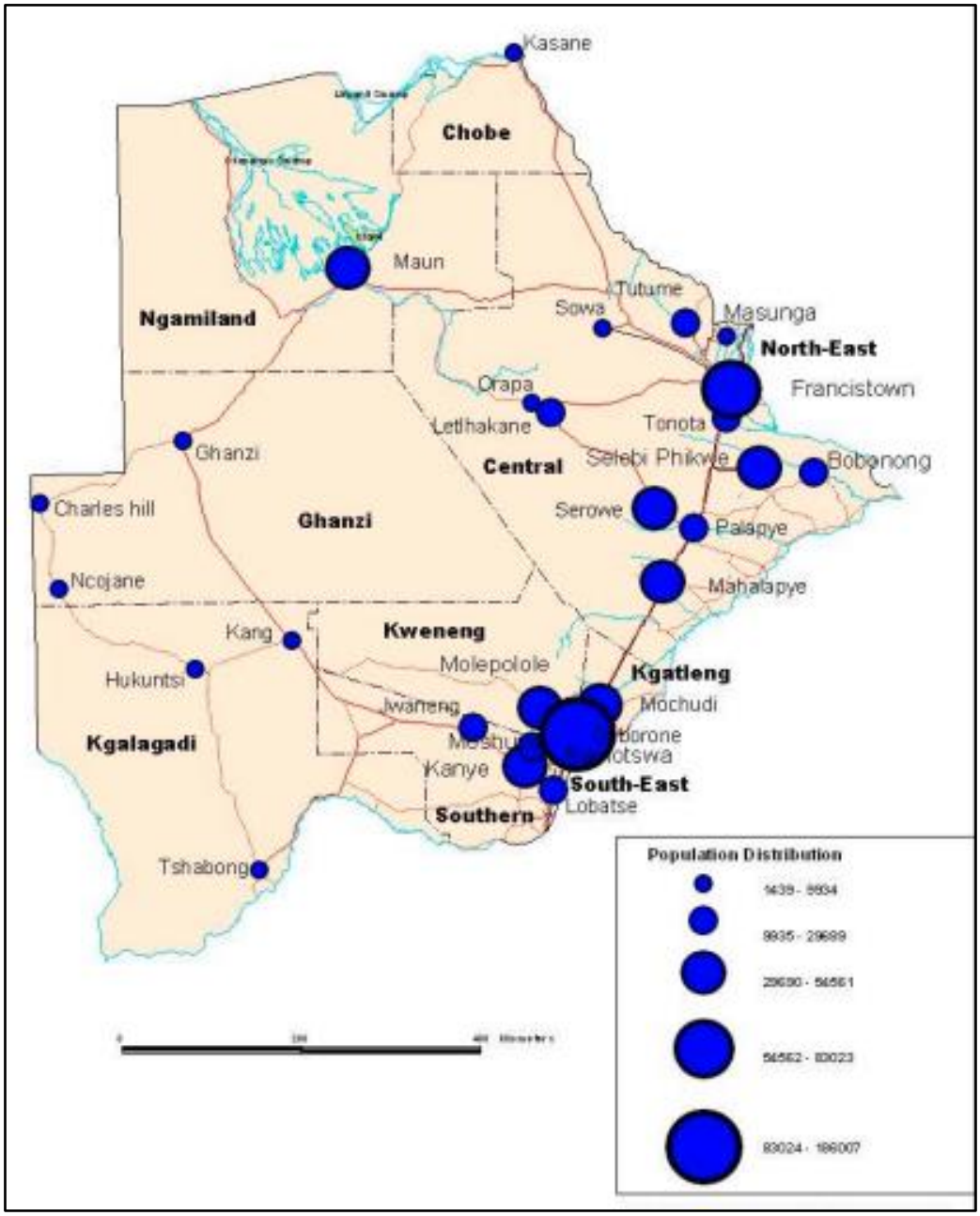


Figure 5-39: Botswana population distribution

Source: Population Census Atlas: Botswana (2005:5).

Botswana's population is concentrated over a short strip of land that runs from north to south throughout the country. This is due to the fact that this location receives more rainfall and has more agricultural fertile land. Gaborone, the capital city, has a population of 208,411 people and is more progressive in infrastructure and economic development than Francistown (the second largest city in Botswana), which has a population of roughly 89,979.

The Kalahari desert's severe circumstances have left the western section of the nation sparsely inhabited. However, because surface water has been made available by the installation of boreholes, a large number of people live in this region, and a large number of people are cattle farmers.

Settlements can be broadly categorised into towns, cities, and urban villages, according to Statistics Botswana (2014:170). This shows that there is a clear urban hierarchy. Statistics Botswana (2014:170) also indicates that only two of these are classified as cities, namely Gaborone (Botswana's capital) and Francistown. Larger cities in Botswana include Lobatse and other mining centres, whereas urban villages are defined as places having a population of at least 5,000 people with at least 75% of personnel employed in the agricultural sector (Statistics Botswana, 2014:170). Botswana has a noticeable imbalanced spatial growth pattern, as shown in Figure 5-39. Natural occurrences in Botswana's west, such as the Okavango Delta and the Kalahari Desert, are primarily responsible for the spatial pattern and hierarchy. In Gaborone and Francistown, the majority of nodes are clustered around the two largest nodes on the top of the hierarchy. In between these nodes, the middle order nodes are clustered. The third-tier hierarchy nodes, as well as some of the second-tier nodes, are separated from the current clusters but connected by existing road networks.

Looking at Figure 5-40 and Figure 5-41 it is clear that the population distribution is unequally distributed with the majority of the population located in the South East District (which borders South Africa). The population density is 210 persons per square kilometre. The North East (which borders Zimbabwe) has a population density of 36 persons per square kilometre (Geo Ref, 2020:1).

In Figure 5-40 and Figure 5-41 the ten largest cities in Botswana are categorised in order to show the population distribution.

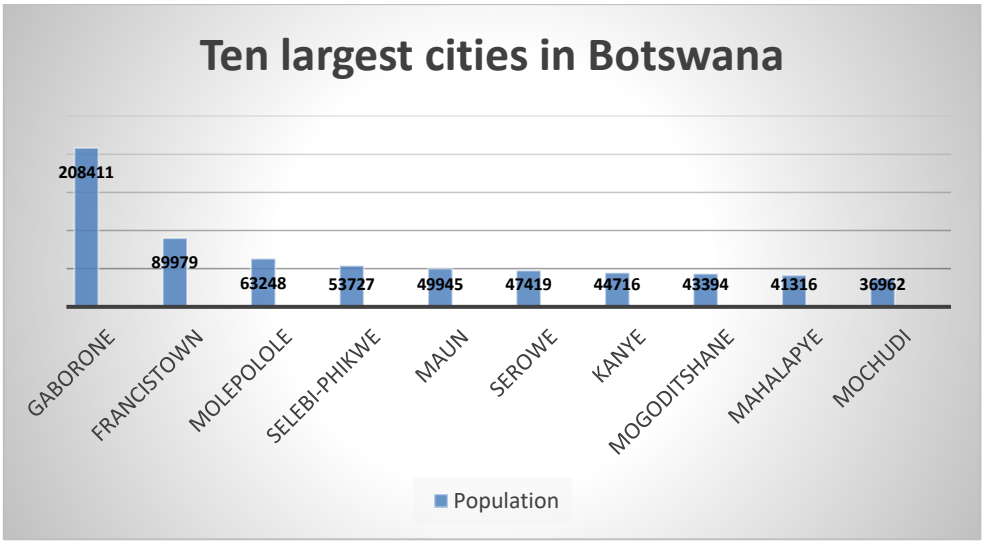


Figure 5-40: Ten largest cities in Botswana

Source: World Population Review (2021:1)

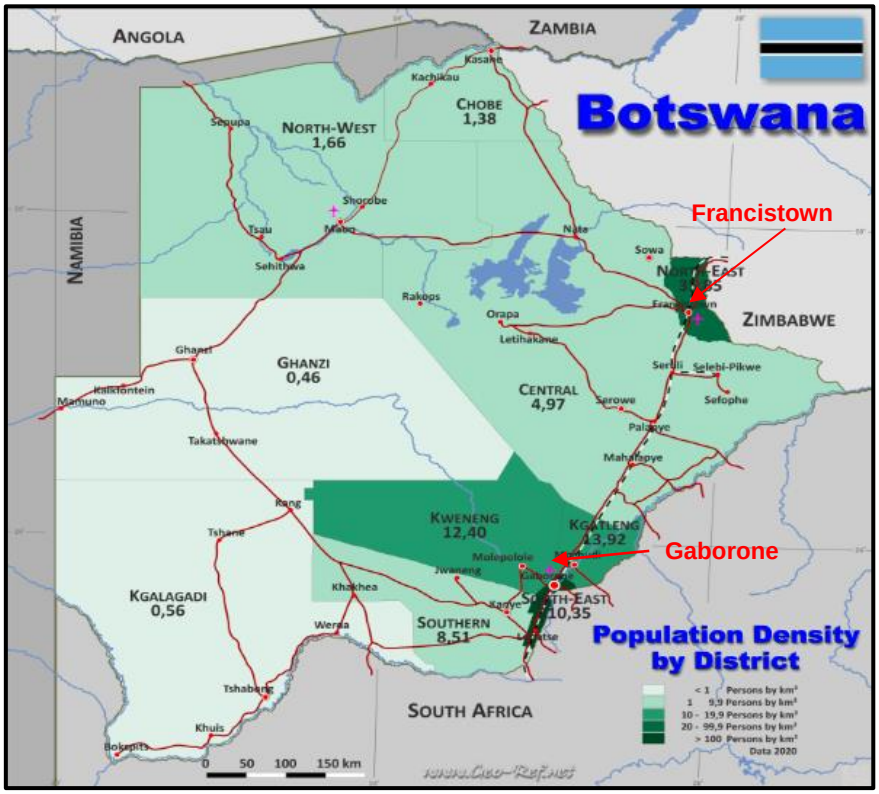


Figure 5-41: Botswana's population distribution

Source: Adapted from Geo-Ref (2020:1)

Gaborone, the capital of Botswana, is located in the South East District. The natural population is continuously growing, which results in planning problems such as housing shortages and overpopulation. Gaborone is an outlier compared to the rest of the cities with similar population numbers. The rest of this case study will focus on the Greater Gaborone, the capital and most populated city in Botswana.

5.2.3.2 Greater Gaborone

Gaborone, the city named after chief Gaborone and located in the Southeast District, is the capital and largest city, as indicated in Figure 5-42. It was formerly one of the world's fastest growing cities, which resulted in housing issues and illegal colonies (similar to South Africa). Gaborone is the country's economic and political capital. It also serves as the headquarters of the Southern African Development Community (a regional economic community). In terms of socio-economic indicators and infrastructure services, the Greater Gaborone Planning Area in the South Eastern Planning Region is the most urbanised and developed region in the country.

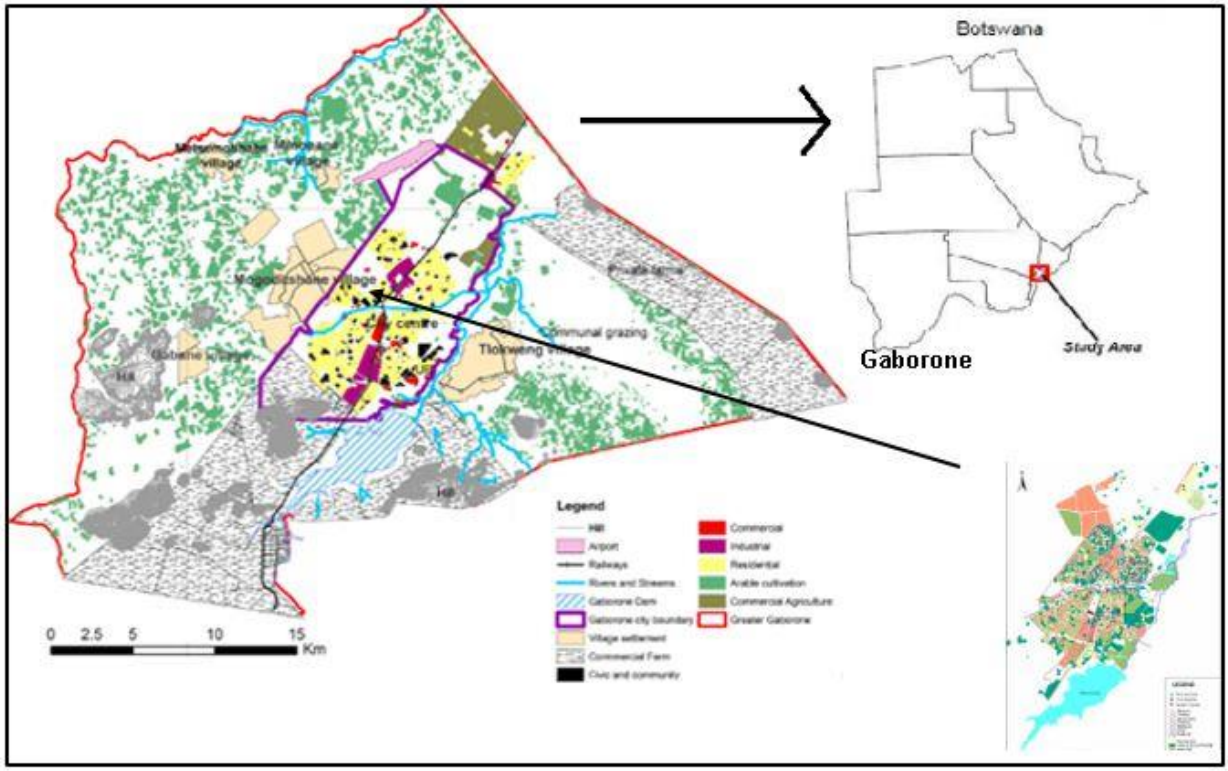


Figure 5-42: Greater Gaborone

Source: Adapted from Sebego and Gwebu (2013:205)

The Planning Area is bound on the west by Bakwena Tribal Land, on the east by Batlokwa Tribal Land, on the southeast by Bamalete Tribal Land, and on the north by Bakgatla Tribal Land. The city is primarily surrounded by freehold farms to the south. Because land acquisition is difficult and expensive, the presence of tribal territory, combined with the presence of commercial farms elsewhere, has limited Gaborone's geographical growth (Sebego & Gwebu, 2013:197).

Greater Gaborone (illustrated in Figure 5-42) major cultivable areas are illustrated in purple in the centre, which is where the capital of Botswana lies. It is mostly residential (yellow) development and industrial areas (purple), with a few commercial (red) developments in the capital. The green

areas surrounding it is mostly agricultural and cultivated areas with tertiary level cities illustrated in grey. At the most southern part of Greater Gaborone, the Gaborone dam is located.

5.2.3.2.1 Population distribution characteristics

Greater Gaborone consists out of the capital city, Gaborone, and various towns surrounding the area. The majority of these towns are situated around the capital city, more to the northern part of the South East District.

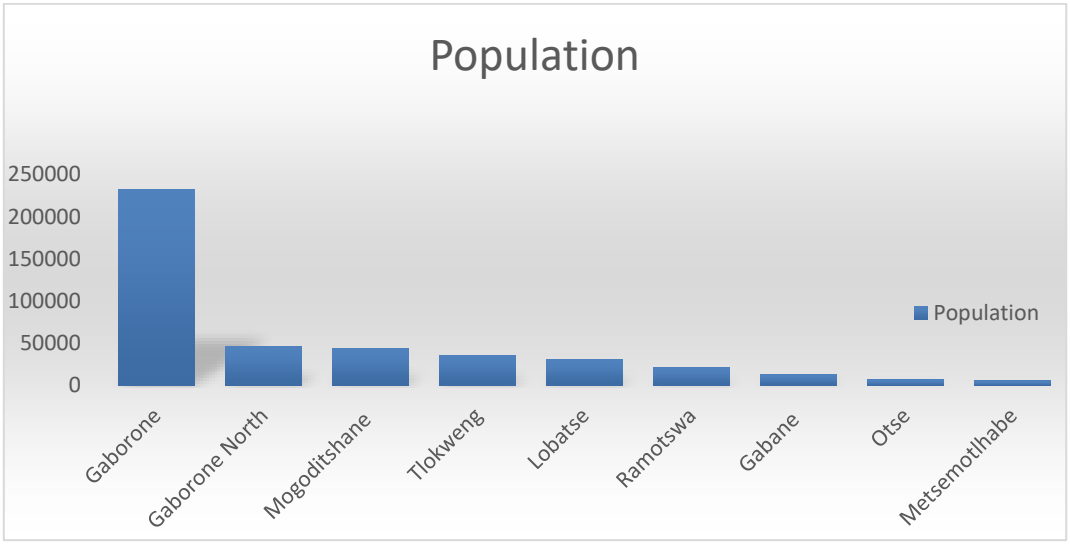


Figure 5-43: Population of ten largest towns in Greater Gaborone

Source: World Population Review (2022:1)

Figure 5-43 shows that the population distribution throughout the ten towns is uneven, with Gaborone as the outlier. The population distribution of Greater Gaborone corresponds with the population distribution of Botswana (Figure 5-40).

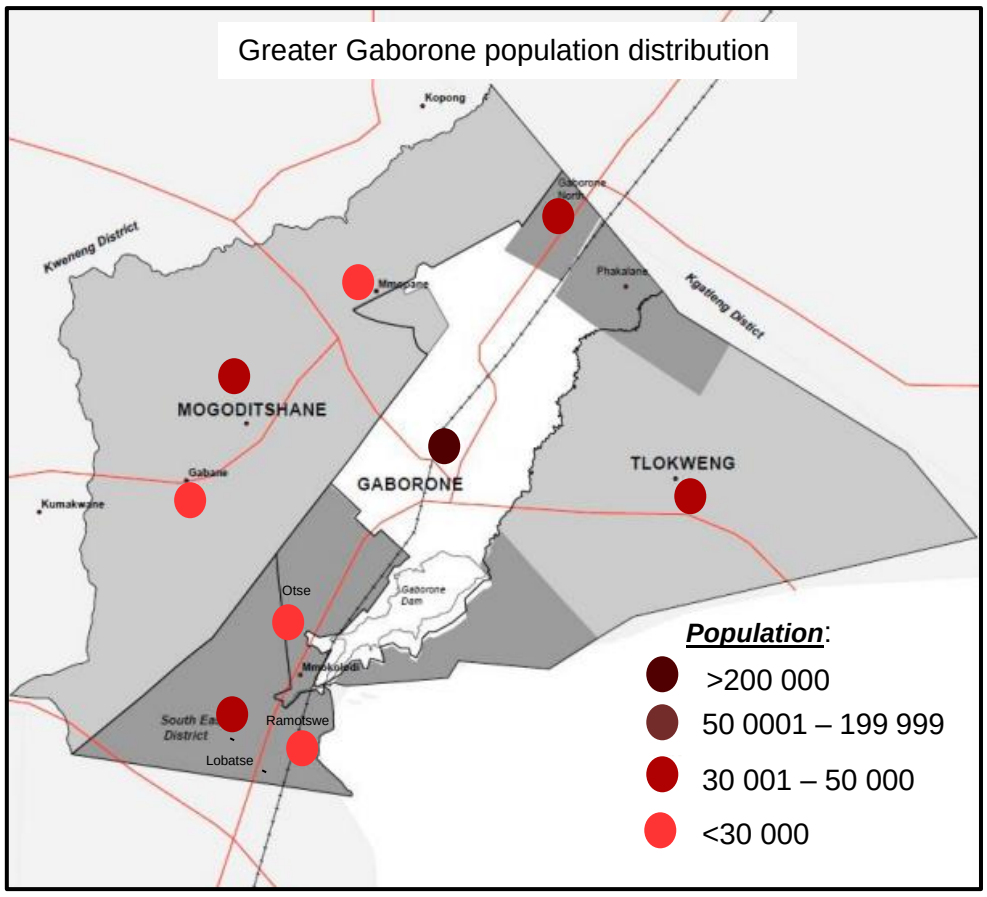


Figure 5-44: Population distribution of Greater Gaborone

Source: Adapted from Kalabamu and Lyamuya (2021:39) and World Population Review (2022:1)

Figure 5-44 shows the population of Greater Gaborone, and it is clear that Gaborone, the capital city, has a much larger population than its surrounding areas, in this case, the metropolitan city. The secondary cities are located closer to the border of other districts, north, south and west of the centre of Greater Gaborone. The tertiary level cities are located between the metropolitan city and secondary cities. This hierarchy is established to improve mobility between the capital city and other districts.

The unbalanced population pattern is due to the Okavango Delta and the Kalahari Desert, two natural phenomena that exist in Botswana's western region.

The southeast district is the smallest district in Botswana and contributes to the largest population figures in the country. The capital, Gaborone, has a surface of more than 169 million square kilometres. The population density of Gaborone is thus approximately 1400 persons per square kilometre.

5.2.3.2.2 Economic performance

Botswana has become one of the fastest growing countries, since diamonds were discovered in 1966 (Harvey, 1992:335). Further primary industries in this country are textiles, brewing, printing, publishing, while the main services are government, healthcare, banking, retail, and transportation (Sebego & Gwebu, 2013:197).

The Jwaneng diamond mine, the wealthiest diamond mine in the world, is situated in the Naledi river valley of the Kalahari in South-East district, about 120 kilometres west of the capital city of Gaborone. Economic activities in Greater Gaborone are similar to the economic activities in the rest of Botswana, mentioned in section 5.2.3.1, and indicated below.

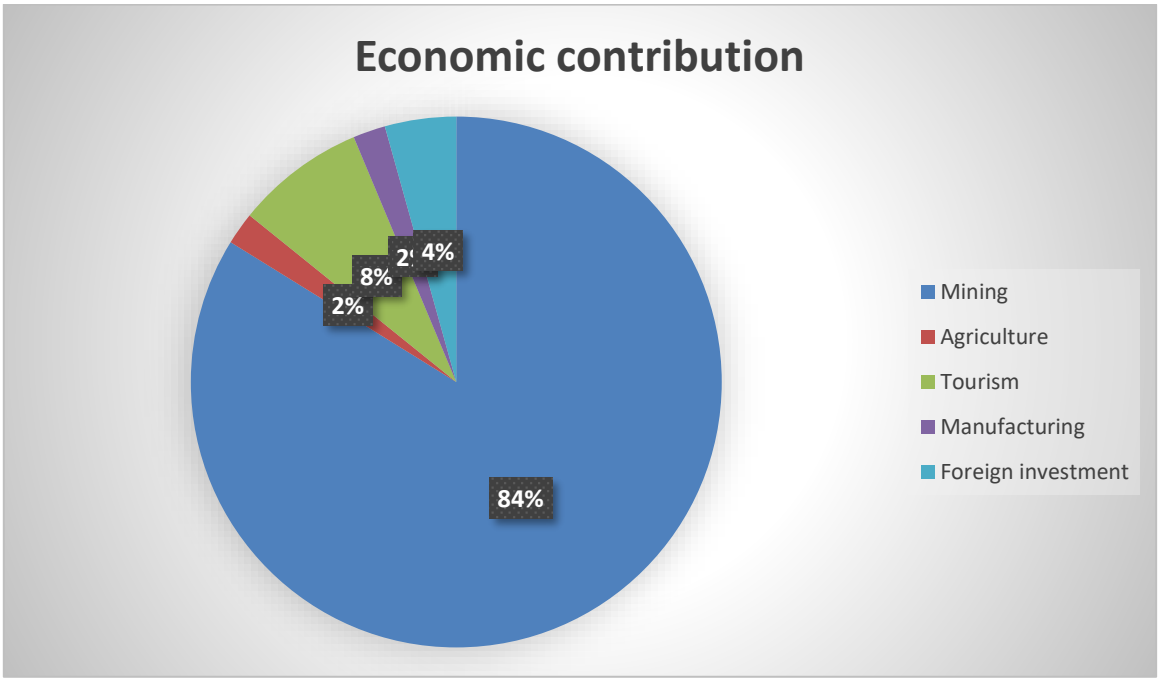


Figure 5-45: Economic structure of Greater Gaborone

Source: Own compilation

Looking at Figure 5-45, it is clear that there is an extremely unequal contribution towards Greater Gaborone's economy, with mining being an outlier. The mining industry in Gaborone is based on diamond mining and contributes the highest monetary value to Greater Gaborone and Botswana. The government is concerned about the long-term viability of its economy, since mining is not a reliable source of income. Therefore, the budget sustainability ratio is used to quantify the dependency on mineral earnings.

The government of Botswana has put a lot of effort into fostering and enhancing exports and investments, even though it is one of the smaller contributors, exports is a long-term investment and may lead to a more stable economy for Gaborone.

5.2.3.2.3 Policies and frameworks

The wider National Economic Development Planning of Botswana, which has been guided by the four national goals of democracy, development, self-reliance, and unity, has since independence incorporated the country's development strategies and poverty-reduction initiatives (Maipose, 2008:3). The political leadership of Botswana was concerned, according to Somolekae (1998), that a strategy of appeasement, in which the nation yields too readily to demands based on irrational wants, may result in a steady weakening of standards that would be challenging to prevent and vice versa. Many industrial and private sector development efforts have continually been encouraged by the Botswana government, demonstrating by the government's policies and tactics in this regard. According to Simphambe (2007:14), Botswana is one of the few African nations that has continually made an effort to put the required institutions, policies, and regulatory frameworks in place, both for attracting Foreign Direct investment (FDI) and for the growth of the private sector. It is crucial to stress that Botswana was not the only country to successfully implement "state-led" development and national economic planning. A similar approach was pursued by other African countries. However, the strategy was extremely effective in Botswana, where the country flourished as a result of clever policies and helpful institutional frameworks. The same policies were linked to, and until recently blamed for, the overall economic problems in several African countries, the majority of which were ruled by one-party dictatorships.

Maipose (2008:4) states that, in terms of quality and how it is achieved, as well as the implications for growth outcomes, is determined by the implementation of policies. As a result, periodisation of growth experience is analytically necessary, and it encapsulates the notion that Botswana's progress may be divided into policy episodes (Maipose, 2008:4). The 1960s to 1975 period is regarded as the initial base-building period, a period of transition that begins with some uncertainty about the nature and economic base of the Botswana state and ends with institutional transformation and development policy direction. Molebatsi (2013:11) argues that the bottom-up method of planning has always been the foundation of Botswana's planning system and that participatory planning is an important aspect of their planning approach. Added hereto are the legislation components a mechanism for development control and planning strategies for future urban development.

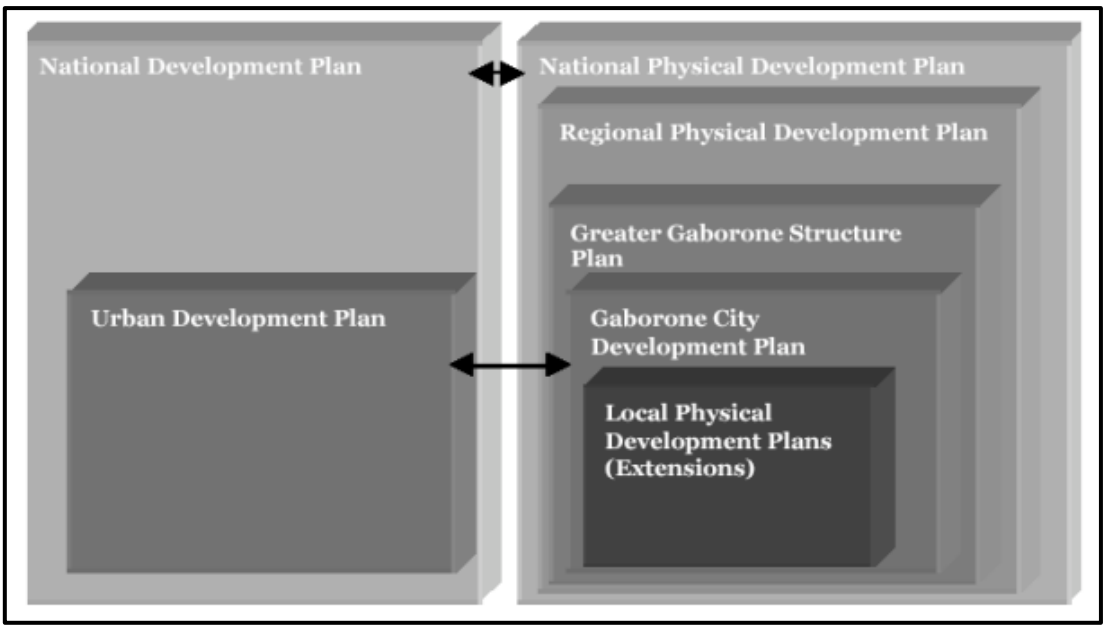


Figure 5-46: Overview of the existing planning levels for economic and physical planning

Source: Keiner *et al.* (2003:45)

The different policies and legislations indicated in Figure 5-46 will be described with the focus on determining urban systems and urban hierarchy as a spatial planning tool.

Table 5-5: Overview of the existing planning levels and their focus on urban systems

NATIONAL DEVELOPMENT PLAN	National Physical Development Plan	Focus is given to increase the effectiveness of using the urban system on a multilevel system. There is also a clear indication on the hierarchy of different nodes.
	Regional Physical Development Plan	No clear indication on the focus of urban systems on urban hierarchy could be identified.
	Greater Gaborone Structure Plan	The strategy offers a framework for co-ordinating institutional, economic, social, and physical development over an area of around 1000 square kilometre. There is reference made to the National Physical Development Plan, which indicates urban hierarchy, but the specific plan does not focus on urban hierarchy, by making provision to include it for the future.
URBAN DEVELOPMENT PLAN	Gaborone City Development Plan	The most significant plan for the spatial development of the city is the Gaborone City Development Plan (GCDP). This document specifically states the goals, objectives, and policies that will direct and shape the future development growth of the city in a sustainable manner. Urban systems and the hierarchy of nodes are mentioned in various parts and the importance of planning for the urban system stands out.
	Local Physical Development Plan	No clear indication of the urban system, but it does mention planning for various hierarchy nodes.

Source: Keiner *et al.* (2003)

All legislations and frameworks applicable to Greater Gaborone mentions the importance of planning for the urban system. It is clear that the Greater Gaborone sees the importance of urban systems as a spatial planning tool. These legislations wish to improve the urban system on a multilevel scale, which indicates that Greater Gaborone is an example for the rest of Botswana. On national scale (Botswana) urban hierarchy is a significant contribution to planning on a limited scale (Gaborone City). The Greater Gaborone does not make provision for urban hierarchy.

5.2.3.2.4 Development initiatives

Since the main focus of all development initiatives is people, it is crucial to project the city's population in order to get a sense of the number of people expected, and to identify the necessary future requirements for land, housing, and other social and infrastructure facilities.

The Gaborone City Development Plan (Ministry of Lands and Housing Department of Town and Regional Planning, 2009:85) claims that sustainable development is a key focus for future development in Gaborone. Another important initiative is the expansion of the city borders. Urban spatial development is the main focus, which includes physical and, to some extent, socioeconomic planning, which may be considered to be a reflection of all three pillars. (Keiner *et al.*, 2003:13).

Strong urban systems enable people to live in surrounding areas and commute to Gaborone city centre, where the majority of labour opportunities are, therefore possible future development would be in this direction.

5.2.3.2.5 Urban system

Most sub-Saharan African countries' urban hierarchies are marked by precedence (section 4.3.3), with metropolitan capitals receiving far more than their fair share of national populations and investment.

Since the inception of contemporary planning services in Botswana, there has been a strong desire to implement a settlement hierarchy that allows for the recognition and expression of differences across settlements in order to support their planning, development, and management.

Gaborone exhibits undesired “megacity” tendencies, according to the ever-increasing urban hierarchy, that continues to dominate the urban hierarchy (Sebego & Gwebu, 2013). Gaborone's supremacy, as evidenced by rank size and precedence indices, suggests regional domination. The economic development, eventually leads to inequities, polarisation, and imbalances.

In the context of this study, unique hierarchical orders and their distribution in the urban system, as described by Berry (1969:190) were defined using population distribution and the economies of various nodes. According to the 2020 statistics of Worldometer (2021:1) 2,3 million people resided within the borders of Botswana. This means an average growth rate of 2,2%. Botswana's population is 0.03 percent of the world's total population, with a population density of 4 people per square kilometre. The land area is 566,730 square kilometres in total. Urbanization accounts for 72.8 percent of the population.

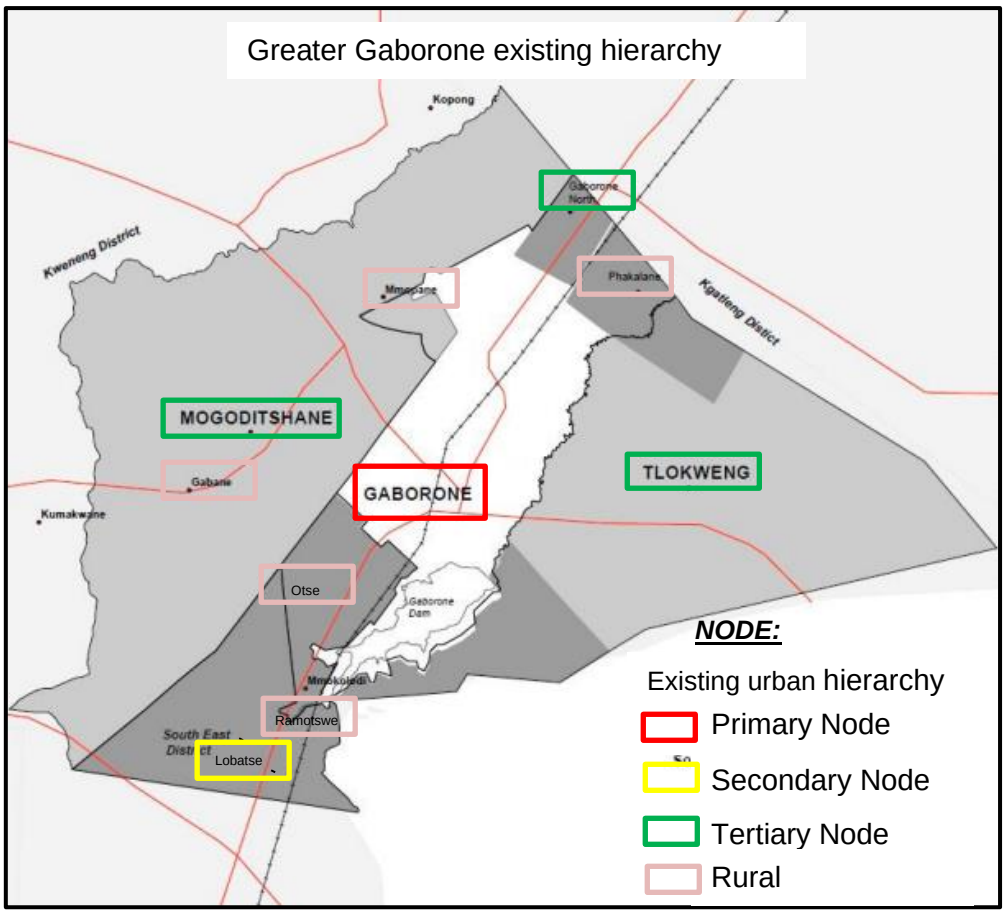


Figure 5-47: Greater Gaborone existing hierarchy

Source: Own compilation based on (Keiner *et al.*, 2003:24) and World Population Review (2022:1)

According to the aforementioned figure, Greater Gaborone has an uneven spatial structure as a result of the impact of the region's inherent physical constraints. Gaborone, the capital of Botswana, is the main node (metropolitan node). Lobatse is suggested to be among the secondary nodes of the hierarchy. The remaining locations analysed have a lower population potential and are suggested to constitute the low order hierarchy.

All legislation and frameworks applicable to Greater Gaborone mentioned the importance of planning for the urban system. It is clear that the Greater Gaborone recognises the importance of urban systems as a spatial planning tool. The legislation attempts to improve the urban system on a multilevel scale, which indicates that Greater Gaborone is an example to the rest of Botswana.

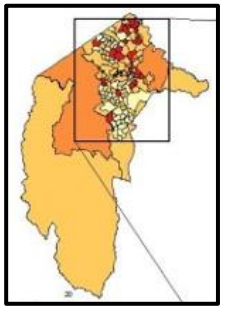
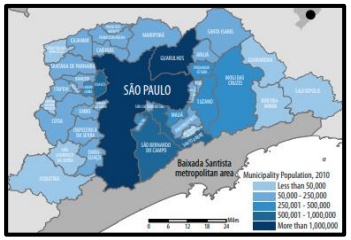
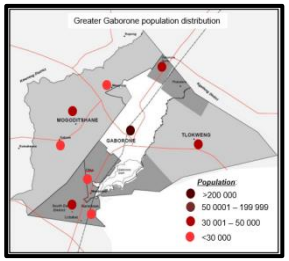
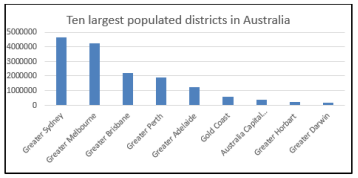
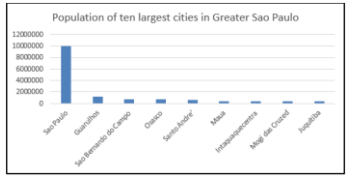
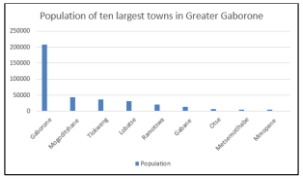
It is important to note that Botswana is a developing country, and that data is not as readily available as it is in developed countries, such as Australia.

5.3 Conclusion

This chapter compares and shows differences between three foreign case studies, namely a developed country, Australia, and two developing countries, Brazil and Botswana. Botswana is a fast-growing developing country which shares many of South Africa's features. The case studies focus on a metro of each country in order to compare and correlate different ways of regional planning and the use of urban systems in each case. This chapter is important since multiple principles from Canberra, São Paulo and Gaborone will be used to generate recommendations and conclusions on the improvement in spatial planning when applied in the Gauteng City-Region, discussed in chapter 8.

The foreign case studies examined in this chapter are summarised in table 5-6.

Table 5-6: Summary of international case studies

	Australia Capital Territory	Greater São Paulo	Gaborone City-Region
Population Distribution	 Population is more equally spread.	 Uneven popuation. Large metropolitan city with smaller cities around.	 Unevenly populated: Large gaps between metropolitan city and third level cities.
Ten largest cities			
Level of Development	Developed country	Developing country	Developing country
Policy implementation	Bottom-up[7] approach	Combination of top-down[8] and bottom-up approach	Bottom-up approach

Source: Own compilation

[7] Bottom-up planning aims to establish a plan from a lower, more meaningful classification level to the higher level.
[8] Top-down planning tries to gradually proceed from the top to the bottom level of a specific hierarchy.

Table 5-6 above depicts and describes the spatial distributions of Australia Capital Territory (in Australia), Greater São Paulo (in Brazil) and Greater Gaborone (in Botswana) respectively. It is clear that Australia focuses on strategically implementing spatial planning, notably through incorporating urban systems, with policies implemented through a co-design approach. The Australia Capital Territory mainly focuses on differential urbanisation (section 4.3.3), attempting to increase the functionality of secondary and tertiary level nodes in the hierarchy of the urban system.

The Brazilian government, on the other hand, employs a fund manager who serves as liaison between the national government and regional enterprises. This guarantees that the demands of local firms and industries are met while employing national principles and policies. São Paulo currently focuses on the physical layout of the relative region, and not on the urban system of the region and the contribution of the system to the spatial planning of São Paulo.

Greater Gaborone, to a considerable extent, takes into account that spatial planning goes hand in hand with the urban system of the region, and the contribution of the hierarchy and different levels to the successful development of the region. The policies and legislations clearly focus on the contributing factors that the metropolitan city has towards the hierarchy of the urban system. More focus is given on the primary tier, rather than on the secondary and tertiary level nodes. This causes extreme economic growth since the metropolitan node (Gaborone) contributes in a great extent to the entire Botswana (section 5.2.3.2.2). The lack of focus on the other levels, however, leads to larger gaps in the hierarchy.

The comparison of Canberra, São Paulo and Gaborone, and, for that matter, Australia, Brazil and Botswana, is important, since each city and country have a distinct economic and sociocultural history.

It is also clear that the policy formation process, as well as the execution of policies and procedures, has a direct impact on the population's geographical distribution patterns in the urban system. As a result, this chapter verified that different policies investigated the result in varied spatial distributions, indicating that policies can either stimulate or discourage migration in spatially targeted areas, thereby improving spatial planning and enhancing urban systems.

CHAPTER 6: CASE STUDY: GAUTENG CITY- REGION (SOUTH AFRICA) - POLICIES AND LEGISLATION.

6.1 Introduction

In South Africa, all spatial planning papers are organised in a co-ordinated manner and are linked to one another. It is therefore crucial to consider the current regional planning environment and regional plans when evaluating and planning effectively from a regional perspective. The objective in this chapter is to assess the initiatives taken, insights learned, and advancements made in the field of regional planning in order to propose and connect the theoretical foundation of this study to the assessment standards. The suggestions for strategic planning in the final chapter will be supported by this integrated strategy and evaluation. The emphasis is on national plans as well as the most recent, relevant regional plans that had a substantial impact on the existing urban systems.

In this chapter the researcher attempts to highlight a number of policies that might have an influence on strategic spatial planning and urban systems (as set out in objective two of this study), and the use of its regional instruments. Several policies will be explored, with a focus on the geographical scale and national policies. The significance is that laws and regulations will be examined that might have an impact on urban systems as part of the strategic pressure for spatial planning.

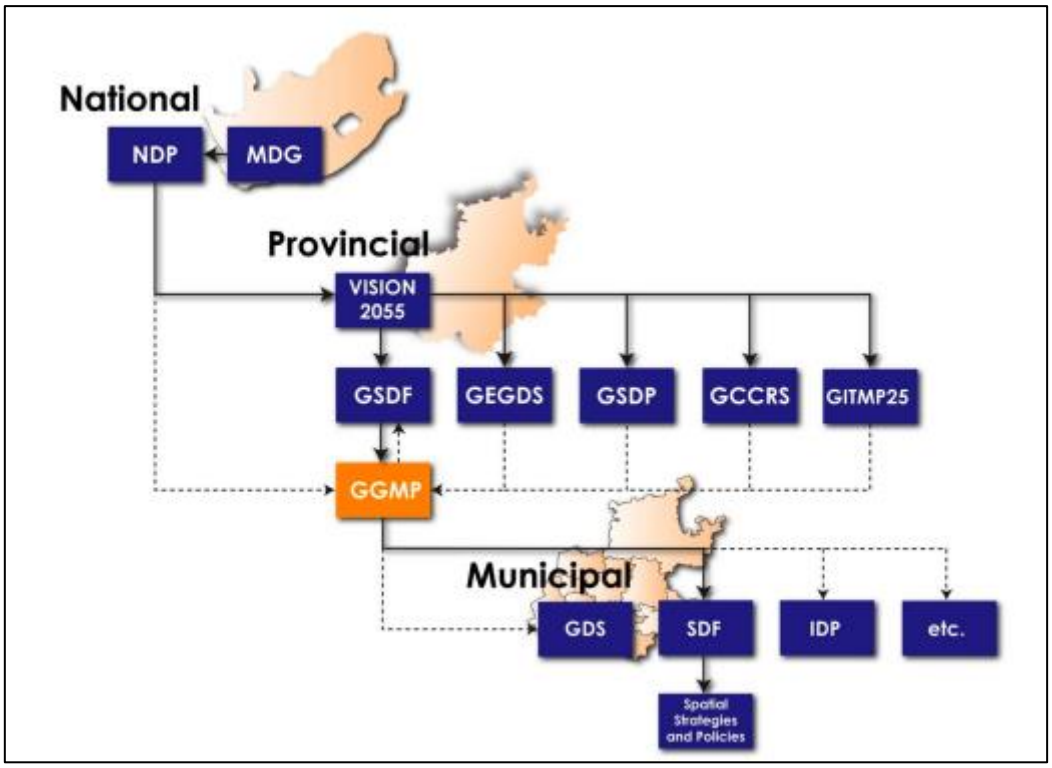


Figure 6-1: Spatial planning at various government levels: national, provincial and municipal

Source: Ekurhuleni MSDF (2015:8)

6.2 National planning policies

Planning is essentially a way of thinking about social and economic issues, according to Friedmann (1966:61) It is extremely future-focused, intensely concerned with the connection between goals and group activities and strives for comprehensiveness in policy and program.

Understanding the overall spatial planning environment of the applicable region is critical for strategic planning. The sequence of spatial planning papers in South Africa is all coordinated and linked to one another. It is important to examine the current regional planning milieu and regional plans in order to do a proper evaluation, and planning from a regional viewpoint. The national regional plans' principles must be represented at the regional and sub-regional levels. Policy planning, according to the South African Government News Agency (2014), is the pathway to policy frameworks. Policy planning entails developing and implementing strategies to assist a country in determining where and when development should occur. It also establishes a framework for making planning application judgements.

The focus is here exclusively on South Africa's relevant spatial planning laws and regulations. Although all the plans in this chapter were published and implemented before the most recent legal framework, it is crucial to comprehend the criteria and requirements that regional planning (whether national or provincial) addresses.

The order of spatial planning papers in South Africa is aligned and it is related to one another. The national regional plans' principles must be represented at the regional and sub-regional levels. The Gauteng Spatial Development Framework (Department of Economic Development, 2011:3) emphasizes the importance of considering national regional plan principles in provinces, regions, and districts. Looking at it from a national planning standpoint, the current regional milieu applicable to this study should include general principles (from existing plans and policies) that must be followed in the studied area.

The objective is to review the actions taken, insights learned, and advancements made in the field of regional planning in order to suggest and connect the theoretical foundation of this research to the assessment standards. By analysing the various policies in detail, possible recommendations can be observed through the strong and weak points. Thereafter suggestions for strategic planning in the final chapter will be an aid to the integrated strategy and evaluation. The initial focus of this chapter is on national regional plans as well as the most recent and pertinent regional plans that had a substantial impact on the urban systems currently in place.

6.2.1 National Physical Development Plan, 1975

The first national regional plan to be published was the National Physical Development Plan (hereafter NPDP). This was the first plan to concentrate on the entire national spatial system.

The NPDP's major goal was to achieve regional balance in South Africa. The NPDP had high expectations since it was the first regional plan with a regional emphasis, and it sought to enhance the national spatial system on a broad scale. The selected planning regions in the NPDP had little concern for population density, which was a serious issue. This flaw can also be linked to the reason why population is not-included in the regional viewpoint evaluation criteria. In regions with no industrial potential, the industrial development that happened as a result of the growth nodes that were picked, was recognized (Geyer, 1989:262).

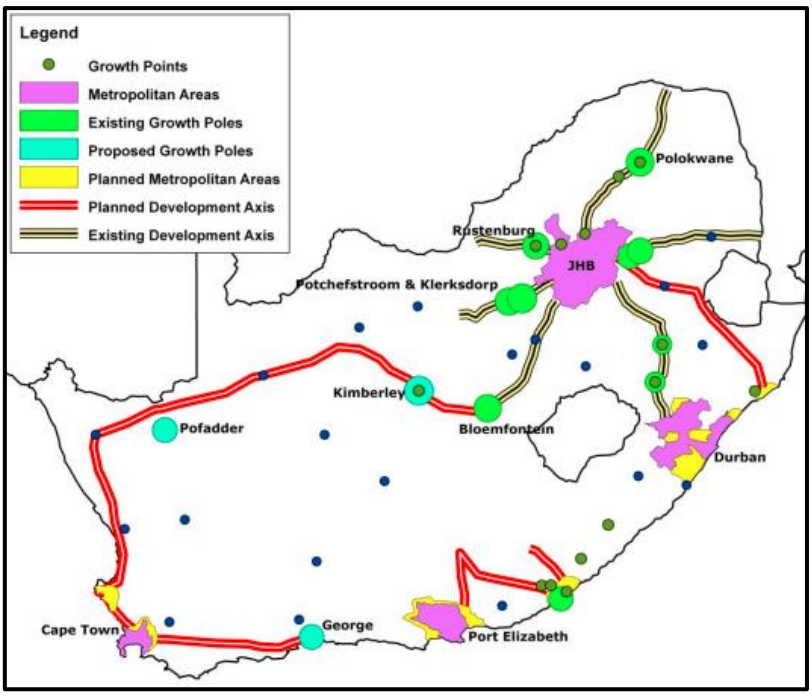


Figure 6-2: National Physical Development Plan: Nodes and corridors

Source: DPE (1975:14)

The National Physical Development Plan was ideologically driven, yet the application of regional planning tools and the objective of creating regional balance in the national spatial system marked a significant advance in national regional planning. The problem, according to Geyer (1989:257), was more with the timeliness of the plan than it was with the National Physical Development Plan's purpose and method. The National Physical Development Plan worked diligently to use nodes and corridors as its main instruments for spatial planning. These tools were both successful and ineffective in a variety of settings, showing that nodes and corridors cannot be formed without a clear vision of balanced expansion.

The National Physical Development Plan started with the correct concept identifying the planning area as a system and integrating it with various spatial planning tools identified within the plan (nodes and corridors). By establishing and providing each spatial hierarchy with the essential infrastructure for the proper operation of all regional and settlement hierarchies benefitting the country, the urban hierarchy is planned for in this strategy. The National Physical Development Plan is crucial for adjusting, transforming, and organising the national development activities in space, serving as a framework for understanding the geographical organisation of the nation, including its urban systems.

By identifying the infrastructure needs that support the distinct functional and societal makeup of each space and settlement hierarchy, the NDPD enhances the idea of planning an urban system.

6.2.2 The Good Hope Plan, 1981

In 1980, the National Physical Development Plan was replaced with the Good Hope Plan (GHP) which is a regional development strategy for Southern Africa (South Africa. Department of Foreign Affairs and Information. Publications Division, 1982). This plan was the next phase in national spatial development planning, and was intended to correct the flaws in the previous plan. The interaction and discussion of both the public and private sectors were recognised as a key contribution, and a fact considered in strategic national planning. Both the public and private sectors were sources of development initiatives in the national arena, thus their behaviour were constantly monitored and checked.

The previous plan's lessons learnt resulted in a substantial reduction in planning regions. It was discovered that if too many planning regions are designated and get incentives, the external influence is small, and there is no genuine growth momentum in these areas. The development axis, often referred to as corridors in the NPDP, was the second regional planning tool that underwent a noticeable modification. Oranje and Merrifield (2010:38) claim that there was no explicit mention of the development axis or referral to it in the GHP. This shows that, when compared to the NPDP, the GHP's focus on the national spatial system was completely different.

The Good Hope Plan endorsed the phenomena and significance of the urban system based on the following criteria:

(a) the metropoles' economic influences shouldn't have an impact;

(b) the region ought to be situated along an established development corridor, between two or more economic centres;

(c) It should comprise a solid foundation of current infrastructure;

(d) the area needs to have a developed core that is already established in order to build a critical mass that will draw visitors and business prospects; and

(e) residents of the homeland should have access to employment possibilities.

A significant movement away from metropolitan regions and existing economic hubs show that the GHP supported the intermediate and lower urban hierarchies if these places qualified, based on the above criteria.

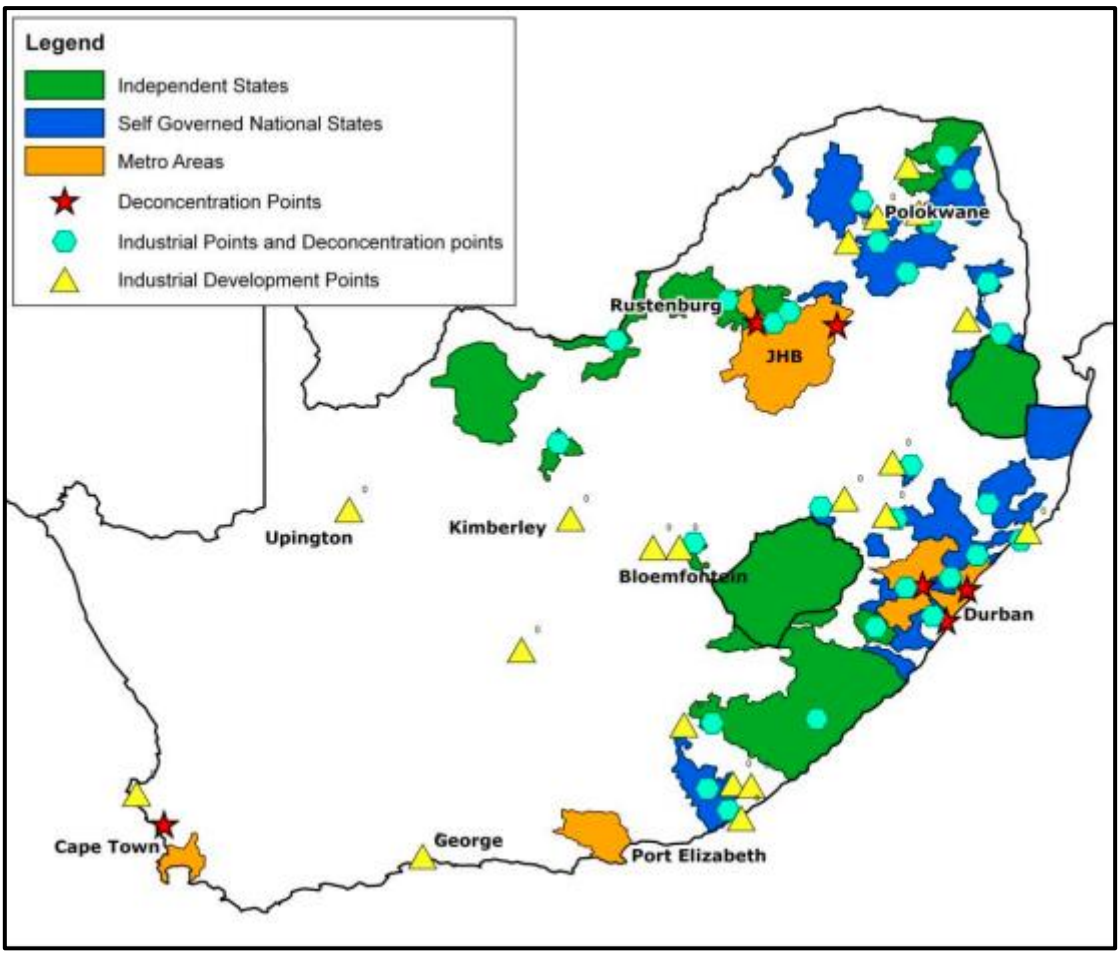


Figure 6-3: National Physical Development Plan: Metropolitans

Source: DFA (1982:34)

Even while the GHP had a different focus than the NPDP and succeeded in improving employment flow, it nonetheless encountered some unanticipated problems. The Good Hope Plan's only real triumphs were the growth of secondary centres and the continued backing and development of corridors connecting these urban centres.

6.2.3 Spatial Development Initiatives

The Spatial Development Initiatives (SDI's) were designed to aid in the creation of regional balance by identifying critical investment areas. The SDI's were used in an attempt to attract external investment into these underdeveloped areas to promote regional balance. Davechand (2020:3) confirmed this by looking at it in another way when he states that the goal of SDIs is to stimulate growth in impoverished areas with economic potential, by creating new employment and improving infrastructure to attract international investors. The SDI's used a region-based planning strategy (section 4.7) that included several routes and nodes.

According to Jourdan (1998:718), Spatial Development Initiatives are focused central government programs that aid in maximising economic potential while also promoting fresh investments and job growth in a particular region. The government supported these initiatives as well, and by emphasizing the advancement of black economic empowerment, it made sure that local and small enterprises profited most. The project was launched by the cabinet in 1995 as an effort to boost government functioning in various regions of the country, notably in those with the highest economic potential, according to Miller *et al.* (2010:11), who emphasises the government's crucial engagement.

Davechand (2020:4) summarises SDI's as:

(a) development corridors, or growths along a significant transportation route, such as a major highway;

(b) provide a link between important industrial or mining locations;

(c) encourage development and access to areas along the development corridor, the government enhances infrastructure all along the path;

(d) along the road, little communities and activities like as farming and tourism grow.

In South Africa eleven Spatial Development Initiatives were identified (Miller, 2011:3), developed along major routes in South Africa as illustrated in Figure 6-4.

Figure 6-4: South African spatial planning initiatives

Source: Davechand (2020:6)

During the Spatial Development Initiatives program's implementation, it was discovered that local and regional clusters were formed in the indicated locations. The Spatial Development Initiatives program's outcome was supported by local and regional clusters providing support aimed at creating a more appealing investment climate in the targeted locations.

The Spatial Development Initiatives program was spatially uneven and economically unbalanced, based on the specified regions in the Spatial Development Initiatives and the crucial component addressing investment in anchor projects. Corridors were a major planning initiative for the policy. The plan moved away from the urban system concept after the Regional Industrial Development Plan made the concept of urban hierarchy known.

6.2.4 National Spatial Development Perspective

The National Spatial Development Perspective (hereafter NSDP) co-ordinated policies that affected the infrastructure initiatives' spatial consequences played out at the levels of the federal, provincial, and municipal governments.

Two regional planning instruments, nodes and corridors, were used explicitly. The significance of nodes and corridors in the NSDP was considered important not only for attracting growth, but also for preventing additional spatial distortion, and facilitating a future settlement development pattern.

As a result of the government's concentration on strategic sites, investment by the private sector was more likely to follow suit and promote further economic activity and local job possibilities.

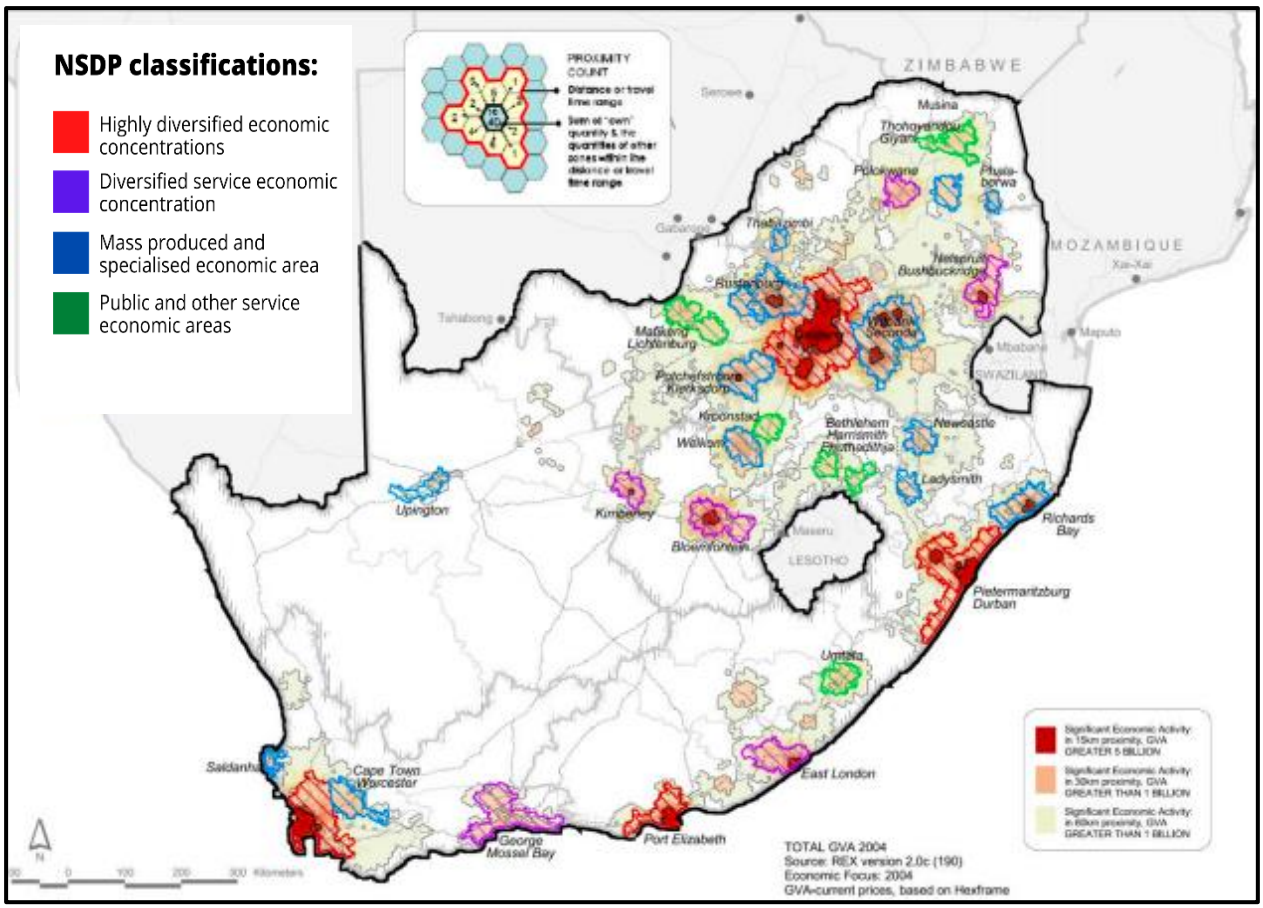


Figure 6-5: Economic significant areas from the National Spatial Development Perspective

Source: NSDP (2006:32) and 2004 GVA data

The National Spatial Development Perspective made significant strides toward creating a structure for guiding regional strategy. By doing so, it ensured that all regions adapted development strategies in accordance with the National Spatial Development Perspective's rules and principles. The National Strategic Development Plans (NSDP's) were the first national development plans to display a mix of top-down and bottom-up techniques.

The method used in the NSDP may apply at many levels on which the empirical study concentrates. The development tactics used in the regional perspective study area are intended to promote regional balance (chapter 7). With the help of district and local municipalities, the Gauteng City-Region might achieve regional balance, which could result in more balanced regional growth.

6.2.5 National Development Plan, 2030

The National Development Strategy (NDP) is a comprehensive plan for South Africa that intends to reduce inequality and eliminate poverty by 2030, which will result in a more inclusive economy, increased sustainability, and capability to address the myriad problems that South Africa faces (National Planning Commission, 2011:1). The NDP is a broad strategic plan that outlines a consistent and comprehensive strategy. The strategic perspective provides South Africa with a long-term vision.

The proposed strategy centred on the following aspects (NDP, 2011:260):

(a) implement strategic catalytic interventions aimed at promoting spatial transformation;

(b) respond systematically to entrenched spatial patterns by illuminating social inequality and economic inefficiency;

(c) strike a balance between equity, economic competitiveness, and environmental sustainability; and

(d) support communities, individuals, and the private sector in their interactions with the government.

To implement the strategy and achieve the goals of the NDP, it is proposed that a national spatial framework be constructed as a tool to drive the change of South Africa's human settlements and spatial system. A spatial policy, according to the NDP (2011:278), strives to co-ordinate and integrate decisions that drive the economy. The proposed spatial policy cannot revolutionize the spatial system on its own; it must be accompanied by strategies that garner support from both the public and commercial sectors. Communities that encourage social cohesiveness could be built by encouraging and executing appropriate spatial planning.

The discussion on changing human settlements and South Africa, in the region and globally, were given priority in this study. It is important to note that the apartheid regime had a significant impact on the development of South Africa's human settlements and urban systems, as shown by the national regional plans (NPDP and GHP). The GHP made it apparent that employment and living conditions were a regional issue. The planning practices of the apartheid system led to the construction of vast distances between people's places of employment and residence, places where services could not be maintained, and places where the economic climate changed a society's dynamics (NDP, 2011:260).

The geographical framework could also be utilised to promote South Africa's relationship and interdependence with its neighbours. Relationships can be reinforced by directing actions to increase cross-border infrastructural linkages and ensuring efficient integration between the countries. The proposed framework should incorporate the government, business, and civil society in order to identify accurate challenges and provide successful development options. As a result of involving the three role players indicated above, it is possible to conclude that the NDP employs a top-down and bottom-up approach. This strategy is comparable to the NSDP.

The National Planning Commission acknowledged the interconnectedness of cities and towns to create an urban system that transcends regional lines. Additionally, it was found that the concentration of economic activity in the major cities is growing (NDP, 2011:278). This indicates that the regional and national geographic systems are currently becoming more and more unbalanced.

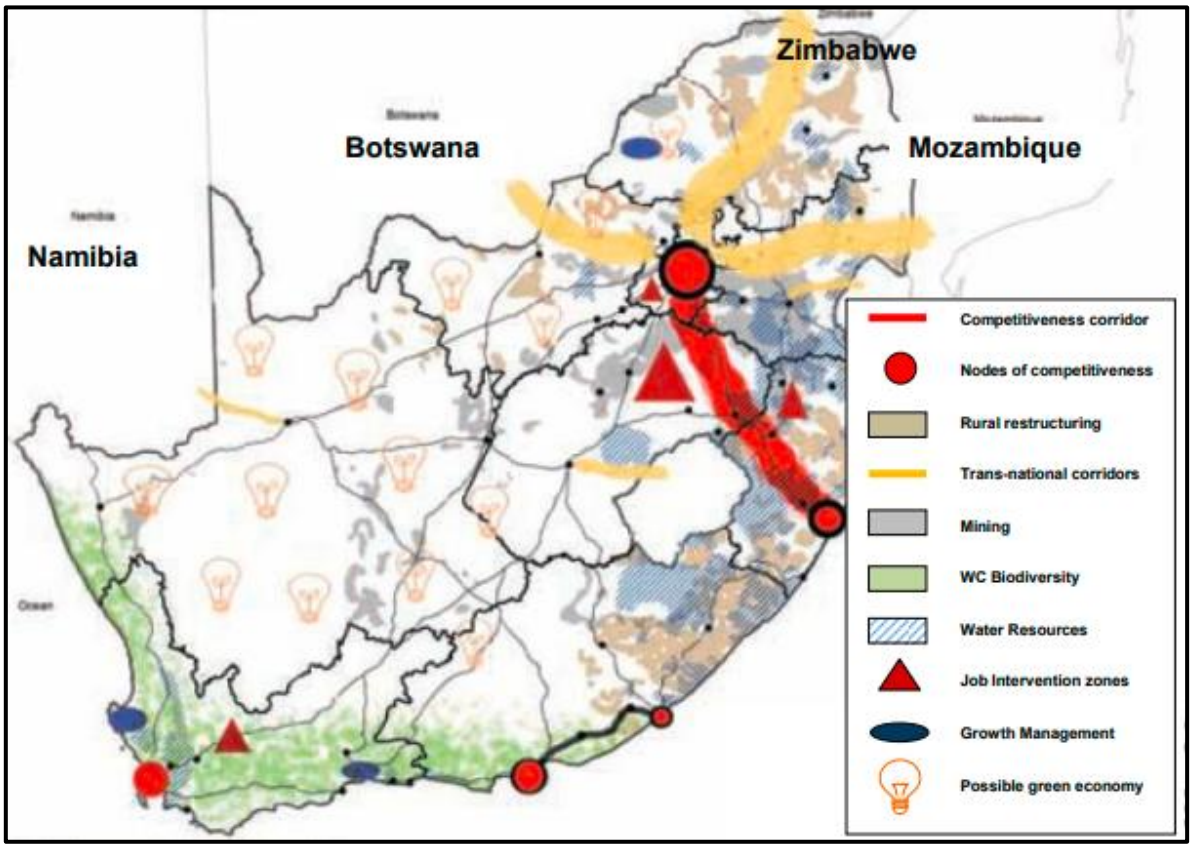


Figure 6-6: Areas identified for growth in terms of the NDP

Source: NDP (2011:279)

The national spatial framework or system identified the following areas to be targeted, as shown in Figure 6-6.

Table 6-1: Explanation of Figure 6 6

National competitiveness corridor	The NDP (2011:279) claims that a key factor affecting and deciding the future expansion of the national economy is the corridor of logistic hubs, road, rail, fuel, and other infrastructure that connects Gauteng and KwaZulu-Natal. Both these provinces are logistic hubs and are gateways to Africa and the word. Johannesburg (Gauteng) and Durban (KwaZulu-Natal) have large airports, O.R Tambo International Airport and King Shaka International airport respectively. KwaZulu-Natal also have the Richards Bay and Durban ports.
Nodes of competitiveness	In order to ensure effective and long-term growth and development, extra attention should be given to these clusters because they have the ability to do so in the future.
Rural restructuring zones	These places must be controlled, institutionally developed, infrastructure built, and the economy encouraged.
Transnational development corridors	An integrated southern African economy is being developed for the most part because of transnational corridors. To stimulate economic growth along these corridors and foster good neighborly relations, certain activities and policies are needed.
Resource-critical regions	This classification has highlighted natural resources (mineral resources, essential biodiversity, and critical water production areas) as lifelines for South Africa's economic and ecological development. To govern these areas and ensure the long-term growth and appropriate use of natural resources, certain policies are needed.
Special intervention areas	Special intervention areas are defined locations that require government assistance for a certain length of time. Intervention in these areas has the potential to result in significant private sector development and the creation of new job opportunities.
Job intervention zones	Areas where job losses have exceeded 20% during the past ten years. In order to diversify the economy and create new job opportunities in job intervention zones, new economic sectors should be developed.
Growth management zones	Places with the potential for significant growth that require management and planning to ensure long-term growth.
Green economy zones	Locations that have the potential to create "green jobs".

Source: NDP (2011:279) and own compilation

The NDP employs both top-down and bottom-up strategies. The NDP places a strong emphasis on South Africa's significance in both the global and regional contexts. During the commission's examination, it was discovered that South Africa is viewed as a regional "bully" in the African context, and that the relevant policymakers in this framework lack a solid understanding of African

geopolitics (NDP, 2011:239). Due to the sluggish but moderate economic growth, witnessed by many Sub-Saharan African countries, Africa is sometimes regarded as the next emerging region to flourish. If Africa continues to grow steadily, as it has over the last ten years, South Africa's efforts to build African partnerships will have a positive influence. On the African continent, many economies are predicted to emerge, resulting in a variety of key growth nodes.

In order to determine if the NDP addresses or recognises the importance of spatial planning in various urban systems, the remaining thirteen chapters of the NDP, which address important subject topics, was explored. Table 6-2 depicts a summary of the NDP's criticisms and recommendations.

Table 6-2: Summary of actions of the NDP

"Economy and employment[9]"	"Economic infrastructure[10]"	"Environmental sustainability and resilience[11]"	"Inclusive rural economy"[12]	"South Africa in the region and in the world"[13]
"Transforming human settlements"[14]	"Improving education, training and innovation"[15]	"Health care for all"[16]	"Social protection"[17]	"Building Safer Communities"[18]
"Building a capable and developmental state"[19]	"Fighting corruption"[20]	"Nation building and social cohesion"[21]		

Source: Adapted from the National Planning Commission (2011:62)

Table 6-2 and the highlighted objectives clearly show a few goals pertinent to spatial planning, the current study, and measures that may be taken to use the urban system as a spatial planning tool.

Economy and employment

[9] Chapter 3 of National Development Plan, 2030
[10] Chapter 4 of National Development Plan, 2030
[11] Chapter 5 of National Development Plan, 2030
[12] Chapter 6 of National Development Plan, 2030
[13] Chapter 7 of National Development Plan, 2030
[14] Chapter 8 of National Development Plan, 2030
[15] Chapter 9 of National Development Plan, 2030
[16] Chapter 10 of National Development Plan, 2030
[17] Chapter 11 of National Development Plan, 2030
[18] Chapter 12 of National Development Plan, 2030
[19] Chapter 13 of National Development Plan, 2030
[20] Chapter 14 of National Development Plan, 2030
[21] Chapter 15 of National Development Plan, 2030

As discussed in sections 3.3, 3.5, 4.3, 5.2.1.2.2, 5.2.2.2.2 and 5.2.3.2.2, the economy is vital in an urban system and the positioning of the urban hierarchy. Despite the fact that this objective state that South Africa should grow its exports and engage in more resource extraction, little focus is given to recommendations for enhancing the economic viability of the regions themselves.

A goal, to achieve this objective, is to establish a transparent structure of decision-making and hierarchy across departments and governmental domains that perform economic line functions. This clearly indicates that South Africa's spatial planning is moving in the direction of a focus on urban systems and using it to improve spatial planning.

South Africa in the region and in the world

The connectivity between regions and urban systems discussed in sections 4.2,4.3 and 4.4 is vital to the growth of each urban system. According to the NDP and in order to determine South Africa's position in the area, on the continent, and in the world for the next 20 to 30 years, as well as the political space the nation will inhabit, a clear strategy must be prepared (National Planning Commission, 2011:235). This specific objective clearly focusses on the hierarchical position that South Africa occupies in relation to the globe.

South Africa must consciously move away from regionalisation, which permits transnational activity without formal political co-operation, and towards regionalism, which entails deliberate political planning.

Transforming human settlements

The vast majority of South Africans reside in an intricate web of towns and cities, that account for about 85% of all economic activity. Urban locations differ greatly from rural places in terms of geographical design, economic foundation, and institutional strength. Therefore, it is crucial that a one-size-fits-all strategy is avoided. Towns and cities are a part of larger urban systems to diverse degrees, and the forces that shape it both locally and globally. The growth of city-regions that go beyond local municipalities is a significant trend. Opportunities are presented, but it also causes urban administration and planning to be more difficult. It is nearly impossible to operate between municipalities or plan across borders because the planning system has established local and provincial boundaries. Planning for development has been hampered by the fact that many developmental issues, such as those relating to the environment, transportation, and economy, cross governmental boundaries.

This indicates that the vision of South Africa's spatial planning should be to integrate the various systems.

Building a capable and developmental state

Every aspect of society has to work together to implement the National Development Plan, and government must exercise effective leadership, with a focus on the hierarchy of systems. The fundamental issue is inequitable capability, which results in inequitable performance in municipal, provincial, and federal government. Accomplishing this objective, a specific target is proactively working to strengthen ties between the federal, provincial, and municipal governments.

The National Development Plan clearly indicates the interconnectedness of cities and towns to create an urban system that transcends regional lines. Additionally, it was found that the concentration of economic activity in the major cities is growing (NDP, 2011:278). This indicates the regional and national geographic systems currently becoming more and more imbalanced, to give a clear indication of the urban hierarchy of South Africa.

6.2.6 Integrated Urban Development Framework

According to the United Nations (2008:1), urbanisation will account for 71,3 percent of the South African population by 2030, and more than 80 percent by 2050. The Integrated Urban Development Framework (IUDF) was created to assist South Africa in preparing for a future population that is primarily urban. The South African environment has failed to properly construct an equitable and sustainable urban growth model, thus hindering the NDP's proposed shift to a resource-efficient path (Cooperative Governance, 2016:11).

The framework focuses on ways to improve the efficiency and benefit of urban area management (Cooperative Governance, 2016:11). The IUDF supports the NDP's goal of developing cities as economic engines by improving spatial efficiency (National Planning Commission, 2011:25). The IUDF emphasizes the necessity for South Africa to (Cooperative Governance, 2016:12).

- by investgating in healthcare, education, skills training, and social protections:
- It boosts inclusive economic growth and thereby job creation;
- boosting the employability of the unemployed;
- anticipation of the shifting nature of global economic competitiveness when international climate change measures take effect;
- bring about change in governing social compact in South Africa by granting citizens more freedom to shred.

Development should be focused on important corridors and current or emerging economic hubs, according to the IUDF (Cooperative Governance, 2016:47). Providing cities or local governments with the authority to subsidise diverse kinds of public transportation could help to encourage integrated transportation and mobility. The IUDF (Cooperative Governance, 2016:56) advocates for more investment in key public transportation nodes and corridors. This will only be possible if cities or local governments identify these hubs and corridors. After these regional planning instruments have been selected, the municipality's strategic planning paperwork should affirm that development is encouraged in these areas.

In order to create additional urban opportunities other than formal settlements, the IUDF (Cooperative Governance, 2016:64) prioritises the revitalisation of inner cities. Consolidating and co-ordinating infrastructure funding in cities and towns has the potential to result in integrated urban infrastructure. To facilitate efficient integration, infrastructure linking rural and urban areas has to be created. In both urban and rural settings. Adequate infrastructure should help with socio-economic development.

In terms of the overall research goals, city integration, improved infrastructure, and urban economic growth will all increase spatial planning, because nodal developments, or urban areas, are a crucial component of a region. The analysis refers to the fact that most studies only look at the significance of nodes rather than an area as a whole. No direct focus is given in these policies on urban systems, but the goals show in the objectives that it was planned in the right direction.

6.2.7 National Spatial Development Framework[22] (2020)

Adopting the Spatial Planning and Land Use Management Act (SPLUMA) (Section 6.3.1), the creation and implementation of spatial plans at the proper scale, is now the responsibility of all levels of spatial planning, including national, provincial, regional, and district spatial development frameworks (Department of Rural Development and Land Reform, 2018:7).

Even though the draft has not been promulgated yet, it is a very important document to be included in this study. The purpose of the newly adapted NSDF is summarised as follows:

(a) coordinate policies, plans and programmes that impact spatial planning, land development and land use management;

(b) coordinate different level of government spheres;

[22] Hereafter only NSDF

(c) indicate desired patterns of land use; and

(d) contribute to a coherent planned approach to spatial development;

The main purpose as indicated in Figure 6-7 is to integrate various strategic and spatial planning policies, which lacked in previous legislations mentioned in sections 6.2 and 6.3.

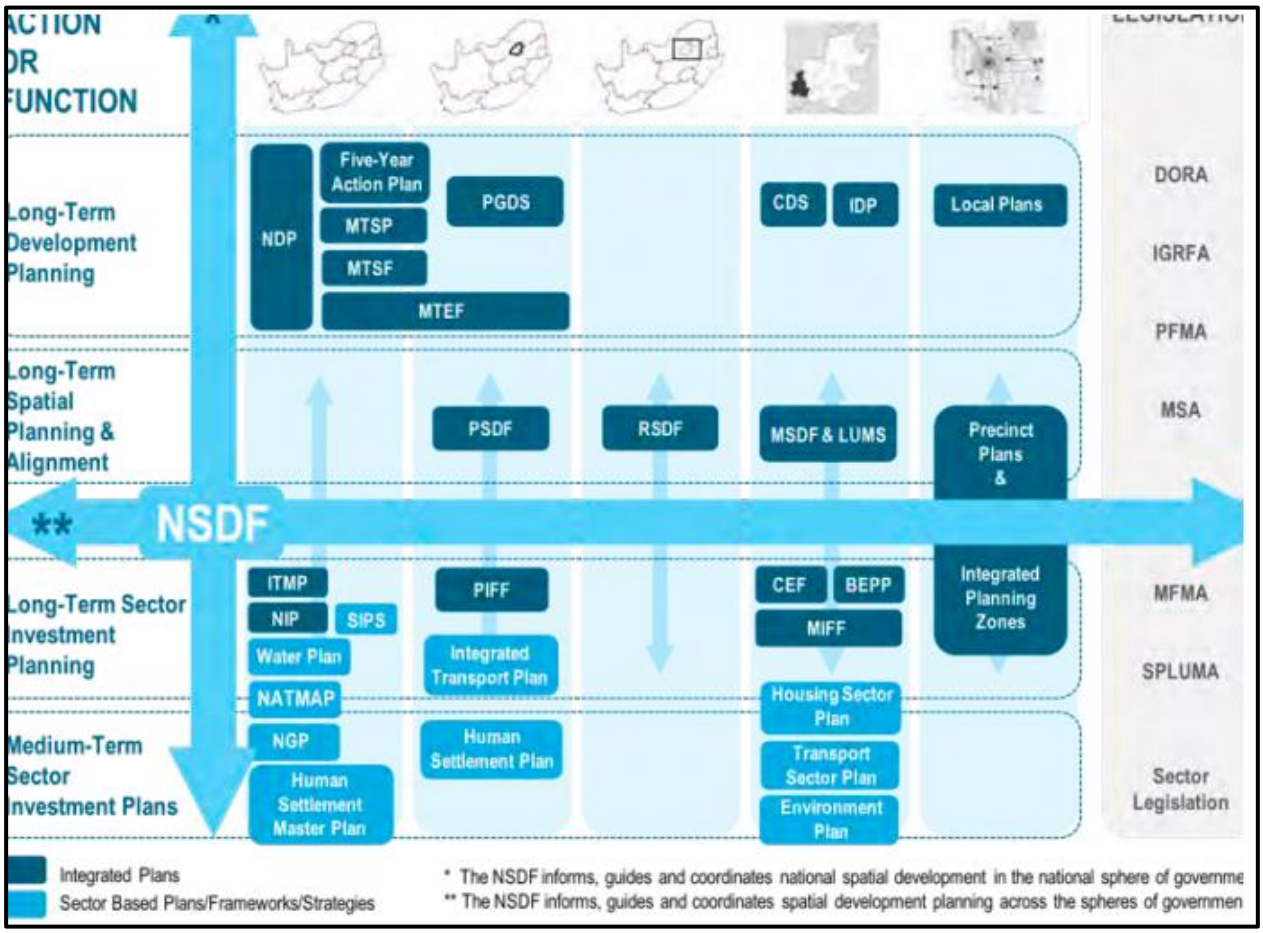


Figure 6-7: The role of the NSDF within the strategic and sector plans of government
Source: Department of Rural Development and Rural Land Reform (2019:37)

The NSDF will be useful for this study since it should comprise many layers of urban systems that might be used to improve spatial planning through government intervention. As previously stated, the document is still in the drafting stage, but it has the potential to have a positive impact when it comes to spatial design in various metropolitan systems.

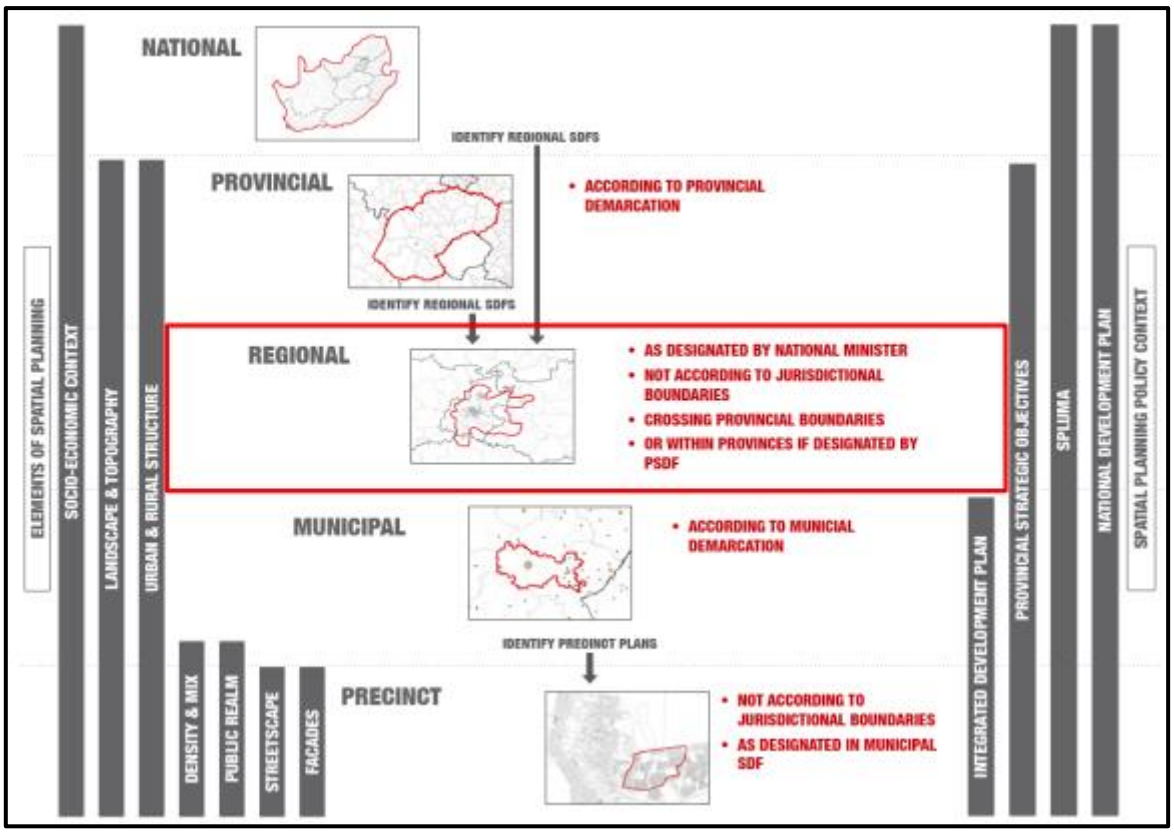


Figure 6-8: Differentiating the different scales of planning

Source: Adapted from the Spatial Planning Land Use Management Act (2016:15)

Figure 6-8 depicts the many planning scales, as well as the various parts of and the policy environment for spatial planning. The regional context was highlighted in red in the diagram above and will be discussed more in the case study section, which focuses on the South African environment (section 7.2).

In addition, the NSDF of 2020, show clear connections to the Spatial Planning and Land Use Management Act's (SPLUMA) principles (section 6.3.1), mostly to address the spatial injustice observed in South Africa. The spatial planning instruments, discussed in section 4.4, is clearly considered in the NSDF, 2020. The importance of using urban areas and urban regions as a spatial planning tool is highlighted by emphasising that nearly 70% of South African's population already live in cities and towns and that urban areas will replace commodities. Corridors is also emphasized in being an important driver of new economies. An additional spatial planning instrument is rural areas. This instrument was not previously focussed on in this study, but the proposal that focuses more on these areas are discussed in the final Chapter.

In table 6-3, the National Spatial Development Outcomes (Department of Rural Development and Land Reform, 2019:99) are summarised and those referencing urban hierarchy are outlined.

Table 6-3: Five National Spatial Development Outcomes and reference to urban hierarchy

Well-connected urban nodes, regional development anchors and development corridors	National corridors of opportunities	National connectivity and movement infrastructure systems are strategically located	Productive rural regions, supported by sustainable resource economies	National ecological infrastructure
Economy, population and social aspects are taken into account determining various levels of nodes.	Infrastructure for economic growth, concentrated settlement expansion, and trade are found along well-connected national and inter-regional development corridors and routes.	In order to meet the growth needs of the expanding population, national transportation, trade, and communication network is aligned with and services the selected nodes and development corridors.	More focus should be given to rural areas, by enhancing strong regional development.	National spatial development and land-use are well-planned and efficiently managed in full understanding of the intricate regional and national spatial interdependencies as well as the effects of spatial development on ecological resources and infrastructure systems.
Determining a clear urban hierarchy is the main focus of this outcome.	Clearly indicates that urban linkages promote the urban system.	Urban hierarchy or urban systems are not prominent in this outcome	This outcome focuses on differentiated rural development (refer to section 4.3.3)	Indicating that the protection of ecological systems do promote the urban system.

Source: Adapted from (Department of Rural Development and Land Reform, 2019:99).

Urban hierarchy is considered substantially more than the previous NSDF and other National policies and legislations. Various references are made to “hierarchical network” (Department of Rural Development and Land Reform, 2019:31, 96, 118). The NSDF (2020:81, 114) shows tremendous growth, in terms of planning for South Africa as an urban system, affecting and enhancing one another.

6.3 National Legislation

The preceding section discussed the need and necessity of expanded regional planning in the current time. The ever-changing geographical environment and dynamics are primarily driving this requirement. The change in the "pattern of state activity," in which governing bodies have an

increasingly constrained budget to distribute to various regulatory authorities responsible for the largely privatised industrial and production landscape. This is another factor contributing to the rise in demand, claim Glasson and Marshall (2007:14). A modest change in the amount of readily available cash and capital causes a rise in the number of private sector players that wish to intervene in the planning process. Previously, the state and governing entities took a much more rigid top-down approach. Changes in top-down and bottom-up techniques are now linked to this shift in demand. According to Glasson and Marshall (2007:15), democratic procedures and public relations put pressure on local and national bodies. Throughout the years, regional planning in South Africa has undergone major modifications and goals. The history of regional planning papers on a regional scale has resulted in a wide range of plans, all with distinct consequences. Only the national regional planning papers that had a definite influence on regional planning in general and the existing urban hierarchy were investigated in order to focus the study efforts.

6.3.1 Spatial Planning and Land Use Management Act (SPLUMA)

The most recent law to be passed is the Spatial Planning and Land Use Management Act (SPLUMA) (Act 16 of 2013). A National Law called SPLUMA grants the Department of Rural Development and Land Reform (2019) the power to create new regulations and specify how SPLUMA ought to be put into practice. It was put into effect in 2013. A new law, a framework known as SPLUMA defines the general guidelines for provincial legislation's planning. It is a comprehensive piece of legislation that defines the planning system and addresses normative direction, planning instruments, planning procedures or institutional structures, and supportive actions in the intergovernmental realm. Effective and efficient planning and land use management are anticipated benefits of the Spatial Planning and Land Use Management Act (16 of 2013) (SPLUMA). Various components should be included, such as plan compilation, review, and approval, as well as overseeing the implementation of spatial planning plans and policies, that the Act permits and discusses with regards to spatial planning principles in a comparable context. SPLUMA intends to provide a framework in South Africa that controls planning approvals and licenses, establishes limits for new projects, and allows for a variety of permissible land uses. SPLUMA empowers traditional councils in a variety of decision-making processes and applications, allowing them to take over various land use planning and duties that are now handled by the municipalities.

SPLUMA aims to correct historic geographical and regulatory inequities by promoting greater consistency and uniformity in spatial planning, development, and land use application decisions and procedures. Previously unaffected by the advantages of these methods, informal and conventional land use development procedures are now under the supervision of SPLUMA. This is applicable to the entire of South African region (urban and rural areas).

According to Spatial Planning and Land Use Management Act (2013:1) the act was developed for the following purposes:

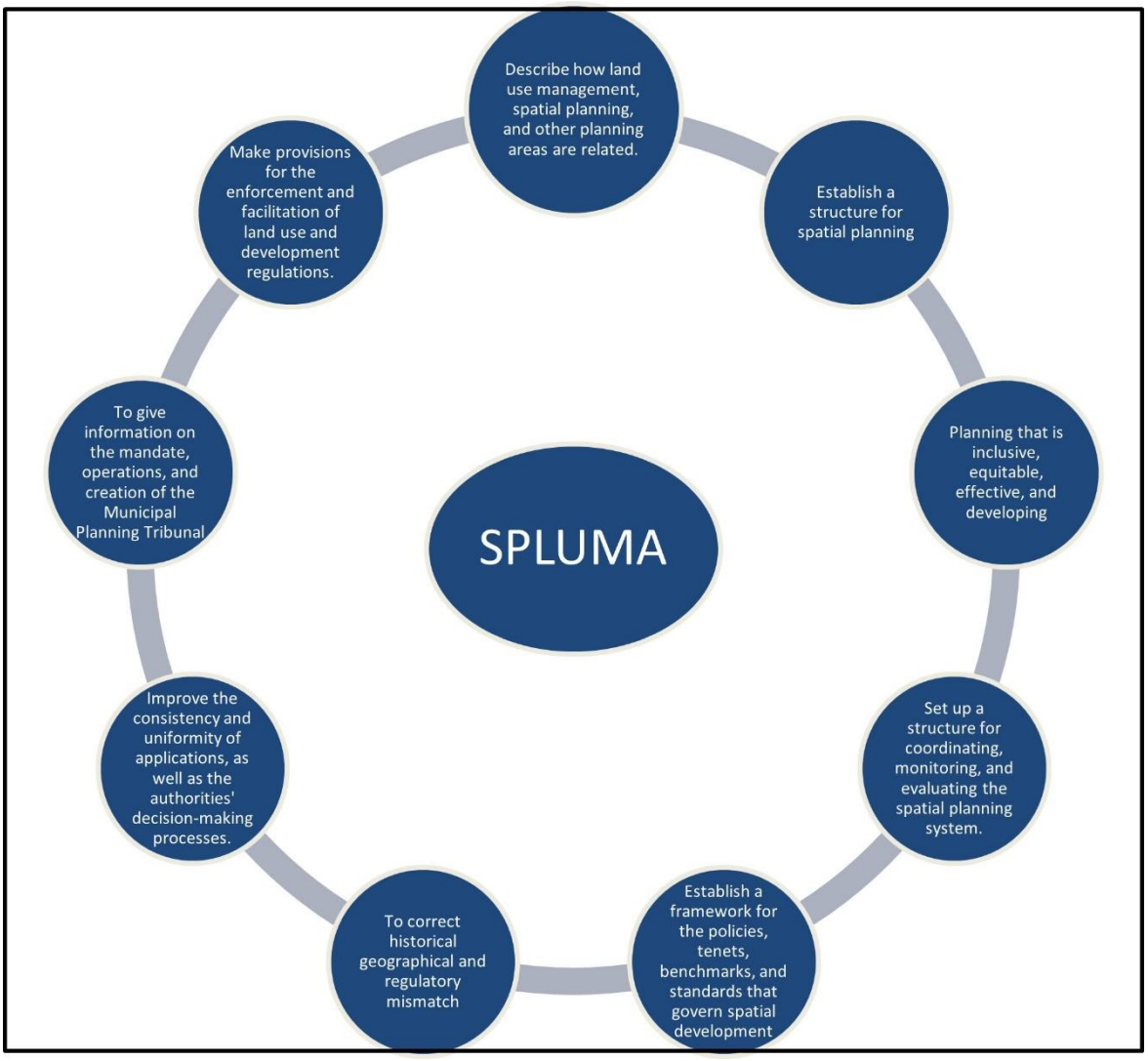


Figure 6-9: Purposes of SPLUMA

Source: Adapted from the Spatial Planning and Land Use Management Act (2013:1)

Section 3.4 (Spatial Planning and Land Use Management Act, 2013:13) categorises four types of spatial planning throughout the three domains of government, which can also be related to the three urban systems:

Table 6-4: The four categories of spatial planning.

Municipal Planning	Regional Planning	Provincial Planning	National Planning
Integrated development plans are compiled, reviewed, and approved.	Regional Spatial Development Frameworks are compiled, reviewed, and approved (RSDF).	Provincial Spatial Development Frameworks are compiled, reviewed, and approved (PSDF).	Compilation, assessment, and approval of spatial development plans and policies, such as spatial development frameworks (SDFs).
Compilation, evaluation, and approval of the components mandated by law that fall under the jurisdiction of the municipality.	The RSDF should put into effect national and local strategies, priorities, plans, and planning laws.	Monitoring the preparation, evaluation, approval, and implementation of land use management systems by municipalities, with a particular emphasis on these four steps, to ensure compliance with the act and any provincial laws.	Concerning land development and land use change, the national sphere should plan for long-term and efficient implementation of its regulations.
Land use within the relevant municipal region is regulated and controlled.	From the standpoint of an area's spatial and land usage, reflect the existing state of affairs.	The long-term and effective application of land use and development laws is being planned.	Compilation and evaluation of all policies and rules necessary for the implementation of national planning, including assistance and monitoring programs for all other areas with an emphasis on how well it functions in terms of land use, land development, and spatial planning.
	Provide basic spatial planning, land development, and land use management standards for the area.	Compilation and assessment of policies and regulations for provincial planning implementation.	

Source: Adapted from Spatial Planning and Land Use Management Act (2013:13)

This indicates that SPLUMA is aware of the three planning levels, but the integration of these government sectors is not completely described. It is obvious from this section that the integration of various urban systems is not explicitly mentioned in order to improve spatial planning. Again, this raises questions because SPLUMA does not take into account various urban systems. Each category focuses on particular results and duties, and the only category that considers all tiers of urban systems, is that of national planning.

It is evident from this section that both the idea of urban hierarchy and the integration of various urban systems are not sufficiently explained to be a tool for spatial planning. The Spatial Planning and Land Use Management Act, emphasises the importance of using various spatial planning policies as a system to improve the urban system of South Africa,

6.3.2 Municipal System Act

The Local Government Municipal System Act 32 of 2000, also known as the Municipal System Act (MSA), controls the delegation of authority to local governments. This is crucial to ensure that towns have enough funding to carry out the duties and functions that have been delegated to them. Additionally, it helps to ensure that the three branches of government work together. The IDP process is governed by two main concepts under the Municipal System Act:

(a) Planning must be developmental in nature.

(b) Planning must take place within a co-operative government framework. Municipal planning cannot be done in isolation; it must be co-ordinated with national and provincial government plans and strategies, as well as with other municipalities.

The legal nature of municipalities as part of a co-operative government system is defined in this act. The Municipal System Act promotes urban systems within municipalities, smaller level than proposed).

The MSA is the fundamental of law that governs municipal integrated development planning. Municipalities are obliged to follow the law and see to it that it is followed. This ensures that spatial development within municipalities is uniform. The municipality is the level of government that the residents can approach in the simplest way. Power and duties are directly affected by the way local communities are developed and local residents live their daily lives. Official governance practices ensure that municipal councils represent the local population (via processes like elections). On the one hand, the local populace should not only elect a new municipal council every five years to take part in community governance. Therefore, on the other hand, should local communities actively participate in municipal procedures to define their own living surroundings.

The MSA does not directly indicate to urban systems as a spatial planning initiative, but the goals and strategy exist to align municipalities in order to increase functional, robust systems such as economic, transportation and socio-economic structure.

6.3.3 Gauteng Planning and Development Act

The purpose of the Gauteng Planning and development Act (3 of 2003) is to:

(a) create a framework for the creation of zoning schemes;

(b) establish a single system of development, planning, and land management in the province;

(c) specify the province's planning and development principles;

(d) create planning bodies and allow appeals to the appeal tribunal;

(e) create a framework for the preparation of development plans and frameworks; and

(f) provide for the transcription of legislation;

The Gauteng Development and Planning Act stipulates that a provincial Integrated Development Plan is developed and implemented. The act encourages land use and development that

(a) encourages more compact urban development, prevents urban sprawl, and safeguards agricultural resources;

(b) supports the correction of historically distorted Gauteng settlement patterns;

(c) encourages integrated land development in rural and urban areas in support of one another; and

(d) results in the use and development of land that maximizes the use of existing resources like water, energy, and natural resources.

The act's other objectives are to:

(a) offer a strategic framework and implementation plan for development in the province;

(b) direct resource allocation in the province; and

(c) provide information to support development decisions, development projects, and municipal spatial planning.

The Gauteng Spatial Planning and Development Framework (Department of Economic Development, 2018:32) focuses on spatial planning of the entire province and provides guidelines for local municipalities to adjust to the same easy way forward with the spatial patterns of Gauteng. Even though the framework tries to provide a single system of development, planning and land management it has great shortcomings when looking at the Gauteng City-Region system as a whole. It lacks initiatives in improving the spatial planning in the entire urban system.

6.4 Conclusion

According to Drewes and Van Aswegen (2013:21), combining spatial components with national macro- and sectoral economic and social policies is critical to successful national strategies. The regional plans, the history of the development of national industrial plans, and spatial landscape and integration planning, were investigated in this chapter. The research on these regional plans was focused on balanced regional development, and it includes the most recent national regional development plan. It is crucial to comprehend South Africa's regional planning environment in order to determine which past approaches were successful and the way some of these plans integrated and implemented regional planning instruments into the national spatial system. The imbalanced spatial structure and gaps between urban hierarchies, as indicated in these designs, have a substantial impact on future regional planning. The national spatial system is strongly correlated with the role of an urban hierarchy and the level of regional balance. National policies were examined, with a focus on spatial planning in various urban systems. When national strategies were evaluated, the level of detail grew, but there was still a lack of information on how to improve spatial planning through urban systems.

Looking at national legislation and policies, the current legislation is the Spatial Planning and Land Use Management Act (South Africa, 2013) is the most significant, since it outlines the levels of government working together. This is significant because it provides a platform for improving the integration of various levels of government, which could improve spatial planning in various urban systems. Even though direct focus is not on urban systems as a spatial planning tool, the goals and objectives outlined in the legislation, will contribute to the improvement of the urban system as a whole. As soon as focus is set on urban systems as a spatial planning tool, it could easily be adapted.

The Municipal System Act 32 of 2000 and Gauteng Planning and Development Act 3 of 2003 do not mention or focus on the urban system or urban hierarchy of the region. The goals therein, will contribute to the improvement of the urban system as a spatial planning tool, just like it is stated in the Spatial Planning and Land Use Management Act.

In conclusion, the national policies make more way for planning the urban system than the provincial scale of Gauteng. Enhancing this concept on a smaller scale will improve the spatial planning on the regional context, which will be aligned to the Gauteng City-Region in the next chapter.

CHAPTER 7: CASE STUDY: GAUTENG CITY-REGION (SOUTH AFRICA)

7.1 Introduction

The previous chapter discussed the national- and provincial policies and legislation relevant to spatial planning in SA and the Study Area. It was concluded that national policies make provision for planning for the urban system, but lack on the provincial scale. This chapter reflects on the national context that focuses on spatial planning in the metropolitan systems with focus on the urban system. The first section will cover the national environment to help the reader comprehend the South African population distribution. The following section will then analyse strategies implemented on a regional scale to promote urban systems as a spatial planning initiative in different metropolitan systems, using the Gauteng City-Region as a case study.

Figure 7-1: South Africa on world map

Source: King & Cole (2018)

7.1.1 Background: South Africa Spatial Planning

South African planning, or more specifically the segregation of diverse land uses, dates back to the 1830s (Oranje and Merrifield, 2010:29-34), resulting in urban centres where commerce a employees.

Prior to 1994, each of South Africa's former four provinces and the black homelands each had their own planning laws and ordinances. Despite modifications in government institutions and

high-level policy (such as the National Development Plan, discussed in section 6.2.4), current land use, and planning legislation and methods essentially remained unchanged after 1994 (South African Cities Network, 2015:10). The techniques and requirements of land use management were detailed in the various provincial ordinances, although spatial planning was ignored. During the 1980s, planning was regarded as a purely technical endeavour, primarily concerned with the layout of townships.

Strategic spatial design has helped to foster more compact, integrated cities in the post-apartheid era while also reversing past inequalities. South Africa consists out of nine provinces. These are Eastern Cape, Free State, Gauteng, Kwazulu-Natal, Limpopo, Mpumalanga, Northwest, Northern Cape, and Western Cape, as depicted in Figure 7-2.

Figure 7-2: Map of South Africa

Source: Adapted from King & Cole (2018)

Table 7-1: Indicators of South Africa's economy

Developing ranking	Country	Human Development Index (HDI)	GNI per Capita	2021 Population
73	South Africa	0.709	5410	59 619 351

Source: Adapted from World Population Review (2021a) and World Bank (2022)

South Africa is categorised as a developing country (ranked 73), has high unemployment and poverty rates, and has a wealth of natural resources and commodities. It is also one of Africa's most industrialised nations in terms of income and Gross Domestic Product (GDP) (Bakari, 2017).

South Africa's GDP was approximately 301,92 billion USD in 2020, according to Trading Economics (2021:1), which is much less than Australia's GDP of 1,331 trillion USD, and higher than Brazil's 6815 USD and that of Botswana's at 6,710.99 USD. South Africa's GDP accounts for 0.27 percent of the global economy. The GDP growth rate for 2021 was 4,9%, according to Statistics South Africa (2021:1). In 2021, the major positive contributors to growth were personal services, trade, manufacturing, and agriculture (Statistics South Africa, 2021:1), as indicated in Figure 7-3.

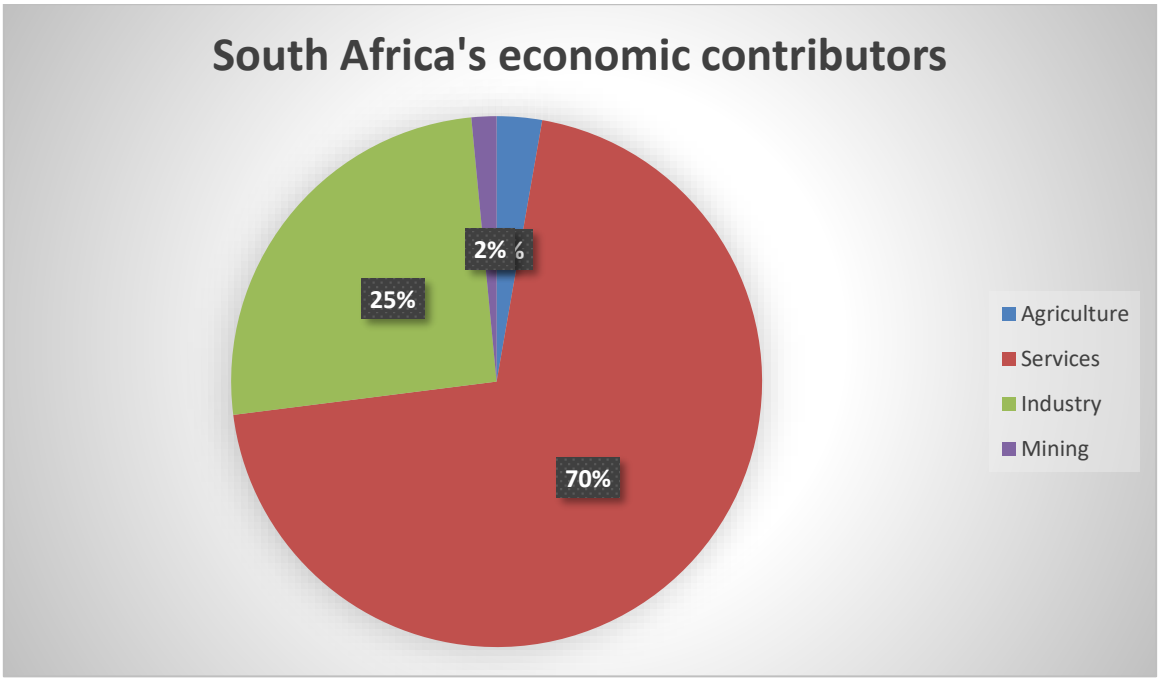


Figure 7-3: South Africa's economic contributors

Source: Own compilation obtained from Statistics South Africa (2021:1)

Figure 7-3 indicates the four major sectors contributing to South Africa's real gross domestic product (GDP). Services in the service sector include, but are not limited to business, communication services, construction and engineering, educational, health and transport.

According to the Parliamentary Monitoring Group (:1), South Africa is rapidly urbanising. By 2030, 71 percent of South Africans are anticipated to reside in metropolitan regions, increasing from the current 63 percent. By 2050, eight out of ten people will reside in urban areas, increasing the need for basic infrastructure. The development of South Africa is severely hampered by this.

Several relevant spatial challenges were previously identified in the NDP (section 6.2.4), including

(a) transforming the national space;

(b) inequalities and differences within rural areas;

(c) urban efficiencies; and

(d) weak spatial governance capabilities (National Planning Commission, 2011:261).

These are all geographical difficulties that South Africa is confronted with, that impact the population distribution, the location of businesses and industries, and the supply of services, among others. As a result, the following section seeks to provide information about South Africa's spatial distribution so that the reader may grasp the various spatial scales and their distributions.

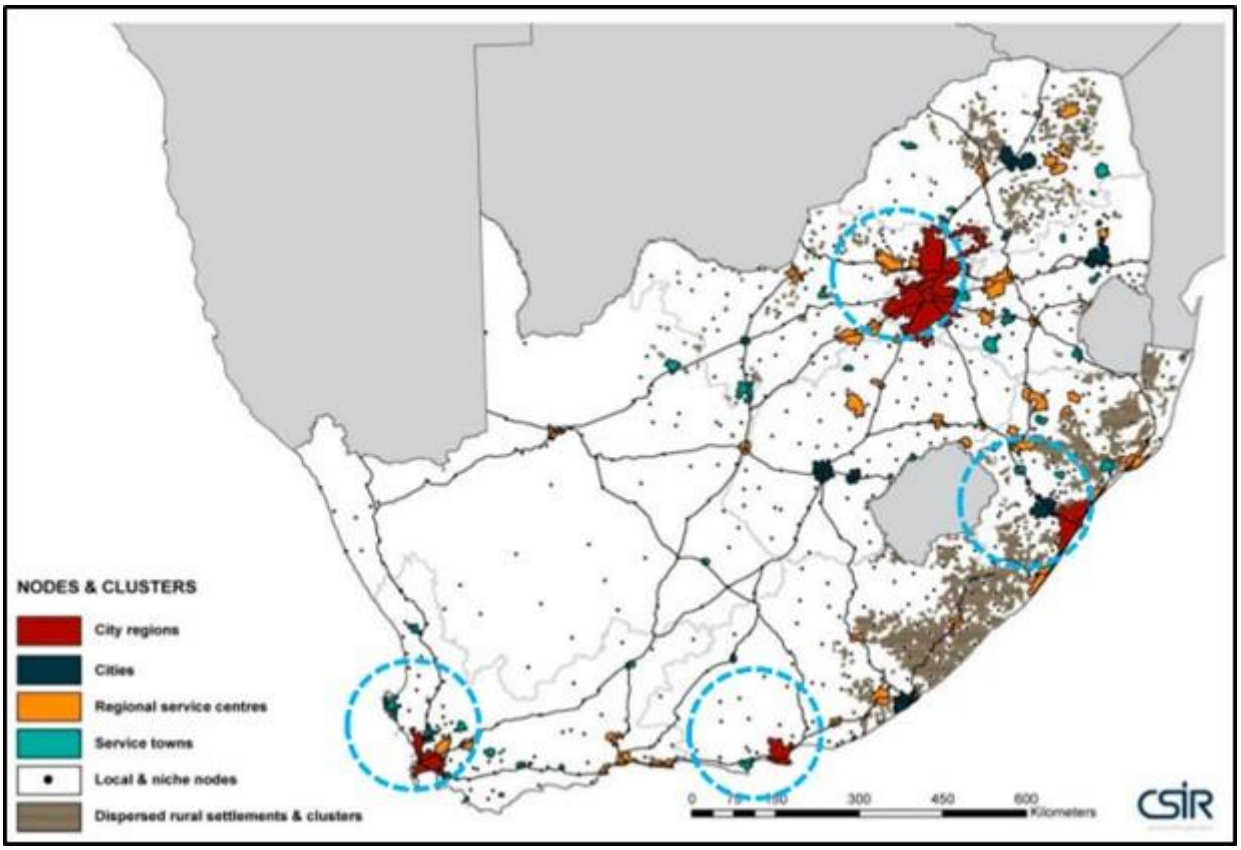


Figure 7-4: South African Typologies as calculated and categorised by the CSIR
Source: Van Huyssteen *et al*. (2016:4)

Figure 7-4 gives a clear visual indication on the various nodes and clusters at present in South Africa. These nodes and clusters are categorised by considering, population, economy, environment and social aspects. The blue dotted circles in Figure 7-4, indicates the service towns of the various city regions. This is a clear indication that the various city-regions (including Gauteng City-Region) has a bigger effect on the surrounding towns. This illustrates the importance of observing spatial planning in an urban system.

7.1.2 South Africa population distribution

The population distribution is the only factor that could be used to establish multiple hierarchical orders in the urban system, as described in section 3.4. In order to identify the population's spatial distribution in the South African context, thereby recommending measures to be put into place for the improvement of the spatial distribution, which will boost the spatial planning in various urban systems, this section will cover population distribution.

The functional settlement typology was created by considering a city's functional role in relation to its regional surroundings. It is worth noting that the categories listed below include not only the settlement, town, or city, but also the functional region and its immediate surrounds (Van Huyssten *et al*., 2016:4). This guarantees that not only the formal economy is taken into account, but also the size of the population and the functional role of the larger town area, which gives access to a variety of possibilities and services. Table 7-2 depicts the many types of settlements found in South Africa, as explained above.

The table below lists the relevant settlement typologies seen in South Africa.

Table 7-2: Settlement typologies in South Africa

Type	Category	Population	Examples
1.	City Region	> 1 million	- Global city region: Gauteng - Coastal city Region: Cape Town
2.	City Areas	500 000 – 1million	Polokwane, Pietermaritzburg,
3.	Regional service Centres		
	Regional Centre 1	300 000 – 500 000	Rustenburg, Witbank
	Regional Centre 2	100 000 – 300 000	Tzaneen, Grahamstown
	Regional Centre 3	40 000 – 100 000	Kimberley, Worchester
4.	Service Town	>20 000	Groblersdal, Piet Retief
5.	Local Towns	Varies	
6.	High density settlement areas	>100 people/km^2 >10 people/km^2 plus economy activity	

7.	Rest of South Africa	Very low-density areas	Mountains, National Parks

Source: Adapted from Van Huyssteen *et al*. (2016:5-7) and Van der Linde (2019:162)

Table 7-2 gives an overview of the many settlement types found in South Africa and categorises them into different hierarchical functions that may be used for spatial planning in various urban systems through development objectives and investment opportunities.

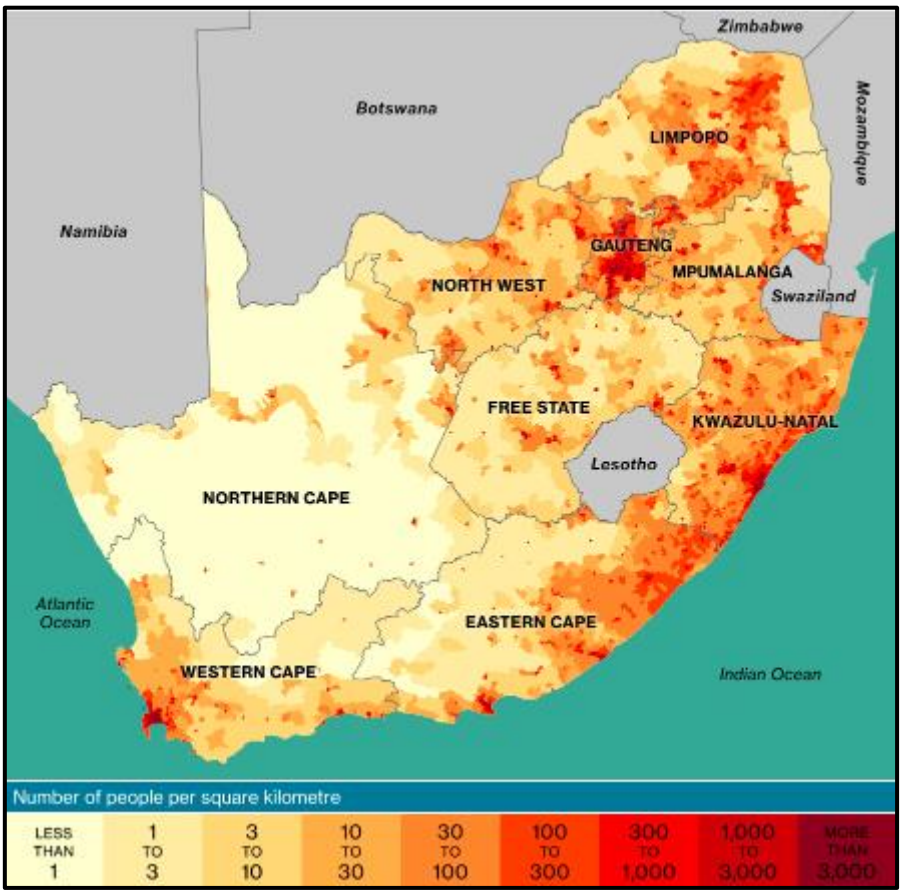


Figure 7-5: South Africa's population density

Source: South Africa Gateway (2019:1)

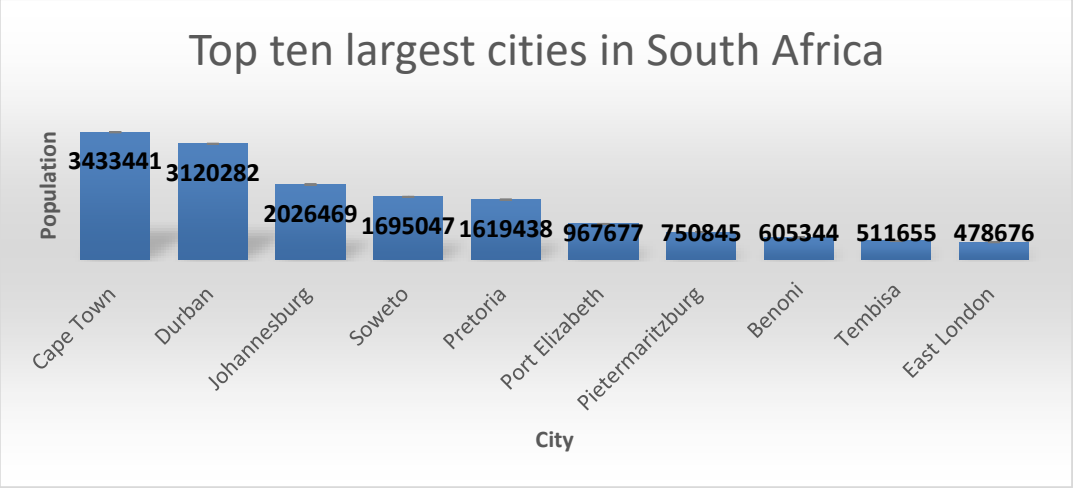


Figure 7-6 Largest populated cities in South Africa

Source: Adapted from StatsSA (2022:1)

The population distribution of South Africa's 10 major cities is shown in Figure 7-6. The data shown in the above figure shows that:

(a) five cities in South Africa are larger than the rest and can be linked directly to lower stability in urban systems;

(b) a "link" between rural and metropolitan cities, called secondary cities, can contribute to reduce the complexity of urban systems; and

(c) a relatively good spatial distribution can be observed with a clear indication on the metropolitan cities and secondary cities.

This further demonstrates that South Africa lacks secondary- and tertiary level or rural cities, but and has four powerful metropolitan regions, which in turn has a negative impact on resilience in urban systems.

The study's fourth objective is to analyse the theoretical nature of large urban systems (section 1.3). Since the major national policies were covered in chapter 6.2, the purpose of this section is to assess the regional policies that have been put into place. Therefore, the Gauteng City-Region was chosen for the study because it has a significantly strong economy and population contribution, and also has numerous measures to enhance regional development. The next section thus concentrates on the attributes of the Gauteng City-Region.

7.2 Gauteng City-Region

Chapter 6 and section 7.1 concentrates on the national level in order to provide a comprehensive picture of the background and important economic sectors, population distribution, and policy

formation, design, and execution procedures. In chapter 5 three regions were discussed, all with relatable characteristics of Gauteng City-Region, Canberra District (section 5.2.1.2), Greater São Paulo (section 5.2.2.2) and Greater Gaborone (section 5.2.3.2). All of them have one significant similarity with Gauteng City Region, in that it is the capital district of the respective countries. Being the economic hub of the respective countries, it is also suitable to compare Gauteng City-Region with these international case studies. Canberra District (section 5.2.1.2) and Greater São Paulo (section 5.2.2.2) have similar population distribution figures when compared to Gauteng City-Region, being metropolitan cities with much more people than the secondary or tertiary level cities. The planning approaches being top-down (section 5.2.1.2.5) a combination of top-down and bottom up (section 5.2.2.2.5) and a bottom up (section 5.2.3.2.5), bring about a variety in planning methods that are ideal to identify which strategy works best for the specific situation.

This study examines urban systems as a spatial planning tool, therefore it is important to investigate a region (provincial) in South Africa, with comparable characteristics compared to the international case studies, notably its urban system and the policies that are put in place to enhance spatial planning. This would give the reader sufficient background information and an understanding on a local and national level. A more thorough analysis of the policy implementation tools for enhancing urban systems as a spatial planning tool, would be a significant contribution to exploring provincial policies implemented on a smaller scale. This section examines the Gauteng City-Region and its provincial strategies, tools, and mechanisms.

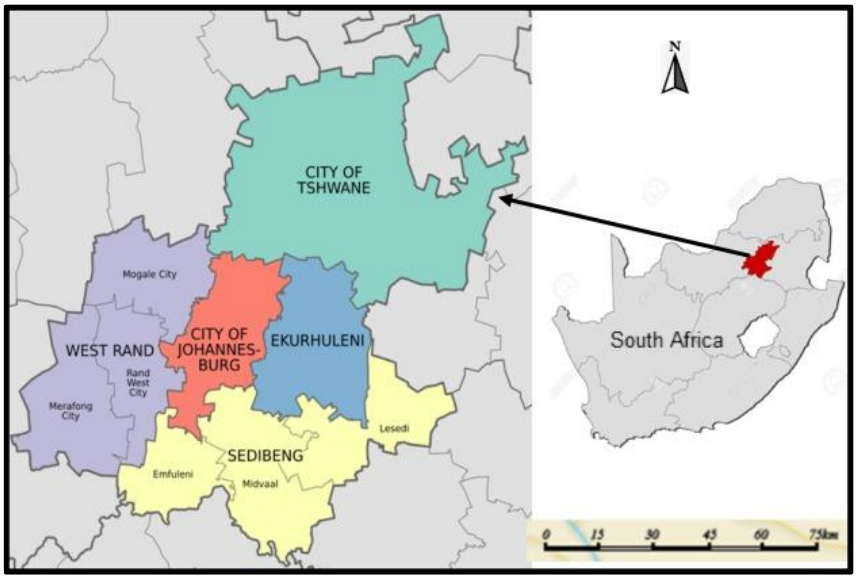


Figure 7-7: Gauteng City Region in South Africa

Source: Nhamo *et al*. (2021:103)

7.2.1 Background

The Gauteng region, named after the nation's smallest but most densely populated province, is mainly comprises of Johannesburg, South Africa's financial and provincial capital, and Tshwane, the nation's administrative centre. It also includes a number of smaller urban centres scattered throughout the province in an almost continuous urban agglomeration, including Germiston, Alberton, and Boksburg. In the Gauteng City-Region's territorial region. There are three metropolitan administrations, six district municipalities, and numerous smaller, local municipalities.

Gauteng City-Region is the most advanced metropolitan area in South Africa, in terms of wealth (WorldAtlas, 2018:1). It is the most populous and wealthiest province in South Africa, and also the one with the smallest area of land in the country. The Gauteng City-Region (GCR) encompasses a broader functional region defined by transportation concentrations, connections, and movements, as well as people, economic activity, natural resources, and other factors. As seen by the flow of products, services, and people throughout its landscape, the GCR is also a highly interconnected geographical area.

According to Statistics South Africa (2019:1), Gauteng City-Region makes up for 25% of South Africa's population. This is the province with the highest amount of people distributed throughout the region. South Africa's economic heartland is the GCR[23]. On 2% of the country's land area, it houses 15.5 million people and creates a third of the country's GDP (Gauteng City Region Observatory, 2021:1). The Gauteng City-Region is a collection of towns, cities, and other urban centres that make up the core of South Africa's economy.

7.2.2 Nodes and Corridors

Nodes are focal points or connecting locations in a neighbourhood that include a mix of institutional, commercial, and residential buildings. Examples of nodes include shopping malls, community centres, libraries, and areas with medium to high densities of housing, as detailed in section 4.4.1.

The regional city-footprint is mostly contained within Gauteng's provincial boundaries. The Gauteng City-Region is sometimes thought of in broad terms, encompassing smaller cities throughout Gauteng and beyond, and sometimes in more specific terms, as the three metros Pretoria, Johannesburg and Cape Town).

[23] Gauteng city-region

Studies imply that the Gauteng City-Region incorporates portions of at least three other provinces (Free State, Mpumalanga, and the Northwest), despite the fact that the city-functional region's economic boundaries are constantly shifting (Gauteng City Region Observatory, 2021:1). Based on functional considerations, the spatial organisation of the Gauteng City-Region can be categorized as polycentric, as indicated in Figure 7-9.

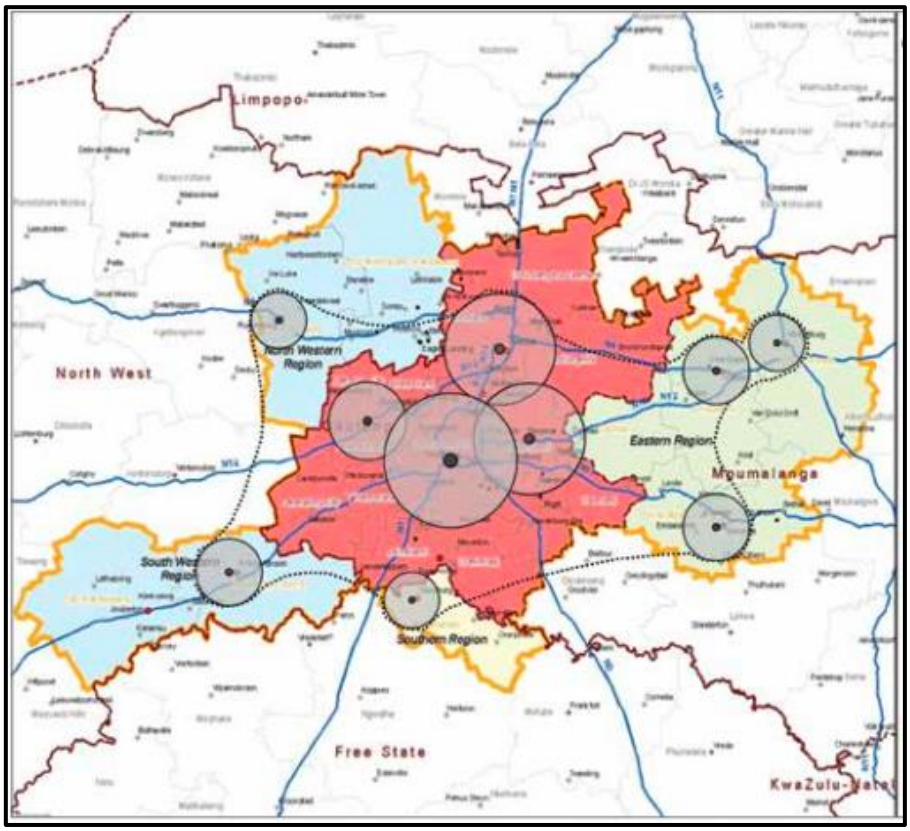


Figure 7-8: Gauteng City Region Footprint

Source: Gauteng City Region Observatory (2021:1)

The most well-known cities in Gauteng are Johannesburg and Pretoria (or Tshwane), although there are also a number of other noteworthy cities. The majority of these cities are located within the Gauteng province, although some are located outside of Gauteng's administrative space. Nonetheless, through the movement of people, resources, information, services, and infrastructure, these other locations are linked to Gauteng, defining the area as a functionally integrated city-region (Sey, 2015:1).

The Gauteng City-Region's economy and space are divided into five development corridors, each with its own set of sectors and competitive advantages (Gauteng Growth and Development Agency, 2021:1).

1. The **Central Development Corridor**, which is centred in Johannesburg as a financial, information technology, and pharmaceutical hub.

This is the financial and technical hub of Africa. In Sandton, Rosebank, and Waterfall in Midrand, as well as Steyn City and Riversands in Fourways, is where the corridor has its major real-estate developments. The Randburg and Lanseria districts also serve as key economic nodes for this corridor.

2. The **Eastern Development Corridor** is built on the Ekurhuleni Metro's economy as a manufacturing, logistics, and transportation hub.

The OR Tambo International Airport Special Economic Zone is located in Ekurhuleni and focuses on agro-processing, jewellery production, mineral beneficiation, and hydrogen fuel cell technology development.

3. The **Northern Development Corridor**, centred in Tshwane, South Africa's administrative capital and the epicentre of the automotive, Research and Development, innovation, and knowledge-based industries.

The Northern Corridor is located in the Republic of South Africa's capital, Tshwane. The automotive manufacturing industry, research and development, the aerospace and defence industries, as well as innovation, are the key economic drivers.

4. The **Western Corridor** incorporates the West Rand district's economy and the development of new industries and economic nodes.

Diversifying the West Rand economy from mining to a hub of agribusiness and agri-processing, renewable energy generation, and tourism-boosting initiatives are a goal for this corridor.

5. The **Southern Corridor** incorporates the Sedibeng district' and its economy, as well as the development of new industries, and economic nodes.

The Sedibeng district and the Vaal Triangle together represents the Southern Corridor. Both industries have historically relied on the steel industry, which collapsed a few years ago.

In Figure 7-9, the current neighbouring connections[24] of Gauteng City-Region is illustrated. These major regional corridors indicate that Gauteng City-Region does not exist in isolation from the rest of the country's economic heartland, it coexists with, and is structured by its neighbouring provinces, cities, and corridors.

[24] Also known as the major regional corridors.

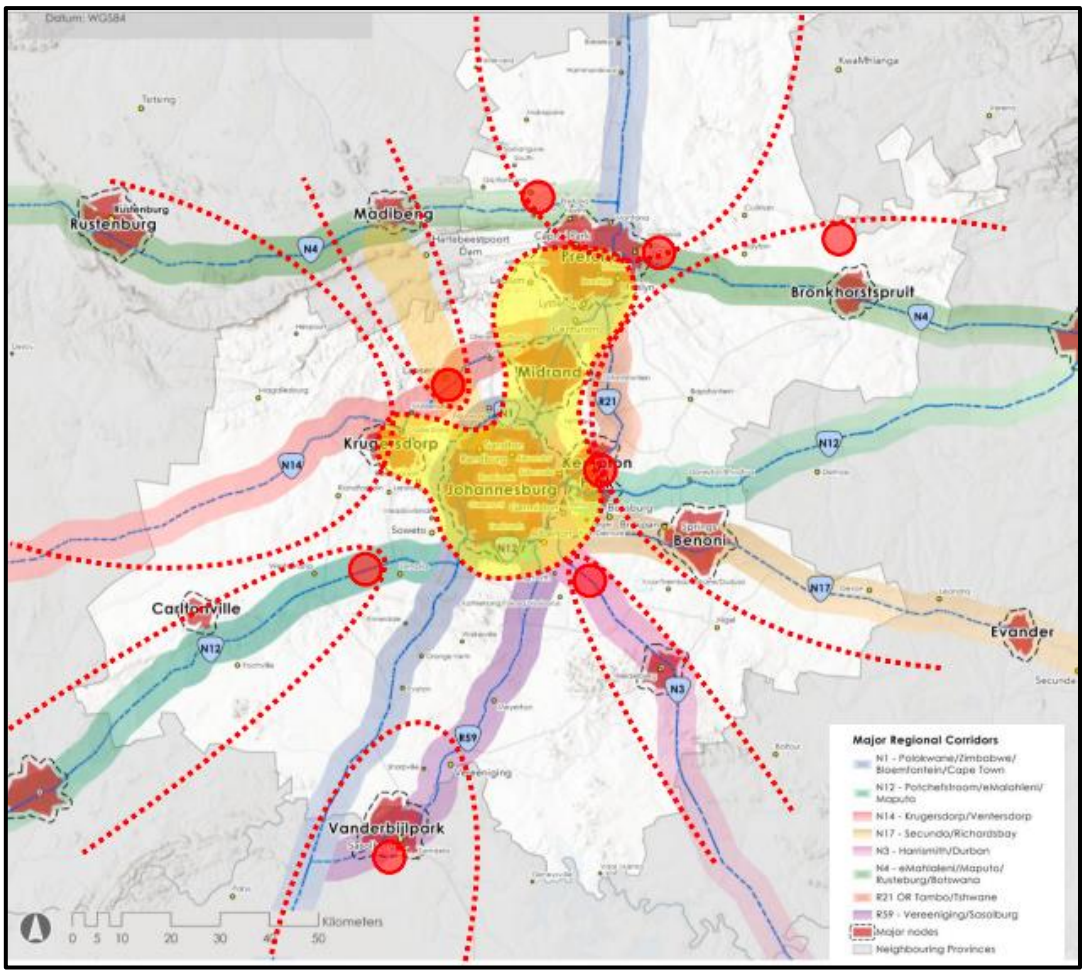


Figure 7-9: Gauteng City-Region neighbouring connections

Source: Gauteng Spatial Development Framework Review (2021:14)

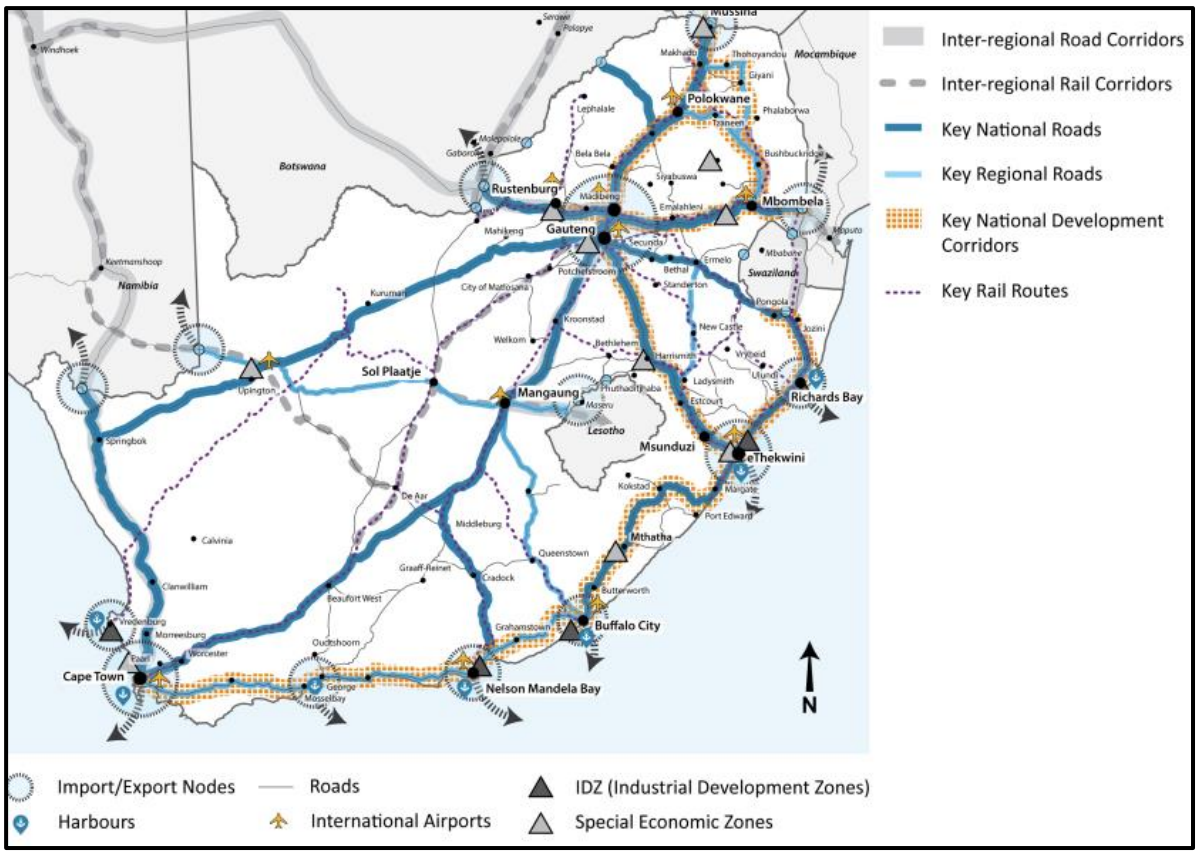


Figure 7-10: National Connectivity

Source: Department of Rural Development and Rural Land Reform (2019:68)

Figure 7-10 and Figure 7-101 indicate the well-connected Gauteng City-Region, that enhance the potential to use corridors as a spatial planning instrument (section 4.4.3).

As a result, economic stimuli in neighbouring provinces is in Gauteng's best interests, as it expands Gauteng's wealth and economic prominence and vice versa.

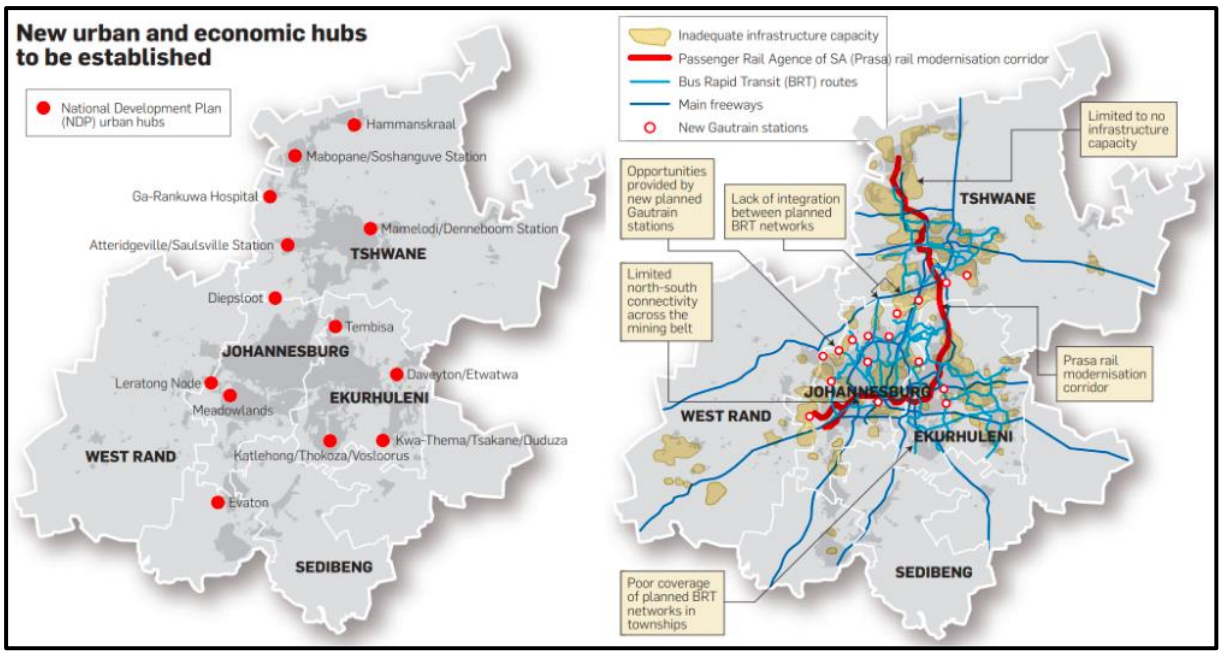


Figure 7-11: Economic hubs and economic corridor

Source: Writer (2018:1)

7.2.3 Population distribution characteristics

According to the 2001 South African census, there were 9 388 855 people living in the continuous urban region inside the Gauteng province's limits, an area of 18 182 square kilometre (Gauteng City Region Observatory, 2021:1). The 2011 census showed an increase in the population to 12 272 263 (Gauteng City Region Observatory, 2021:1). A statistical estimate is that Gauteng's current population is about 15 810 388 people, according to a mid-year calculation released in July 2021 (Gauteng City Region Observatory, 2021:1).

The population in Gauteng City Region’s believed to make up about 45 percent of South Africa's internal migrant workers, many of whom engage in 'circular migration' from the original locations to the workplace (Sey, 2015:1). With a population of roughly 4.5 million people, Johannesburg is the largest city in South Africa, yet it is not the country's capital. Pretoria, Bloemfontein, and Cape Town are the three capital cities of South Africa, which is unusual. Each of these serves as the seat of a separate government branch. In this study the focus is on the administrative branch of government based in Pretoria.

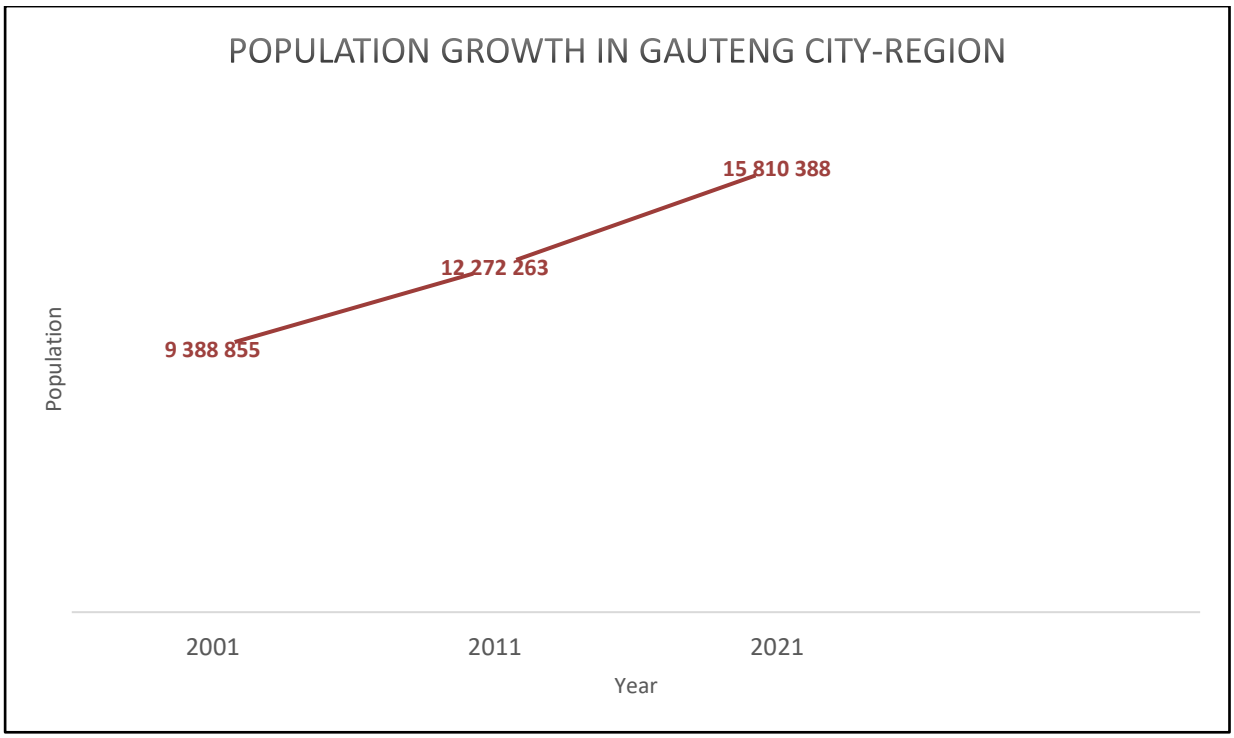


Figure 7-12: Population growth in Gauteng City-Region

Source: Adapted from Gauteng City Region Observatory (2021:1)

At the present rate, the Gauteng City-Region's population growth is estimated to be around 2.2 percent per year, including internal migration and immigration (Sey, 2015:1). By 2030 the estimated population for Gauteng City-Region's is calculated to be 18 million, and by 2050 nearly 20 million people will reside in the Gauteng City-Region.

Figure 7-13 illustrates that Gauteng's dense residential settlements are made up of a diversity of dwelling types to accommodate the city's high population density.

The most dense populated square kilometre in Johannesburg (63 211) is just slightly less than the most populated area in New Delhi, India (64 830), However, it is still about a third of the density in the most dense area in Dhaka, Bangladesh (175 192). Johannesburg's most populated area per square kilometre in Africa is significantly less dense than Nairobi, Kenya (96 953) and Cairo, Egypt (105 712).

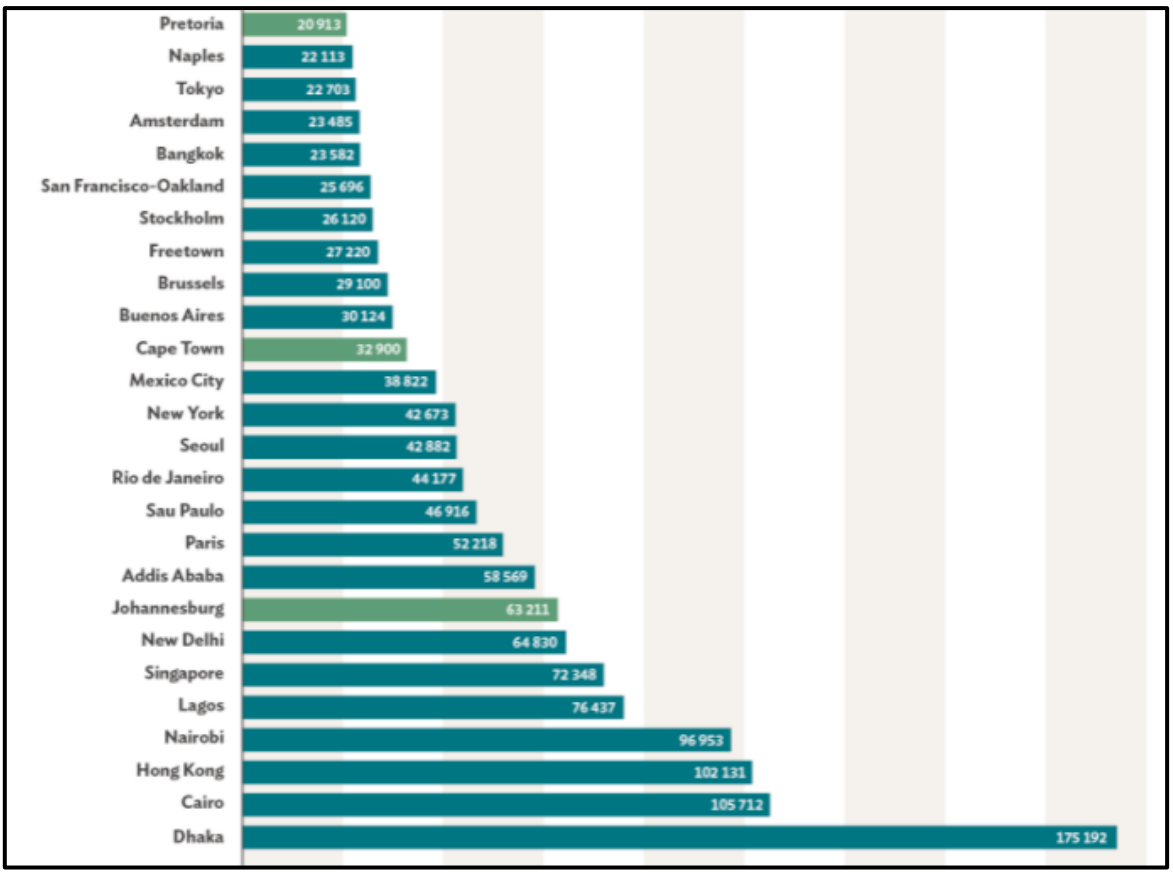


Figure 7-13 Most dense square kilometre of various cities

Source: Parker & Hamann (2020:1)

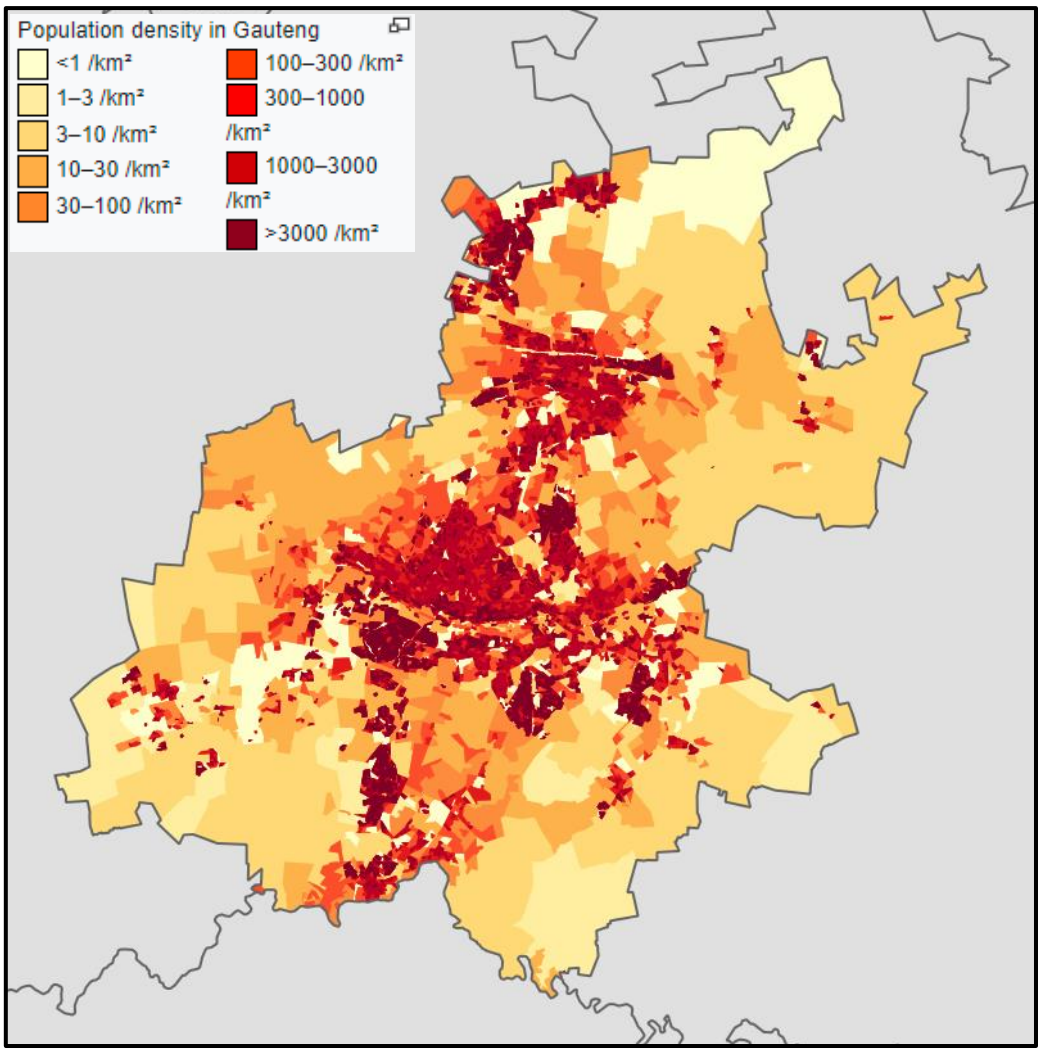


Figure 7-14: Population density in Gauteng City-Region

Source: Parker and Hamann (2020:1)

Looking at Figure 7-14, it is clear that the population density increases more to the centre of the City-Region. Johannesburg, Pretoria, Tembisa and Soweto are all located in this centre. Five out of the ten largest populated cities in South Africa are found within the Gauteng City-Region, namely Johannesburg, Soweto, Pretoria, Benoni and Tembisa.

The population distribution of the ten largest cities or towns in the Gauteng City-Region is depicted in Figure 7-15.

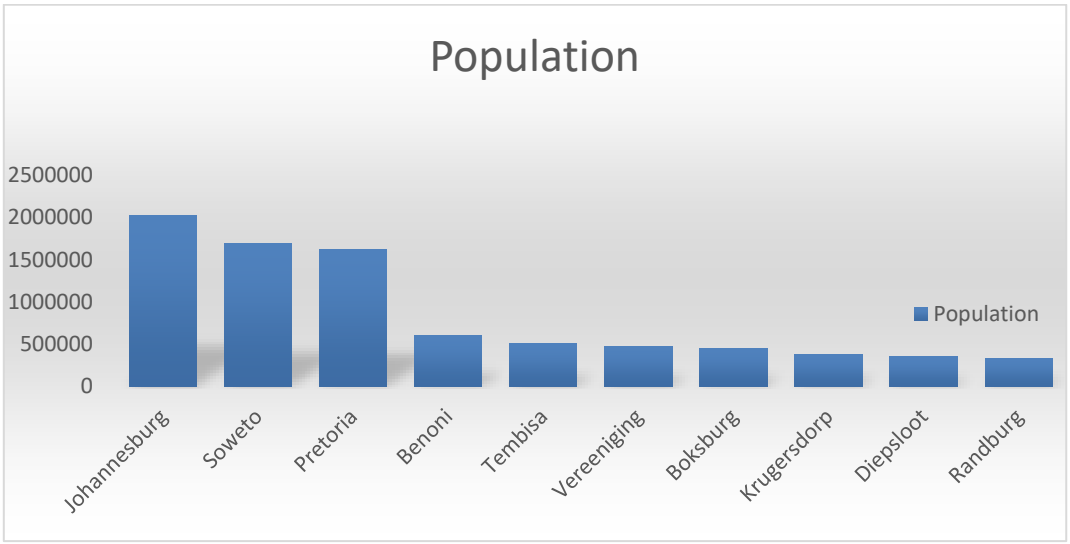


Figure 7-15: Largest cities in Gauteng City-Region

Source: Adapted from World Population Review (2022:1)

Figure 7-12 to Figure 7-17 demonstrates that the Gauteng City-Region has a population distribution similar to that of South Africa (see Figure 7-16). Three larger cities are observed (Johannesburg, Soweto and Pretoria) with a large fall in population to the secondary cities.

The nodes are larger than expected, causing an imbalance in the Gauteng City-Region regular distribution. The various metropolitan cities located in Gauteng City Region, creates a large gap between the metropolitan level and tertiary level cities. Gauteng City-Region's urban hierarchy is further discussed in Section 7.2.7 and Section 8.3. Recommendations arre given on the improvement of the population distribution of Gauteng ,the functionality of the urban system and the contribution to better spatial planning, .

7.2.4 Economic performance

The strategy of Gauteng City-Region aims to transform Gauteng to a more connected and globally competitive region, with diverse sections of the province complementing each other's economic activity, to secure Gauteng's position as Africa's economic powerhouse and a globally recognised city region (Gauteng Provincial Government, 2006:16).

A significant portion of South Africa's economic output is produced by the Gauteng City-Region, whose many industries such as mining, manufacturing, financial and business services, innovation, and commerce collaborate to create a fully integrated urban economy and an unified labour market (Gauteng City Region Observatory, 2021:1). Three provinces adjacent to Gauteng are included in the economic footprint (see Figure 7-9).

The Gauteng City-Region accounts for slightly less than half of South Africa's economic product, with a focus on several areas as mentioned above. These areas should collaborate to form a functionally integrated urban economy and single labour market (Sey, 2015:1). This region serves as the country's hub for trade with the rest of Southern Africa and abroad, particularly with regard to financial services, telecommunications, manufacturing, and logistics.

According to Götz (2019:1) and Gauteng City Region Observatory (2021:1), mining was the strongest growing sector in Gauteng in 2010 with an increase of 6,4% with agriculture showing the lowest growth with a decrease of 0,3%. In 2016 the main industries in Gauteng, which contributed to growth, were finance 23%, government services 19%, manufacturing 14%, with agriculture as the weakest industry (South Africa Gateway, 2019:1), as illustrated in the Figure 7-16.

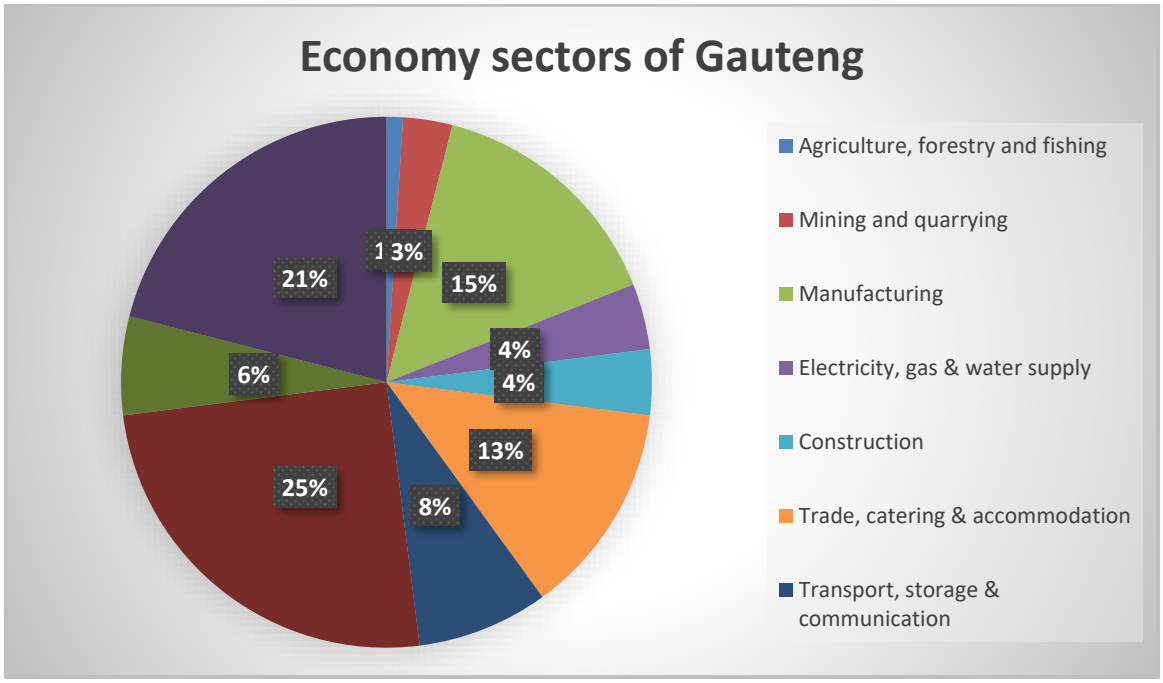


Figure 7-16: Economy sectors of Gauteng

Source: Adapted from South Africa Gateway (2019:1)

In Figure 7-18 it is clear that the financial sector is contributing the most to Gauteng's GDP and agriculture is contributing the least. The reason can be found in the fact that a great deal of development takes place in Gauteng and most agricultural land is in high demand for development. According to the Gauteng City Region Observatory (2021:1), the Gauteng City-Region has advantages over other parts of the country due to its relative economic robustness locally and in the rest of the subcontinent. There is a strong perception that there are more jobs and educational options in South Africa.

According to Parilla and Trujillo (2015:1) the Gauteng City-Region has considerable international strengths in the following five elements. By improving these strengths, Gauteng will have significant chances to improve international competitiveness.

(a) Trade

The Gauteng City-Region is a principal worldwide commerce and investment hub.

(b) Innovation

Many of the ingredients of a flourishing innovation ecosystem can be found in Gauteng City-Region, which can be enhanced by more commercialisation and entrepreneurship. The two most highly ranked research universities in the city-region are important hubs of knowledge generation and collaborate well with industry on research.

(c) Talent

The workforce in the area has grown more skilled over time, yet high and persistent unemployment remains a major concern. The Gauteng City-demographic Region's dividend and ongoing inflows of immigrants guarantee a consistent supply of labour for the local economy.

(d) Infrastructure

While the Gauteng City-Region benefits from the most connected aviation centre in Africa, its connectivity lags behind that of peer cities throughout the world. The logistics and freight networks in South Africa are average, but the costs associated with exporting for business remain high.

(e) Governance

The public sector has embraced city-regional government co-operation, a process that may be reinforced by further engagement with the commercial and civil sectors.

7.2.5 Policies and frameworks

Numerous measures are in place to counteract the continuous segregationist geographical transformation, but many critics within and outside of government point to the challenges of achieving more comprehensive spatial reform.

In Section 6.2, national policies with a focus on South African content were outlined. This section concentrates on the regional or provincial issues. SPLUMA and the NDP (Sections 6.3.1 and 0) envisions that the various domains of government should create their own spatial policies to assist

with the spatial planning principles and policies of South Africa as a whole, as detailed in Sections 6.2.

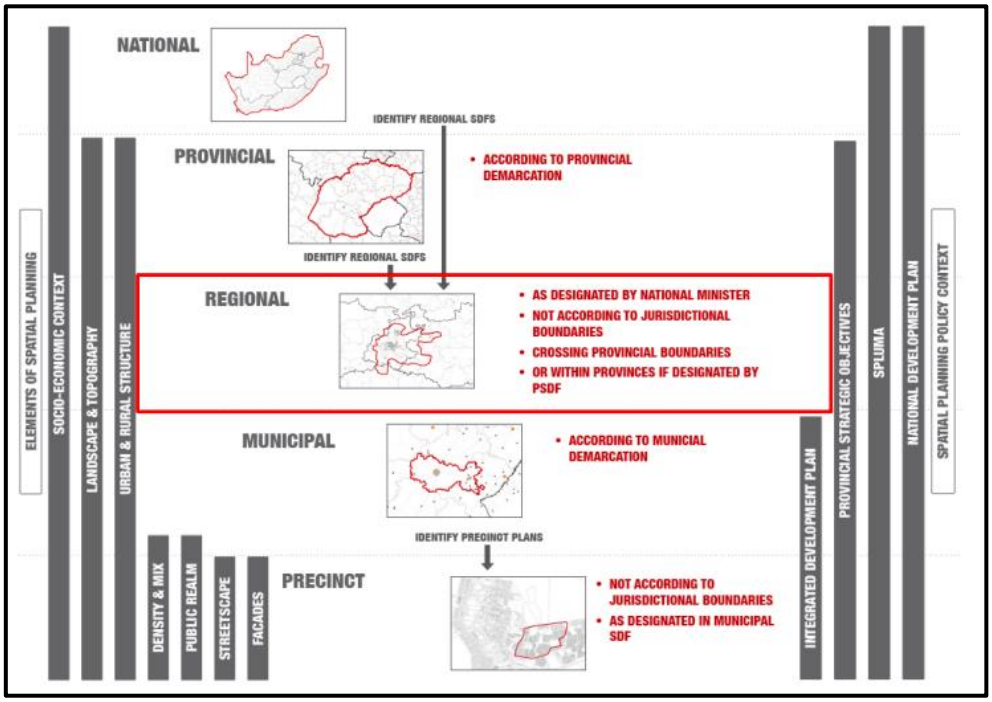


Figure 7-17: Differentiating the various planning scales based on the relevant aspects, policy contexts, and legal boundaries

Source: Department of Rural Development and Land Reform (2019:15)

Hundreds of documents, covering a wide range of spatial scales and legislative weights, deal directly with the integration of economic, social, and environmental planning in South African cities. As a result, the focus of this part will be on policies developed at the regional level, Gauteng City-Region and metropolitan or regional level.

7.2.5.1 Policy design

(i) Gauteng Spatial Development Framework (GSDF)

One of the frameworks developed in accordance with SPLUMA was the Gauteng Spatial Development Framework (South Africa, 2013:32) intended to promote long-term sustainable urban and rural development (Section 6.3.1). Different development "capitals" or growth centres were recommended by the GSDF to aid economic progress.

(a) Human Capital;

(b) Social Capital;

(c) Infrastructure Capital;

(d) Natural Capital; and

(e) Monetary Capital

All of them are critical for the province's development since they are equally crucial for initiating growth and development, as well as improving spatial planning in various urban systems.

The Gauteng City-Region's regional growth would be aided if these five domains of development capitals have strong links and networks.

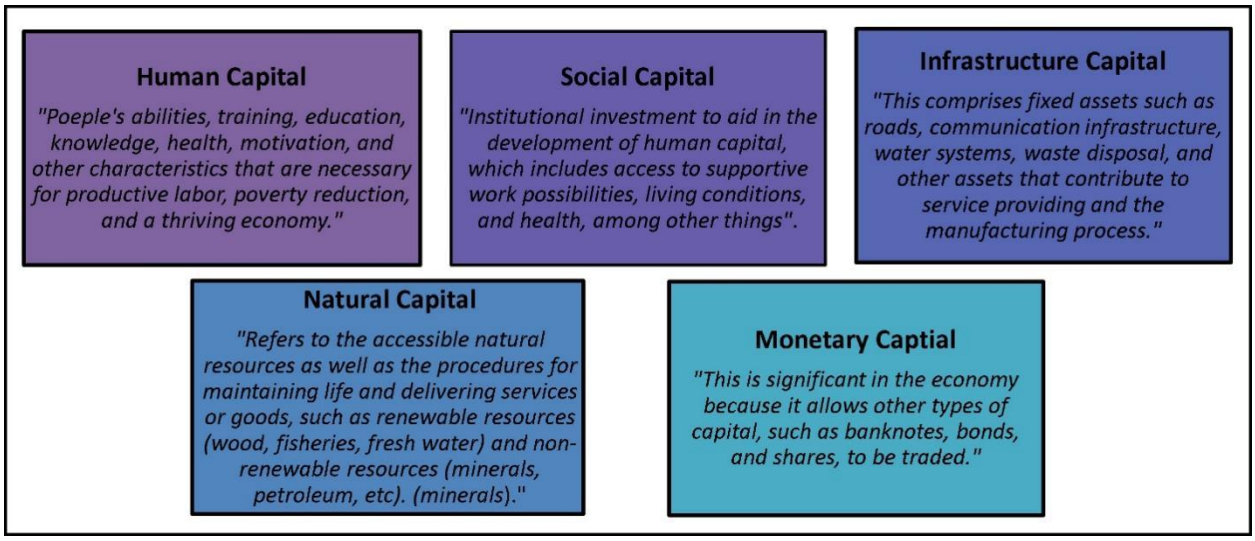


Figure 7-18: Five development capitals

Source: Adapted from van der Merwe & Zietsman (2011:2)

The regional development of the Gauteng City-Region would be enhanced if there were strong ties and networks within these five types of development capitals, discussed in Figure 7-18. This might then be connected to the many areas determined to increase the effectiveness of the urban system, improvement of spatial planning, as discussed in Sections 3.2, 3.4, 3.5 and 4.6. There have been increasingly settlement trends in the Gauteng City-Region for a number of years, necessitating the reformulation of policies to aid with the drastically population increase.

The following policies and actions were introduced to boost regional development and the function of the urban system on a regional level:

The Gauteng Spatial Development Framework was created in response to the requirements stipulated in SPLUMA (section 7.2.5) to the province's social and economic development needs and framework to build Gauteng through equitable, responsible and efficient development. The GSDF 2030 is guided and informed by the national legal framework, international, national, and provincial spatial policy directives, and local Spatial Development Frameworks.

Regional development initiated by the Provincial Spatial Development Frameworks is an inherent feature of national spatial planning and governance, and key components in the overall organization and operation of provincial government, notably spatial planning and governance.

The Gauteng City-Region's economic, ecological, social, and cultural characteristics all find physical shape and form in the GSDF, which is based on infrastructure-led development with the aims in Figure 7-19.

Aims of GSDF:
Safe, affordable and sustainable public transport
Quality of life and living, implying proximity to, or easy and affordble access to quality open space and social and cultural facilities
Creativity and innovation, ensuring that the province can adapt to change in constructive ways
Protection and enhancement of the natural environment
Shared, sustainable and inclusive economic growth
Choice, enabling individuals and communities to decide within an overarching framework that works for them

Source: Adapted from Gauteng City-Region (2017:197)

Figure 7-19: Gauteng City-Region aims for Gauteng

The current urban classification of the Gauteng City-Region indicates a widespread city-region with a continuous lack of integration, which is a major source of concern. The GSDF guides Gauteng's dramatic spatial transformation, as mandated by Growing Gauteng Together 2030's strategic direction (GGT2030). The GSDF outlines the spatial agenda for the province's inclusive, equitable, and efficient spatial planning. The Gauteng Spatial Development Framework does not refer to urban systems.

The regional sphere has to guarantee that the spatial implications of long-term plans are considered and that annual plans, budgets, and the provincial spatial logic are aligned. New strategies and policies with spatial consequences for the Gauteng City-Region should be developed and supported. According to the GSDF (2030:136), the Gauteng City-Region and the core surrounding nodes, work together as a machine that needs all parts (economic, spatial, natural, environmental) to function properly, despite the increased focus on economic development.

The spatial plan depicts the province of Gauteng's anticipated future spatial vision. The geographical structure depicted is an aggregation of the province's shared overarching development principles, applied in all local governments' local spatial development frameworks.

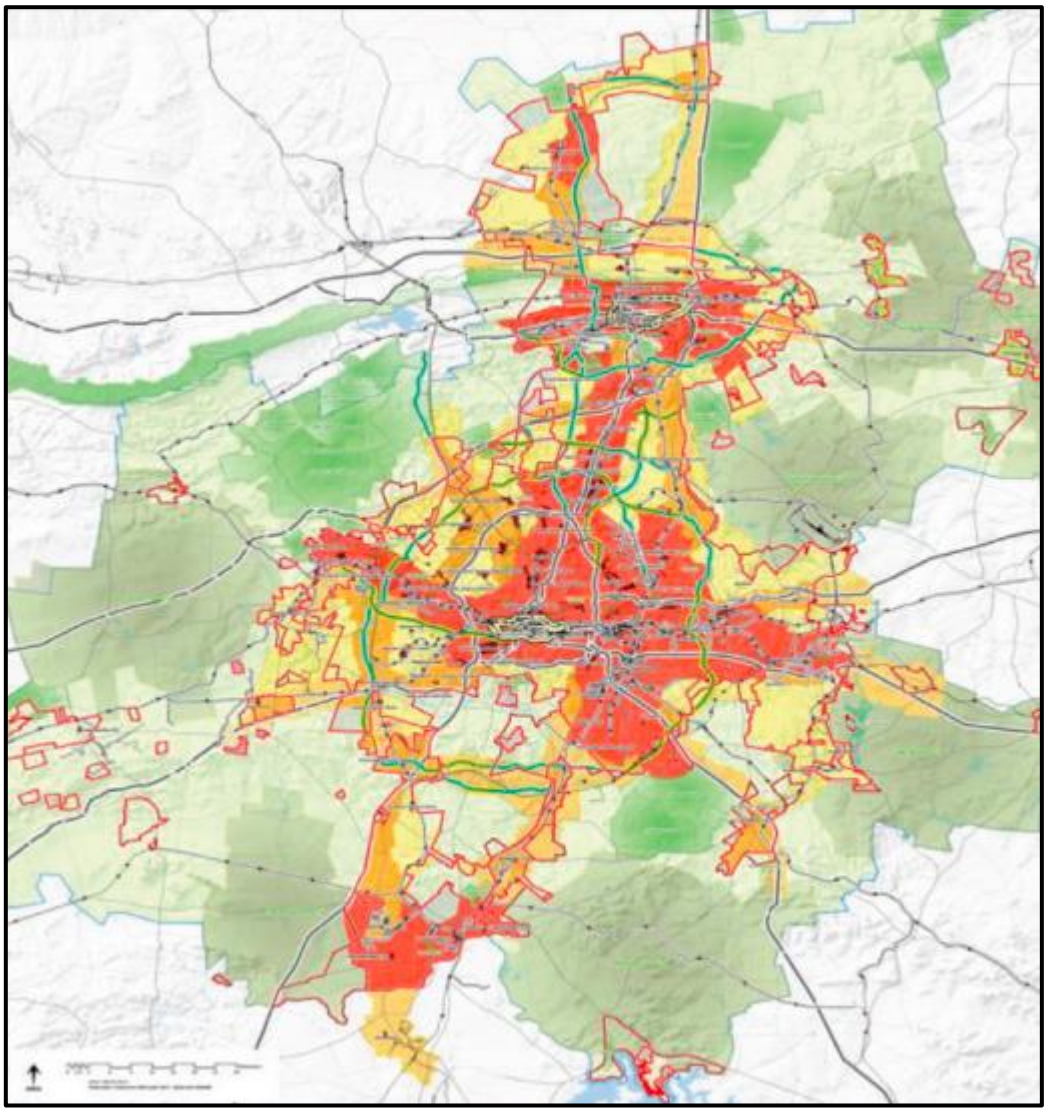


Figure 7-20: Gauteng Spatial Development Framework Plan (2011)

Source: Gauteng Spatial Development Framework (2030:3)

Figure 7-20 (the Gauteng Spatial Development Framework) highlights many strategic initiatives related to urban structuring and priority action areas that will be implemented between 2011 and 2030. These programs are seen as the most important spatial focal points for significant urban transformation in the Gauteng province during the next decade.

The spatial structure depicted is a synthesis of the general development principles that apply to each local framework for spatial development which is owned by each inidvidual local authority in the province. The goal of the strategy is to improve the social and economic integration of underprivileged areas into the urban system., particularly those on the outskirts of cities. Therefore, the area is urged to strike the correct balance when putting modern spatial planning systems in place to address the issue of spatial fragmentation.

As low government integration poses a barrier to the current policies that are to be implemented in South Africa, it would also be advantageous if the roles of the various government domains were categorised, and integration was encouraged. The Gauteng City-Region's spatial planning ,and ultimately South Africa's entire urban system, would be improved by strengthening the integration between the government domains, allowing for more effective policy implementation and coherent strategy development.

In conclusion, this framework focusses on getting rural areas to increase contribution to the urban hierarchy of Gauteng City-Region. It indicates that the framework focuses on the differential urbanisation concept to increase spatial planning in the region (section 4.3.3).

7.2.5.2 Policy Implementation

South Africa is now struggling with the execution of various strategic documents at the municipal, regional, and national levels, due to a lack of integration within government sectors (section 6.2). As a result, the Gauteng Spatial Development Framework implemented a Spatial Prioritisation Matrix to address the spatial imbalance in the Gauteng City-Region and improve the spatial planning on the regional level.

Table 7-3 GSDF Spatial Prioritisation Matrix

SPATIAL PRIORITISATION MATRIX						
SPATIAL TARGETING RESPONSE		**GSDF 2030 FOCUS AREA**				
Role Player	Programme	1.Shared Economic Prosperity	2.Social Economic Integration	3.Economic consolidation	4.Social & Local Economic Support	5.Rural Enterprise Support

Source: Adapted from Gauteng Spatial Development Framework (2030:132)

The Spatial Prioritising Matrix explore the urban hierarchy as a spatial planning initiative which indicates that the GSDF strives to accommodate and visualise the Gauteng City-Region as an urban system (GSDF, 2030:145). The planning that occurs on this regional scale is to ensure that spatial planning coheres to ensure an integrated impact.

The Gauteng Spatial Development Framework (2030: xii) adopted a bioregional strategy as implementation plan:

(a) *Coordination and alignment:* The GSDF 2030 serves as a unified blueprint for Gauteng's development and spatial management, and its provisions direct the IDPS, SDFs, and development strategies of the federal, provincial, and local governments. This is necessary for spatial planning coherence.

(b) *Spatial targeting:* Ensure that these priority regions align with other regional, nationwide, and local nodes and offer a chance for co-ordinated crowding-in of investments.

(c) *Spatial performance management:* It is important to rely on spatially quantifiable planning baselines, performance indicators, and targets that have been established by provincial agencies and entities from the onset.

In order to create an effective Spatial Development Framework for the Gauteng City-Region, it is crucial to integrate and standardise planning across all areas of government. According to the temporal model (section 4.3.3) the development phase should be determined in Gauteng City-Region, before the policy is compiled.

It is clear that the Gauteng Spatial Development Framework refers to and focuses on the region’s urban hierarchy. No clear indication is given on the improvement of spatial planning in the region using the urban system as a tool.

7.2.6 Development objectives

The Gauteng City-Region is a complex region with a wide range of socio-spatial relationships, with the planning by the era of apartheid before 1994 still looming large. The Gauteng urban landscapes are investigated via the production of urban space, both in terms of its initial construction and its alteration by those who utilise it.

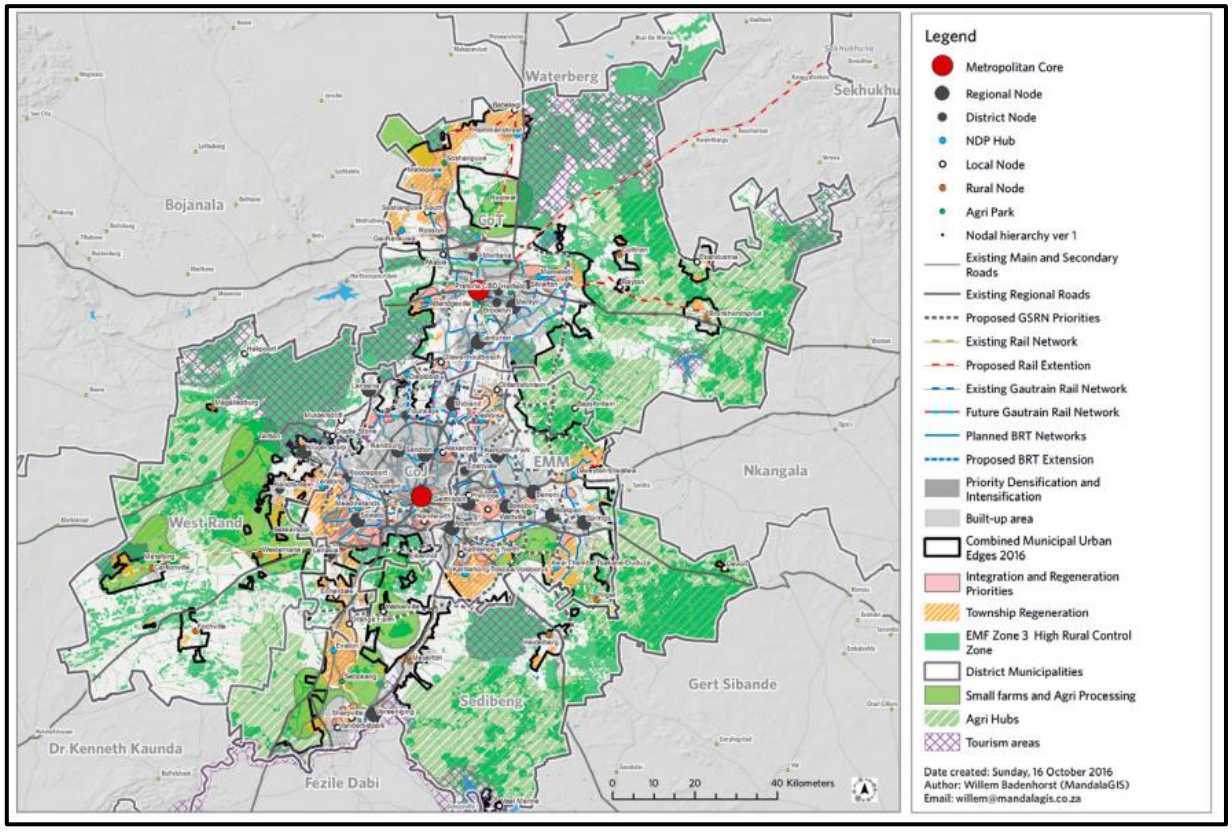


Figure 7-21: Gauteng Spatial Development Framework map

Source: GSDF (2021:123)

The Gauteng Spatial Development Framework map (Figure 7-21) illustrates the various nodes, priority dense areas and the integration and regeneration priorities. Hundreds of gated community projects have been built throughout Gauteng's suburban edges. All developments in the province must comply to six spatial development principles to realise the spatial development vision, namely liveability, concentration, connectedness, conservation, diversity and viability.

Aims to 'densify' the GCR by constructing three new cities in the area - the first of the settlements completely established since apartheid (Sey, 2015:1). These townships, which will be built in undisclosed West Rand areas, are part of a bigger plan to address the geographical gaps between Johannesburg, Tshwane, and Ekurhuleni - along the main highways, namely the M1, N1, as well as the R21, which passes by the OR Tambo International Airport. The development and construction of more settlements and enterprises will eventually fill these spatial corridors.

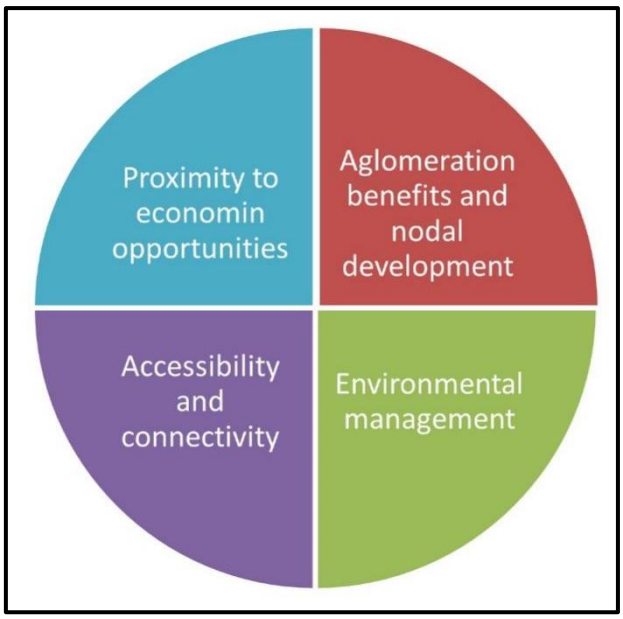


Figure 7-22: Spatial development strategies of Gauteng

Source: GSDF (2021:116)

Figure 7-22 illustrates the objectives of Gauteng on which the future vision for development is based. According to Growing Gauteng Together (Gauteng Provincial Government, 2020:7) an integrated government wide planning and stakeholder approach need to be followed in order to address the fundamental problems facing the residents of the Gauteng City-Region. The fundamentals illustrated in Figure 7-27 give an indication that the Gauteng City-Region takes various perspectives into account to improve the current imbalanced spatial layout, which gives an indication that current spatial planning initiatives may include the urban system as an initiative.

The main focus is to address the imbalanced spatial layout. The objectives considered to address the main objective are:

(a) promoting economic growth;

(b) diversification;

(c) transformation;

(d) reducing poverty via social development;

(e) improving institutional and government effectiveness and efficiency;

(f) improving infrastructure to ensure economic growth and social development; and

(g) consolidating the three metros.

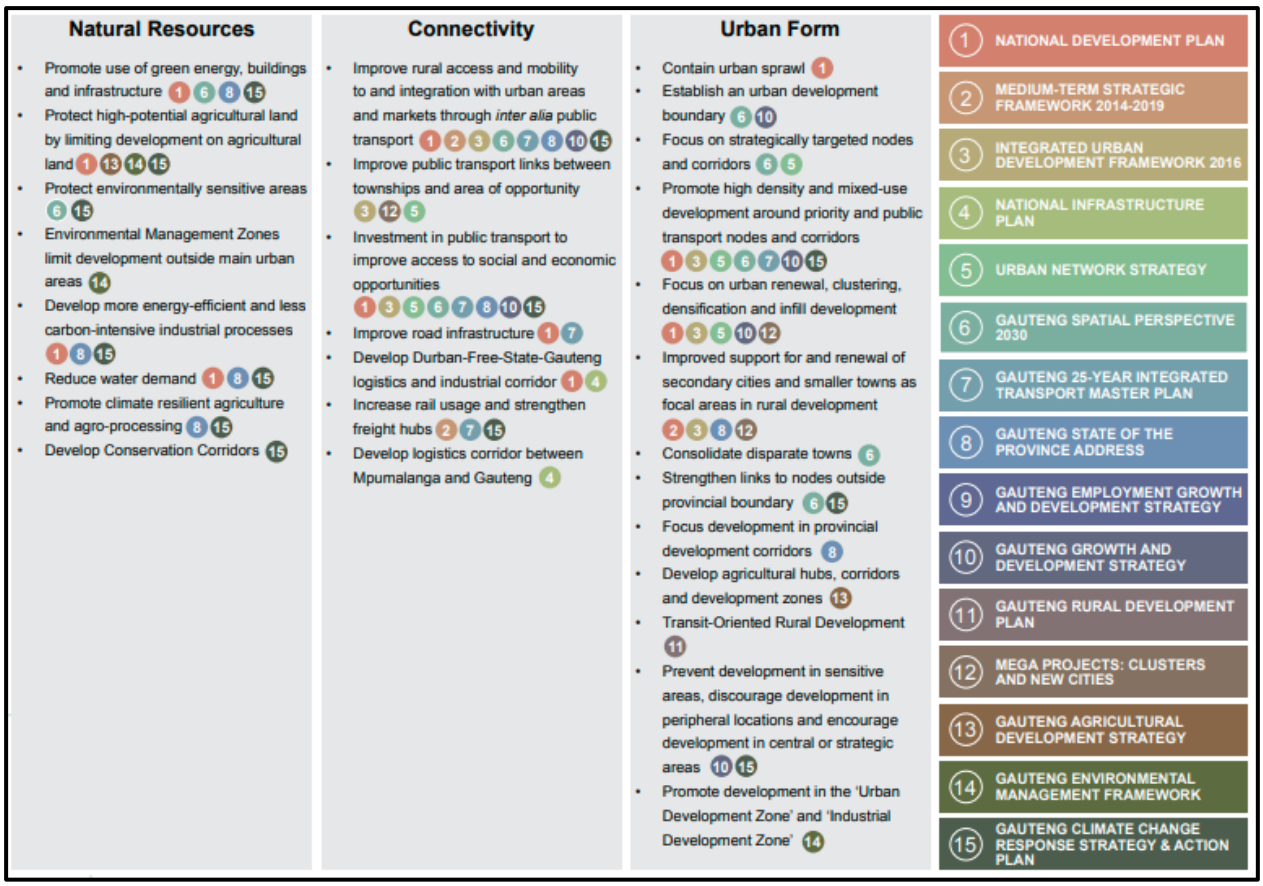


Figure 7-23: Objective analysis of National and Provincial policy directives

Source: Gauteng Spatial Development Framework (2030:39)

In the objectives set out in Figure 7-23, it is clear that the main focus is the improvement of the urban form of GCR. The improvement of connectivity follows, with the promotion and protection of natural resources. The three main goals, supported by the majority of laws and policies, are to invest in public transportation to increase access to social and economic opportunities, to increase rural residents' access to urban areas and their mobility within them, and to encourage high-density, mixed-use development along public and priority transportation corridors, illustrated in Figure 7-26.

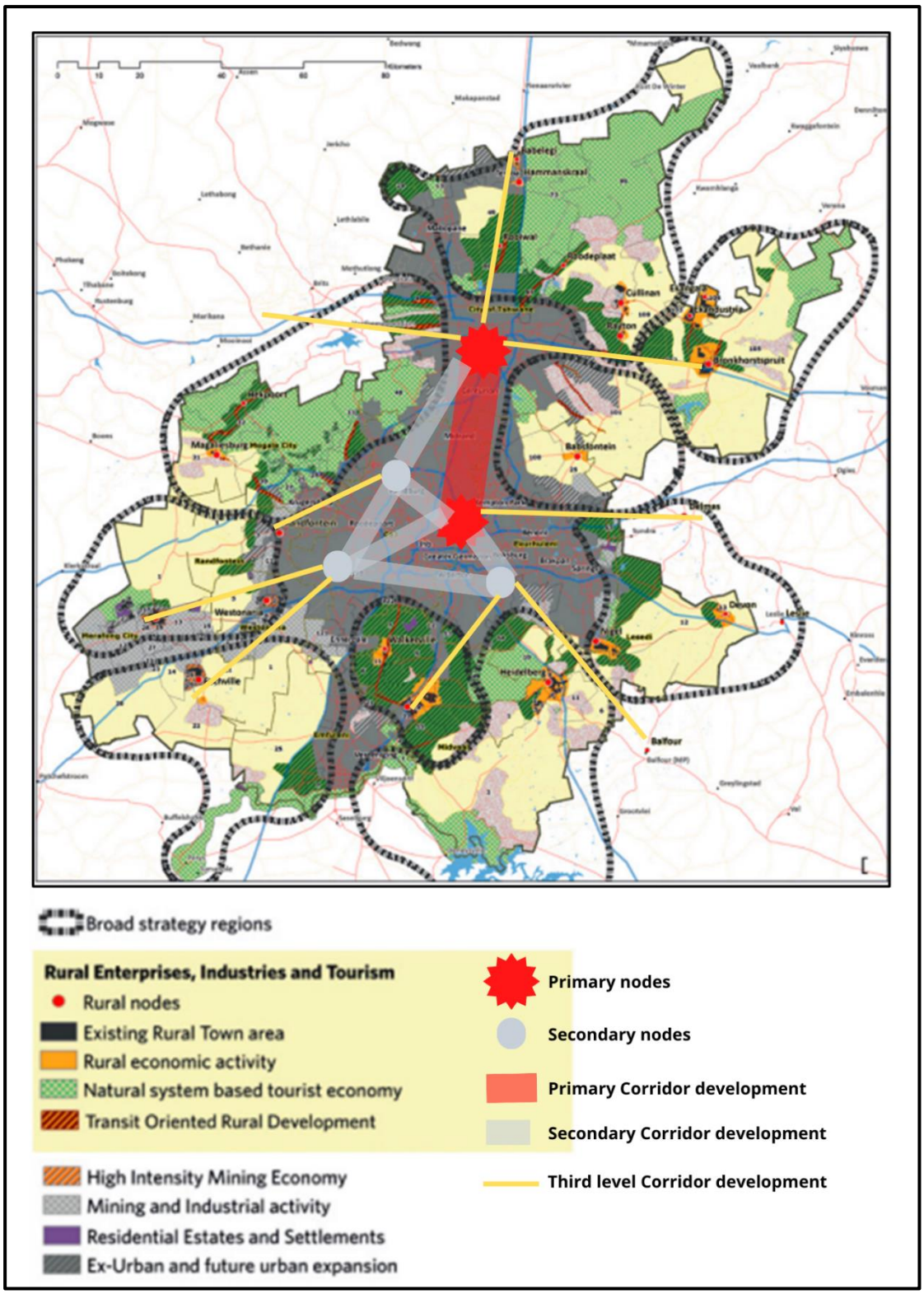


Figure 7-24 Gauteng Development objectives

Source: Own compilation

7.2.7 Urban Hierarchy

It is clear from section 3.4 that Christaller's study (1966) was significant in that it pioneered the idea that human settlements and, in particular, urban centres - should be classified according to their size, economic function. This could be thought of as a city pyramid or hierarchy. Size of an urban centre is determined the type of commodities and services provided by an urban centre .. Larger towns offered 'higher order' goods and services, while smaller communities offered 'lower order' goods and services.

The discussion of a hierarchy of spaces in South Africa is quite restricted. There is no formal ranking system that determines where various cities, towns, and communities is in the broader national space economy (John, 2012:220). The population of a city is a significant measure of its importance to the national space economy. The demographic strength of emerging urban centres around the world is a key criterion. However, in the developing world, massive concentrations of people can also be found in rural settlements that cannot be classified as secondary cities.

Gauteng City-Region has a kind of hierarchy, illustrated in Figure 7-25, which indicates a metropolitan node (large red circles), a regional node (secondary node) (smaller red circles),a district node (tertiary level node) (pink circles) and a rural node (yellow areas). The blue areas are the major economic areas connecting Pretoria and Johannesburg.

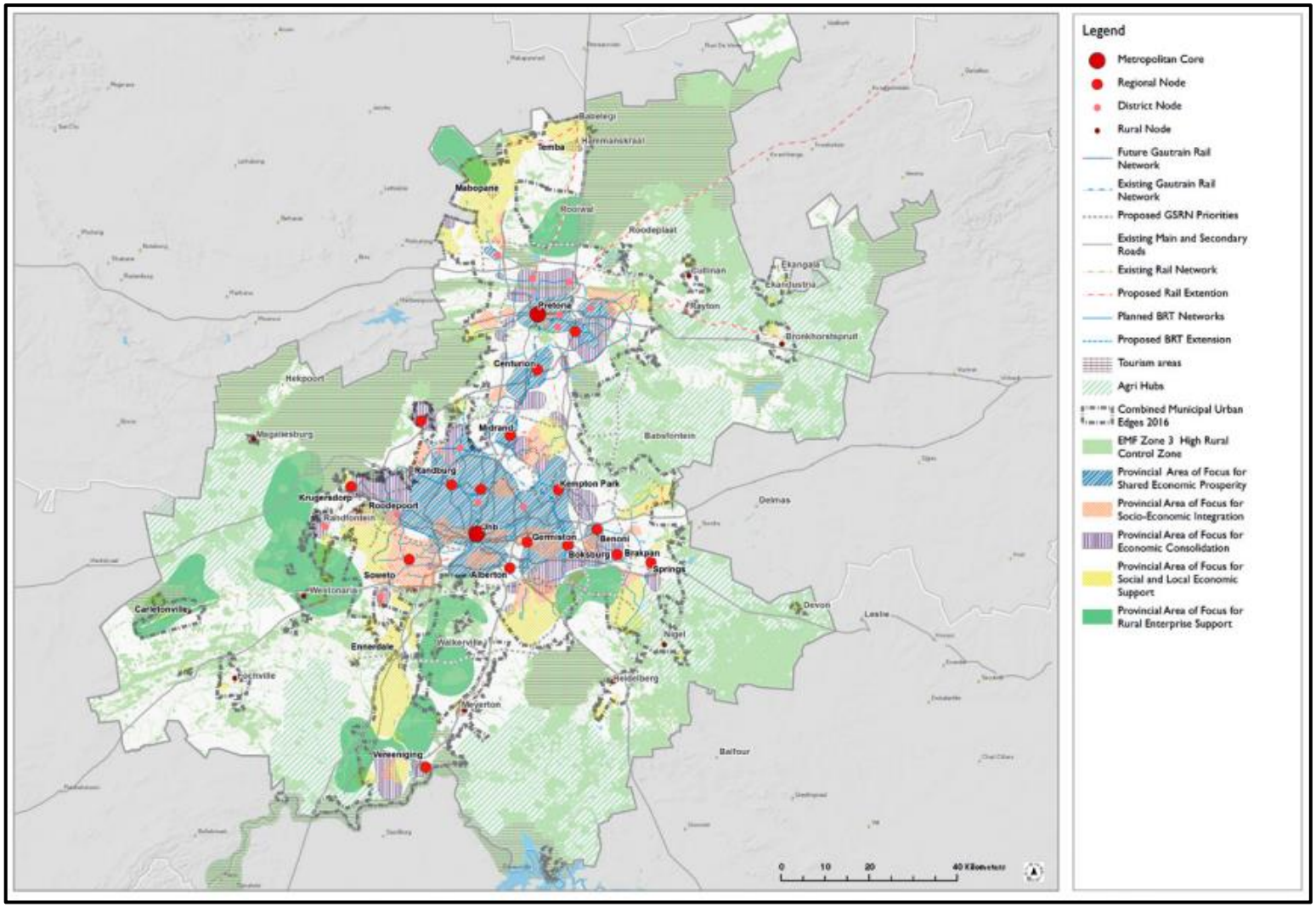


Figure 7-25: Gauteng City-Region Urban Hierarchy

Source: Gauteng Spatial Development Framework (2030:xiii)

The population figures are also used to determine the multiple hierarchical orders present in the urban system, as indicated in Sections 3.4 and 7.2.7 (or in this case, the specific study area). This was the only way to establish and indicate the distinct hierarchical orders. As a result, the population distribution of the eight largest cities/towns in the Gauteng City-Region is depicted in the graph below:

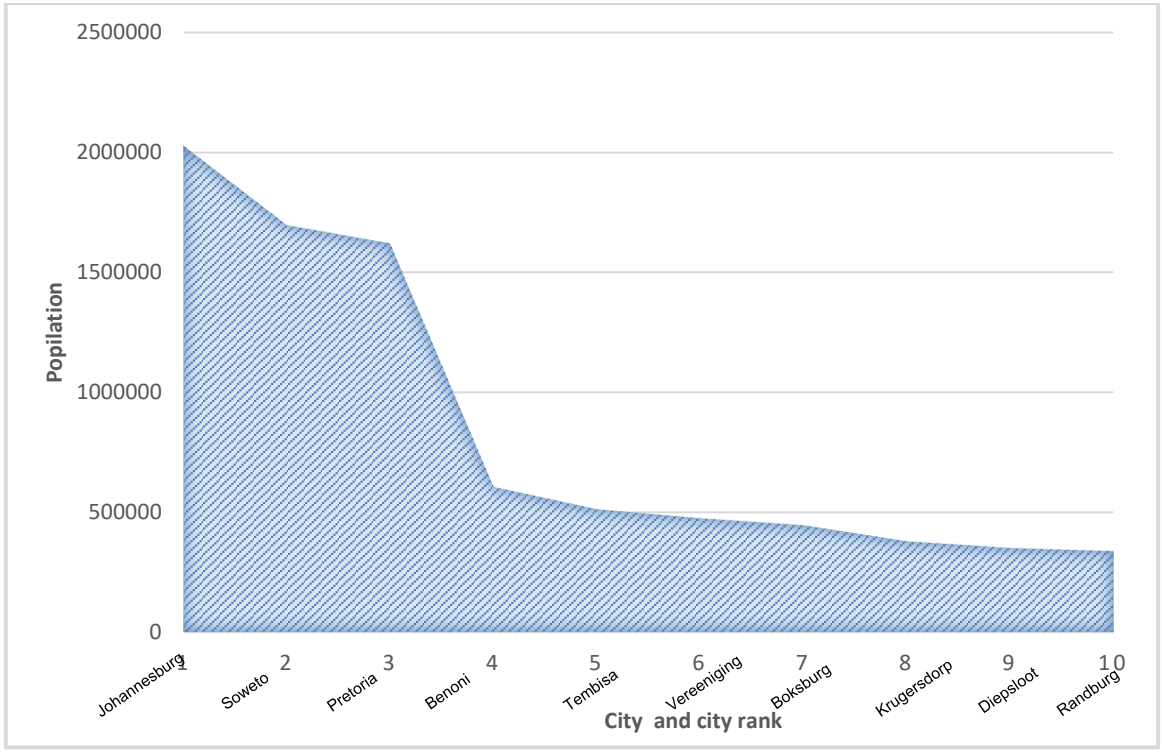


Figure 7-26: Largest cities in Gauteng City-Region

Source: Own compilation from World Population Review (2022:1)

The ultimate goal for Gauteng City-Region is to transform the province's three key metro districts – Johannesburg, Ekurhuleni, and Tshwane – into a 'metropolis' by 2030. This will have an impact on the hierarchy of the city. Currently (as indicated Figure 7-27) the three metros are at the top of the hierarchy, followed by secondary cities and tertiary cities (Writer, 2018:1).

Figure 7-31 indicates the urban hierarchy of 20 cities in Gauteng City-Region.

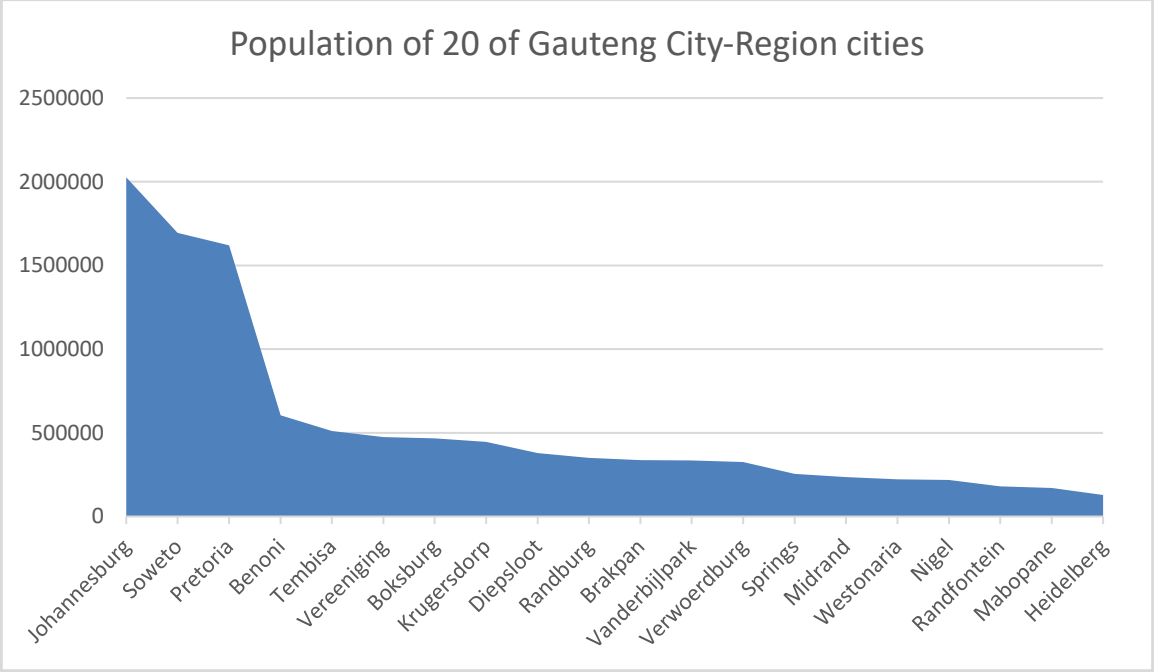


Figure 7-27: Population of 20 of Gauteng City-Region cities

Source: Adapted from World Population Review (2022:1)

From the development objectives for Gauteng City-Region (section 7.2.6) it is clear that focus is on the rural communities, to integrate them with the metros. It is generally presumed that effective urban systems, which use small towns as the catalyst for regional development and economic progress, are intimately tied to sustainable rural development. The major focus is on the transport systems throughout Gauteng City-Region, which forms part of the urban system, and spatial planning is thus being developed accordingly.

Rural development policies, particularly on the part of the national government, do not consider the contribution that small towns might generally add to regional growth section 4.3.3). A more dynamic strategy that acknowledges the current and prospective roles of rural towns, would have a ripple effect on secondary cities and metropolitan cities. The interconnectedness between rural and urban areas must also be acknowledged, and if necessary infrastructure is in place, the productivity of the region as a whole could increase. In chapter 8, recommendations for policy interventions and the implementation on a South African level will be made, using the concepts as illustrated in the empirical investigations along with the pertinent theories and concepts found in the literature study.

7.3 Conclusion

The Gauteng City-Region (GCR) is a complex region with a wide range of socio-spatial relationships. Planning during apartheid is still visible to a great extent. Gauteng is the most populous and wealthiest province in South Africa is also the one with the least amount of land in South Africa. In Chapter 5, three regions were discussed that have relatable characteristics of Gauteng City- Region. Canberra District (5.2.1.2) , Greater São Paulo (5.2.2.2) and the Greater Gaborone (5.2.3.2) have one significant similarity with Gauteng City-Region, being the capital district of the respective countries.

Gauteng City-Region has distinct nodes and corridors in three metropolitan areas (Johannesburg, Soweto and Pretoria). The most prominent nodes and corridors are those connecting these metropolitan areas (highways R21, N1 and N14). Secondary corridors that connect the Gauteng City-Region with other provinces, are the N12 and N4 highways.

The investigation of the background (section 7.2.1), nodes and corridors (section 7.2.2), population distribution (section 7.2.3) and economic contributors (section 7.2.4) a clear urban hierarchy can be seen with three metropolitan cities at the top tier and then, a large gap towards the secondary cities. The Gauteng policies, lack in clear indications and objectives to plan for an even distribution of hierarchy (section 7.2.5).

The next chapter will mainly recommend the use of urban systems as a spatial planning instrument. The recommendations will take into account the theories (Chapters 3 and 4), international case studies (Chapter 5), national policies and legislation (Chapter 6) and the case study of Gauteng City-Region (Chapter 7).

SECTION 4: SYNTHESIS

CHAPTER 8: DISCUSSION AND RECOMMENDATION

8.1 Introduction

The study is based on four research objectives (Section 1.3), that were addressed using a pragmatic paradigm approach in both literature and empirical studies by using quantitative and qualitative data (Section 2.2).

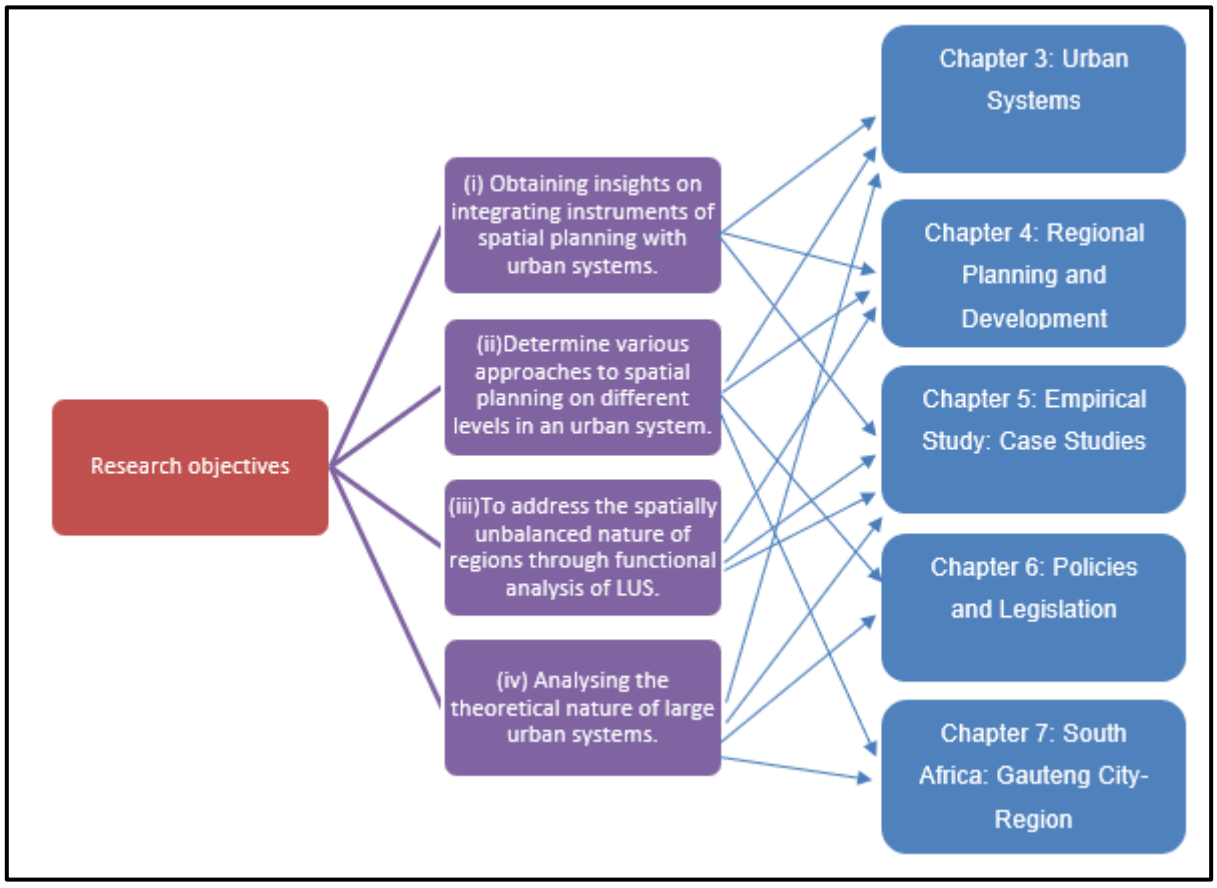


Figure 8-1: Addressed research objectives in the outline of the study

Source: Own compilation

The study is divided into four sections.

Section 1. Contextualisation gave an oversight of the objectives of the study (Chapter one) and the way in which it will be focused on several theories (Chapter two).

Section 2. Literature review, discussed various spatial planning and development theories, including urban systems (Section 3.2.2 and 0), regional urban system (Section 3.5.2), regional

development theories (Sections 4.3 and 4.4), and different hierarchical orders and spatial distributions of settlements within regions (Section 3.4).

Section 3. Empirical analysis Chapters 5–7) analyse three international case studies (focused on various policies undertaken on a national- (Sections 6.2 and 6.3), and regional (Section 7.2.3) scale to promote urban systems as a spatial planning tool. These policies are assessed in order that the researcher, with the knowledge needed, provides recommendations on the use of policies promote urban systems as a spatial planning tool

Section 4. Synthesis.

8.2 Synthesis

The theoretical and empirical findings of the study will be reviewed separately (Sections 8.2.2.1and 8.2.2.2) as well as jointly in this section. The synthesis will give a summary of the combined theoretical results of the urban system (Chapter Three), regional planning and development (Chapter Four), as well as explain the function of the various theoretical sections and the influence on the study and the study's goals. The common thread that connects the three topics is the function of an urban system as a tool for spatial planning. Although there is no direct connection between these themes, it does have an indirect effect on the spatial dynamics of a location.

8.2.1 Purpose

The study's objectives were

(a) to obtain insight on integrating instruments of spatial planning with urban systems;

(b) to determine various approaches to spatial planning on different levels in the urban system;

(c) to address the spatial unbalance nature of regions and

(d) to analyse the theoretical nature of large urban systems.

The main aim is to analyse theoretical and practical approaches for large urban systems as a strategic planning tool in the Gauteng City-Region.

8.2.2 Findings

8.2.2.1 Literature

The components used as instruments all contribute to the development of the region, therefore the employment of spatial planning tools (Chapter 4) is essential in this research. The spatial planning tools examined were nodes, corridors, and planning regions (Section 4.4 and 4.6). Each tool in its own way contributes to building and directing a region's structure and progress in order to fulfil a particular goal. In order to comprehend how planning tools are employed in a region to support a specific structure or growth direction, the fundamental theory, development, influence, and dynamics of each spatial planning tool are examined.

The urban system is linked by several authors to a well-established network and systems of spatial human behaviour and preferences over time (Pumain, 2006:300). When urban systems grow and change through time in regional, international, and global spatial systems, many urban systems and dynamics are likely to appear. To link the literature on urban systems and their operation to the subject of this thesis, the urban systems in developing countries are discussed.

The urban hierarchy refers to the hierarchical distribution and interaction between nodes of a certain size, according to the urban systems literature (Section 3.2). Each of these nodes has its own distinct purpose and dynamics in the hierarchical differentiation. Apart from socio-economic criteria and population size, the interaction and relationship between the different nodes in a region affects the urban hierarchy.

For the purpose of this study, the regional urban system is referred to and examined. It is found that the number of connections or interactions between nodes significantly correlates with the range of goods and services offered in nodes or specific neighbourhoods with a distinctive service offer (urban hierarchy). It is also common practice to organise cities according to only population density. These perspectives, tactics, and dynamics of an urban hierarchy must be considered and put into practice as a fundamental instrument for spatial planning in order to achieve regional balance.

The node was the first spatial planning tool investigated (Section 4.4). Nodes are areas in a region where activities are concentrated and where development and expansion take place (Weber, 1909:34). The evolution and role of a node are linked to its use as a spatial planning instrument. Nodes are defined in a given setting to encourage the introduction of activities that will help the region expand and develop naturally.

Corridor was the second spatial planning tool investigated. The most significant of all the instruments analysed are nodes and corridors, which cannot be separated from one another. The interplay and combination of nodes and corridors is an important factor to consider. A corridor's growth and dynamics are influenced by various factors. It is significant and might play a critical role in regional development. A corridor's connecting function is to establish connection between distinct order nodes and areas within a region (Geyer, 1989:123). Corridors oversee guiding development and growth towards newly recognised nodes in a spatial system, both within and externally. Nodes and corridors of Gauteng City-Region was discussed in section 7.2.2.

The final spatial planning technique mentioned was planning regions. This thesis mainly focuses on the development and application of planning at the regional level. The study's conclusions include that planned regions are places where growth is being planned for, in order to guide the particular region's development in the desired direction. The study unequivocally establishes that whereas economic growth refers to nodal economic production whereas investment, geographical development relates to a region's node distribution. All of the current regional planning initiatives and objectives that are covered in this thesis work toward improving a region's spatial and economic balance.

In order to promote spatial balance in a region and prevent it from taking on an imbalanced spatial form, the various spatial planning tools that were explored, are being used in specific defined territories. This chapter explores the process of regional delineation and clarifies the importance and function of corridors (Section 4.5). The many approaches examined for regional delineation serves as a guide for the process of delineating the various regions. The study unmistakably demonstrates that although economic growth refers to nodes' economic contribution and investment, geographical development of a region refers to nodes' dispersion.

The urban hierarchy, which emerges from the expansion and development of a region, serves as the thesis's last theme and is a major contributor. Given how closely related these two ideas are to one another, the topic of urban systems and urban hierarchy was integrated into one chapter (see Chapter 3). As previously stated, the case studies used in this study includes both developed and developing countries (Sections 3.2.2 and 0) in order to gain a better understanding of the

policy design process and policy implementation of different countries, and to recommend guidelines for Gauteng to promote urban systems as a spatial planning tool.

It was discovered in Section 4.3.3 that there is a differentiation in urban systems. Urban systems are differentiated in order to examine and express various levels of urban systems spatially. Each node, whether it is a central or noncentral location, fulfils a specific role in the area, with an effect on the urban hierarchy. The central and non-central places are discussed in the light of these findings and to better comprehend the dynamics of the various types of places (Sections 0, 3.3.2 and 3.3.3).

One of the primary problems with strategic planning, according to the analysis of the link between these instruments, is that the techniques and models now in use tend to oversimplify the operation and dynamics of the urban hierarchy within a region. The urban hierarchy from a regional perspective and sub-continental size is referred to and investigated for the purposes of this research.

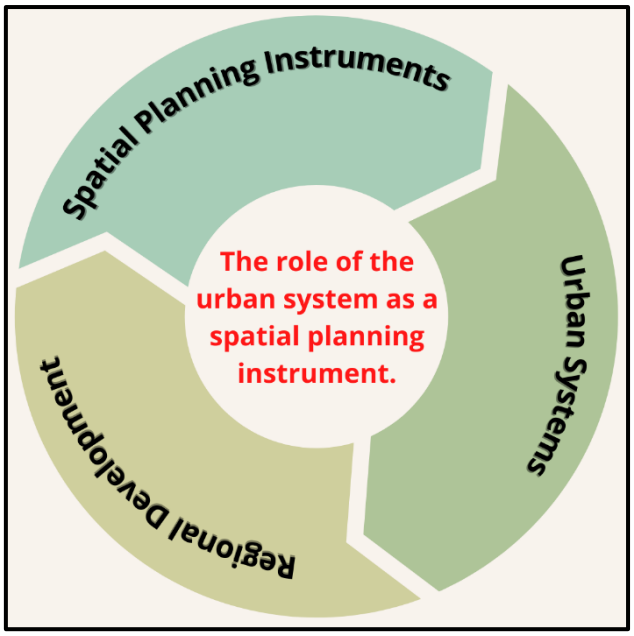


Figure 8-2: The relationship between the literatures and the role of an urban system as a spatial planning instrument

Source: Own compilation

Combining these three instruments could promote a relative regional balance. Promotion of said regional balance, the region should use an integrative approach that combines spatial planning instruments, urban hierarchy, and regional development. The role of an urban hierarchy and urban system as spatial planning tools are discussed in this section.

As a result, this research slightly modifies the literary principles that are now applied. The principle, the existing application, and the suggested changes in the new integrative approach to urban hierarchy as a spatial planning tool are shown in Table 8-2 in Section 8.3.

8.2.2.2 Empirical

The case studies reveals that the developed country had a broad economic sector that was mostly focused on tertiary economic activity and commerce When creating policies, a robust public engagement process (co-design)is also used. Then again, the developing country takes a strong top-down approach, focusing on spatially focused investment possibilities to correct the geographical distribution. As communities and other stakeholders challenges the frameworks, the strong top-down approach results in various social issues.

Rising nations' strategies emphasise secondary and tertiary economic activity as part of their efforts to diversify their economies (refer to Section 5.2.1.2.2 and 5.2.2.2.2). South Africa, however uses a top-down strategy for developing and implementing policies and frameworks, concentrating mostly on primary and secondary activities (see Sections 7.1.1 and 7.2.4). Examining economic sectors, policy design, and implementation, Table 8.1 illustrates the similarities and differences across the countries under consideration:

Table 8-1: Comparison between case studies

	Australia Capital Territory	Greater São Paulo	Greater Gaborone	Gauteng City-Region
Country	Australia (developed country)	Brazil (developing country)	Botswana (developing country)	South Africa (developing country)
Main economic sector	Agricultural and Forestry, Construction and Public administration and Safety.	Services, Public administration services and Industry.	Mining, Tourism, agriculture, foreign investment and manufacturing	Finance, Real-estate and Business.
Population distribution (the distribution of population in the largest cities in the various case studies)				
Policy Design	Bottom-up approach	Top-down and Bottom-up approach	Bottom-up approach	Top-down approach
Policy Implementation	Global, national, city-regional, and local governance sectors are all becoming integrated.	Implementation is primarily based on national policies.	The spheres of national and provincial government are combined.	The spheres of national and provincial government are combined.

	Australia Capital Territory	Greater São Paulo	Greater Gaborone	Gauteng City-Region
Urban hierarchy as instrument	Canberra's citywide distribution of centres is a clear hierarchy that has historically served as the foundation for its spatial design. Canberra is continuously implementing the differential urbanisation	Brazil exhibits an urban structure that is strongly hierarchised and created through a self-organiing process. The system as a whole is characterised by a separation between cities that are developing faster.	Gaborone exhibits undesired “megacity” tendencies, according to the ever-increasing urban hierarchy, that continues to dominate the urban hierarchy, in other word a clear outlier in the hierarchy is observed. An objective of Greater Gaborone is to improve the hierarchy.	A very unbalanced urban hierarchy is clear in this case study, with three large metropolitans at the top of the hierarchy and a large gap between secondary order cities and thereafter a large group of rural areas. The hierarchy mainly focus on the metropolitans, creating even bigger space between the hierarchical levels.
Urban systems approach as instrument	When it comes to urban systems, this suggests that the ACT has a well-integrated spatial distribution system. The spatial system is balanced across multiple hierarchies and the city-rural division is satisfied.	The Brazilian city system is characterised by the inherent dichotomy between small and big. Focus is given on rural communities leaving the potential and development of primary cities behind. The focus on urban system in São Paulo has not yet been clear.	All legislation and frameworks applicable to Greater Gaborone mentioned the importance of planning for the urban system. It is clear that the Greater Gaborone sees the importance of urban systems as a spatial planning tool. The metropolitan receives major focus on being the metropolitan node and less focus is given on the secondary-, tertiary level- and rural nodes.	An urban system is clear in this case study, individually in each metropolitan, no clear indication is given that the entire region is viewed as an urban system. Future opportunities to implement the region as a system as a whole lies in the transport system.

Source: Own compilation

The differences and similarities between the nations studied are depicted in Table 8-1 . It is clear that the developed country (Australia, specifically Australia Capital Territory) takes a bottom-up strategy to development, with a strong emphasis on improving infrastructure and economic development. Canberra has a strong planning principle towards the urban system and currently focuses on differential system planning. Brazil (Greater São Paulo),a developing country, is primarily concerned with economic diversification and co-operation among various government areas and entities. São Paulo has decline in attention towards growth and more attention to growth is given to the rural communities. There is a clear hierarchy, but the different levels do not depend on each another. South Africa focuses primarily on social development, and addressing spatial imbalance, while also attempting to increase administrative efficiency. This demonstrates that merging diverse domains of governance in South Africa is a difficult task. The Gauteng City Region policies (Section 6.3) has comparable development goals to South African legislation.

When the above empirical and theoretical sections are viewed in an integrated manner, the following is evident.

(a) There is a more prominent, strong urban system in Canberra district, because the focus on urban hierarchy is clear in all government spheres, thus the integration of legislation on various planning levels, with a focus on urban hierarchy and how to improve the distribution thereof.

(b) It is evident that all regions discussed in this study, have prominent metropolitan city(ies) at the top of the urban hierarchy, but lack in reaching evenly distributed urban hierarchies, because the legislation continued to focus on the metropolitan cities and no co-planning with secondary and tertiary level cities.

(c) It is important to use the various spatial planning instruments (Sections 4.4 and 8.2.2.1) for hierarchical levels, for example, the hierarchy of nodes, corridors and regions.

8.3 Recommendations

8.3.1 General principles

Promoting urban systems as a tool for spatial planning can be done in a methodical way by initially linking spatial research and strategic spatial planning to the goals and policies that need to be implemented. Thereafter spatial governance is used to ensure that the spatial policies are carried out. More information on this approach will be provided in Section 8-2-3.

Table 8-2: Literature theme, application and proposed alterations

Concept	Current application	Proposed alteration	Impact on Gauteng City-Region
Spatial planning instrument			
Node	Nodes have a high density of mixed uses that are situated near busy access points.	To achieve balance in a region, investment nodes should be identified after potential has been assessed.	Combining and applying these spatial planning tools collectively so as to produce balanced regional growth is the function of an urban hierarchy as a spatial planning tool. The first level nodes and corridors have extreme potential in Gauteng City-Region to contribute to the increase in the secondary and tertiarylevel nodes and corridors. Highway R21 is a primary linkage between the three metropolitan cities (Johannesburg, Soweto and Pretoria). From these primary linkages, the secondary linkages (highways N1/N4/N12) are neglected for development. Corridors are very important tools to increase the functionality of the urban system and therefore more focus should be given to lower-level corridors and attract economic activities around the secondary and tertiary level nodes. Urban hierarchy as a tool for spatial planning could help to maximize the potential of node, corridor and region individually and ensure its implementation in regional planning.
Corridor	A region's nodes are connected by a linear development plan with high land use density.	To build a high-quality urban or regional environment, encourage the creation and accessibility of economic and social opportunities.	
Region	Planning ahead to determine preferred sites and development trajectories.	A planning region's ability to function properly depends on its movement network.	

Concept	Current application	Proposed alteration	Impact on Gauteng City-Region
Regional Development			
Regional development phases	Paradigms like Rostow and Rostow's (1990:16), the stages of regional development, and the core-periphery placed an emphasis on integrated regional policy, innovation, research, and development, as well as investments in human resources and infrastructure.	Pay close attention to Rostow and Rostow's (1990:16) development stages, which can be used to gauge the region's level of growth.	Determine the detailed development phase of the region’s relative development phase, relevant to the time frame of forward planning (regional plans).

Concept	Current application	Proposed alteration	Impact on Gauteng City-Region
Urban systems			
Urban system	The urban system (dynamics) of a region is directly impacted by the rank and size of settlements or nodes.and frequently depends on the population density of a specific node or region.	Using the urban system as a tool for spatial planning is made possible by the role and function of the urban hierarchy.	Should be used as a key tool in spatial planning to strengthen connections between locations, create balance in an area, and determine long-term investment and development goals for the country. The main connection between the three major cities is Highway R21 (connecting Johannesburg, Soweto and Pretoria). More attention can be givento secondary-level corridors (Figure 8-3, especially corridors connecting Johannesburg and Krugersdorp, Johannesburg and Benoni and Johannesburg and Springs to draw economic activity to the secondary nodes (Figure 8-3), especially Benoni and Tembisa which will distribute the hierarchy more evenly since corridors are crucial tools for improving he functionality of the urban system.
Central and non-central places	The study of central and non-central locations within a region helps define urban hierarchy.	Revealing the potential of the urban system as a tool for regional planning, is crucial to investigate the locations of various types of sites within the urban hierarchy and the relative influences.	

Source: Own compilation

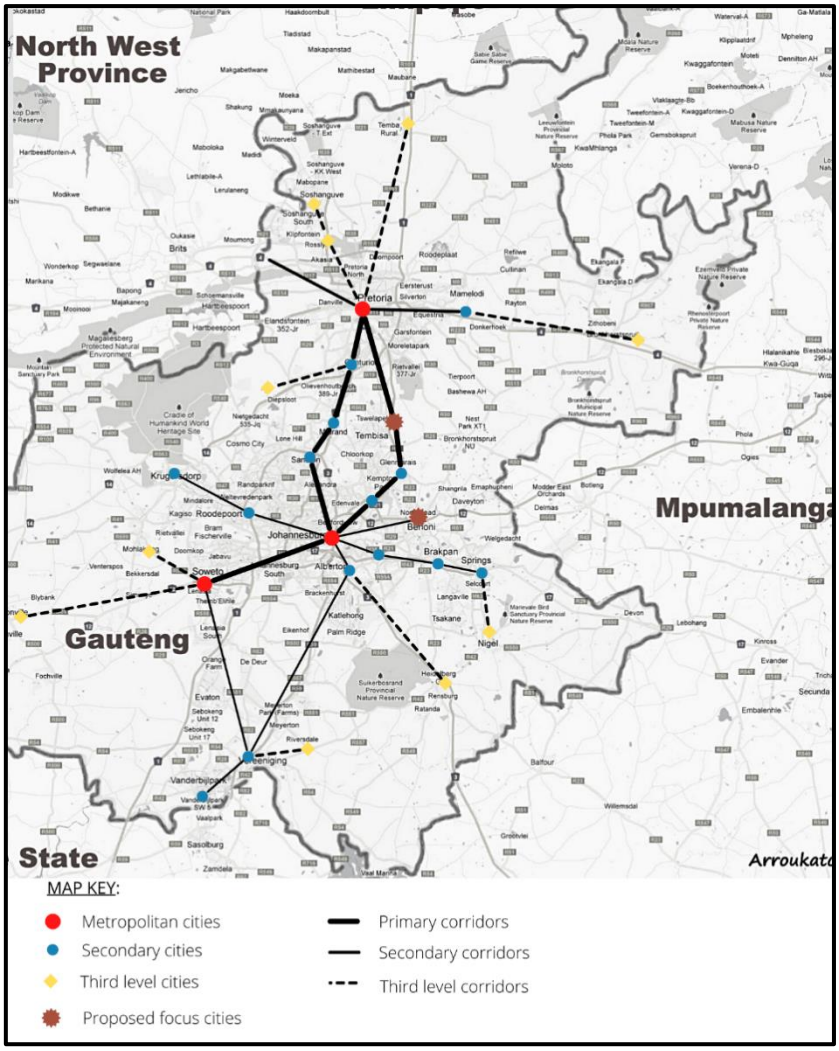


Figure 8-3: Hierarchy of Gauteng nodes and corridors and proposed focus areas

Source: Own compilation

The purpose of Figure 8-3 is to summarise the key topics of the literature used, how it is currently applied, and to suggest modifications and additional applications to provide a more comprehensive approach.

8.3.2 Spatial governance

Governance is intrinsically tied to interaction processes and the decision makers who develop and carry out policies. In order to support urban systems as a tool for spatial planning, it is crucial to recognise and understand the specific government's duties in policy planning given that it has the power to distribute resources and provide services. Additionally, there are three levels of government: national, provincial, and municipal. All of these areas are significant in the formulation and implementation of spatial development-oriented strategic policies (see Sections 3.5, 4.2, 6.2.1, 6.2.1.4, and 6.3.1).

A comprehensive planning strategy is necessary in the policy-making process at all levels of government (national, provincial and local level). Additionally, in order to enhance the policies to be implemented, it would be crucial for the government to encourage and boost community engagement. A bottom-up approach needs to be implemented, as observed in the case of Australia (Section 5.2.3.2.3). The identification of appropriate stakeholders to involve in the process, is the most important step. Professional stakeholders with knowledge of the specific field is proposed to start the first level of inputs from the public. After circulating the draft policy to these stakeholders, considering and taking into account their opinion. Thereafter only meetings with specific stakeholders invited, can be scheduled. These, various stakeholders, might even be outside the specific field. Finally, an open meeting regarding the policy in various affected areas needs to be scheduled where questions can be asked, and inputs and concerns can be shared. This proposal involves an interactive approach and institutional approach (Sections 4.6.3.3 and 4.6.3.1).

To build initiatives, top-level strategic policy intervention is essential. Collaboration across all government spheres and departments, as well as between various stakeholder groups and regions, is essential for a successful long-term strategic framework. This will improve the function of the urban system, particularly as a spatial planning tool. Regional government sectors face difficult circumstances since government spheres and are prone to low integration Aside from the poorly integrated domains of government, the many entities presented within each sphere of government also have problems with integration. SPLUMA (refer to Section 6.3.1) and its references to the Intergovernmental Relations Framework Act (13 of 2005) was implemented in order to achieve greater integration of the various governmental realms, although its implementation remains difficult.

It is recommended that the government spheres encompass the following functions and responsibilities:

- National Government Sphere

The National Physical Development Plan (South Africa, 1975) was ideologically founded, but the goal of creating balance between regions in the national spatial system, as well as the way regional planning instruments were used, was a significant step forward in terms of national regional planning.

The National Development Plan, 2030 (South Africa, 2011) offers a number of recommendations for spatial development in South Africa, such as an emphasis on economic resilience by boosting exports and creating sustainable areas. It also covered improvements and spending in the

infrastructure sector. Making provision for an inclusive rural economy, and a number of ideas were found to boost investment in the Agri-processing industry, as well as the agricultural sector. As it integrates with ideas from the IUDF to develop solid and effective planning systems, this would help improve South Africa's population distribution and human settlements.

The National Spatial Development Framework (NSDF), 2020, that assigns various tasks to the national, regional, and local domains of government, is in its final draft stage. This policy was recommended by the Spatial Planning and Land Use Management Act (16 of 2013) and the National Development Plan (South Africa, 2011). The creation and implementation of the NSDF is crucial because SPLUMA was developed to address a number of spatial problems (see Section 6.3.1) brought on by the apartheid government. Referring to the compilation of SDF's, it also gives numerous recommendations and will provide spatial guidelines on a national scale.

All of the national frameworks and policies mentioned above (and Chapter 6) include some elements and ideas related to the urban system. However, since the regional spheres rely on these documents when creating their own regional frameworks and policies, more precise principles and ideas ought to be investigated and incorporated. Additional information should be provided before these frameworks and policies are put into effect, particularly when it comes to SPLUMA as it aims to enhance the integration of the many government domains. The integration of various urban systems in terms of spatial planning is a shortcoming in most of these policies.

The National Spatial Development Framework (2020) needs to indicate primary, secondary and tertiary level cities and corridors within an urban system which need to receive more attention regarding planning. This will increase the integration between secondary and tertiary level cities, but the hierarchical order will still remain. Another proposal is to improve the integration between the metropolitan cities, not in terms of economy and population or even transportation, but the legislative documents of spatial planning. The Gauteng City-Region urban system needs to be guided by the three metropolitan areas. Without co-ordinated policies, movement in the same direction will not take place. Canberra City district (refer to 5.2.1.2) is a good example of how policies are integrated on national, regional, provincial and local spheres. It (refer to 5.2.1.2) also focuses on differential urban system, that helps planning for secondary and tertiary level cities.

8.3.3 Spatial distribution incentives

Spatial research is necessary to comprehend Gauteng City-Region’s spatial characteristics and distribution. It is important to look into a region's current situation in order to determine its strengths and shortcomings. This is regarded as a form of preliminary planning for the following stage of strategic spatial planning. It includes the principle of economic contribution to be included

in regional analysis and urban system determination. Economic contribution analysis can be carried out in a theoretically sound and data-driven manner using an economic based social accounting study that is carried out concurrently across all sectors of the regional economy. This method may be carried out using easily accessible and typical data methods, thereby enabling contributions for non-traditional elements of the economic base (households, government transfers, etc.) to be accounted for in a consistent and theoretically sound manner.

The difficulty in determining a region's functionality arises as a result of the physical interconnection of both systems and sub-systems as a disruption in the system that affects more than a single part (one city or settlement). As mentioned in Section 3.4 and 7.2.7, population distribution is a potential method to determine a city’s level in the hierarchy.

South Africa is a developing country which tends towards primacy distribution that poses a number of spatial and economic issues. Policy interventions are used to focus on spatial targeting and is necessary to improve spatial layout with regards to the population distribution creating balanced spatial planning. Gauteng City-Region is a primary focus on primary cities.

The contributing factor of population distribution in South Africa regions is prominent. Bearing in mind that Gauteng City-Region’s policies invest more in secondary cities than the three metros’ (as proposed in Section 6.3 and 7.2.6). This can be seen in Figure 8-4, where the increase in the secondary cities’ population with 200 000 people, through an incentive scheme. Based on the population growth (3%), the largest city in Gauteng (Johannesburg) will have an estimated population increase of approximately 200 000 inhabitants, by 2025.

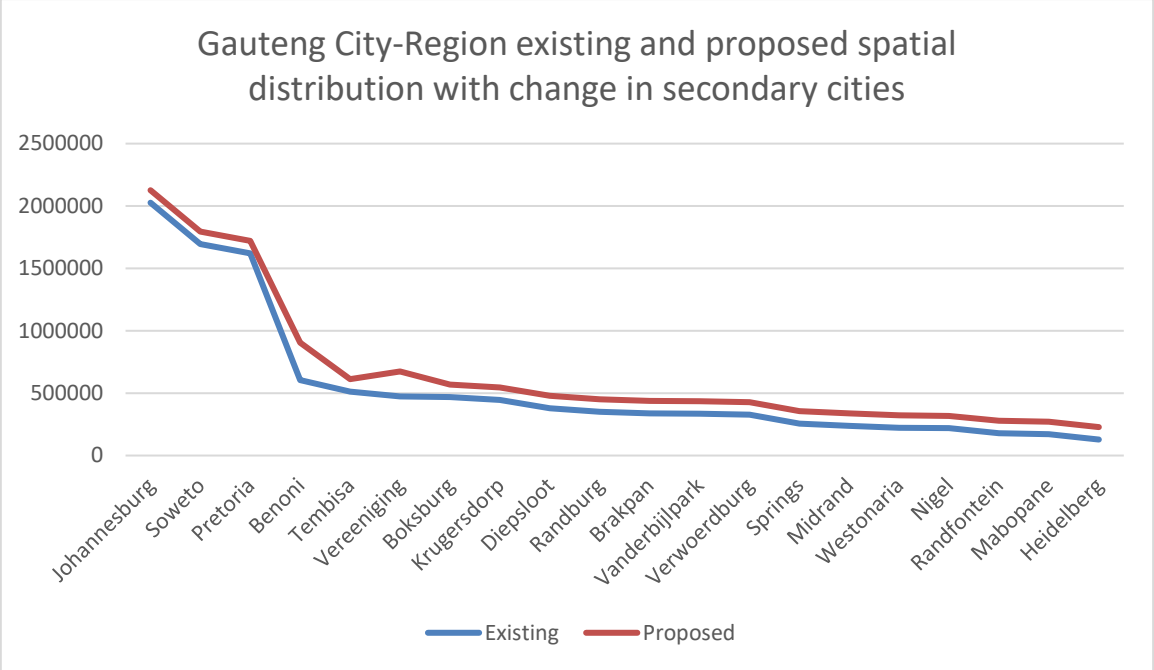


Figure 8-4: Gauteng City-Region's existing spatial distribution and spatial distribution with proposed 200 000 new inhabitants in Benoni and Vereeniging

Source: Own compilation adapted from Statistics South Africa (2021)

Figure 8-4 depicts the alteration of South Africa's spatial distribution when government activities focus on the provinces' secondary cities (mainly Benoni, and subsequently Vereeniging). Figure 8-4 depicts the targeted investment in Benoni and Vereeniging. These cities will have better results in better spatial distribution, which will improve South Africa's entire urban system, impacting the unbalanced spatial planning currently occurring. Even though Thembisa is a secondary city between Benoni and Vereeniging, it has no economic foundation, only a large population and is therefore the next city where traditional economic cores will be proposed.

Where secondary cities are found and focussed on a more effective solution appear since it would be easier to implement and would greatly narrow the gap between the primary and secondary cities. From Figure 8-3 and the development objectives of Canberra (Section 5.2.1.2.4) different urban systems Section 4.3.3), will help amend the urban hierarchy of the Gauteng City-Region and the region would therefore be enabled to function as an urban system that will substantially influence the spatial planning. This is a reformation of agglomeration economies which has the advantages that occur when businesses and people group together in cities and industrial clusters. This proposal will decrease travel costs and time and it may increase the overall quality of the resident's lives.

8.3.4 Strategic spatial planning

The procedure represents a bottom-up approach for strategic planning. During the empirical research (Section 8.3.1) the recommendation was made for the Gauteng City-Region putting measures in place to attract population to secondary cities in order to balance population distribution. This proposal involves the collaborative approach (Section 4.6.3.2)

The goal of this study as stated in Section 1.3, was to promote urban systems as a spatial planning tool and as a result, recommend the implementation of recommending policy alterations in four specific categories.

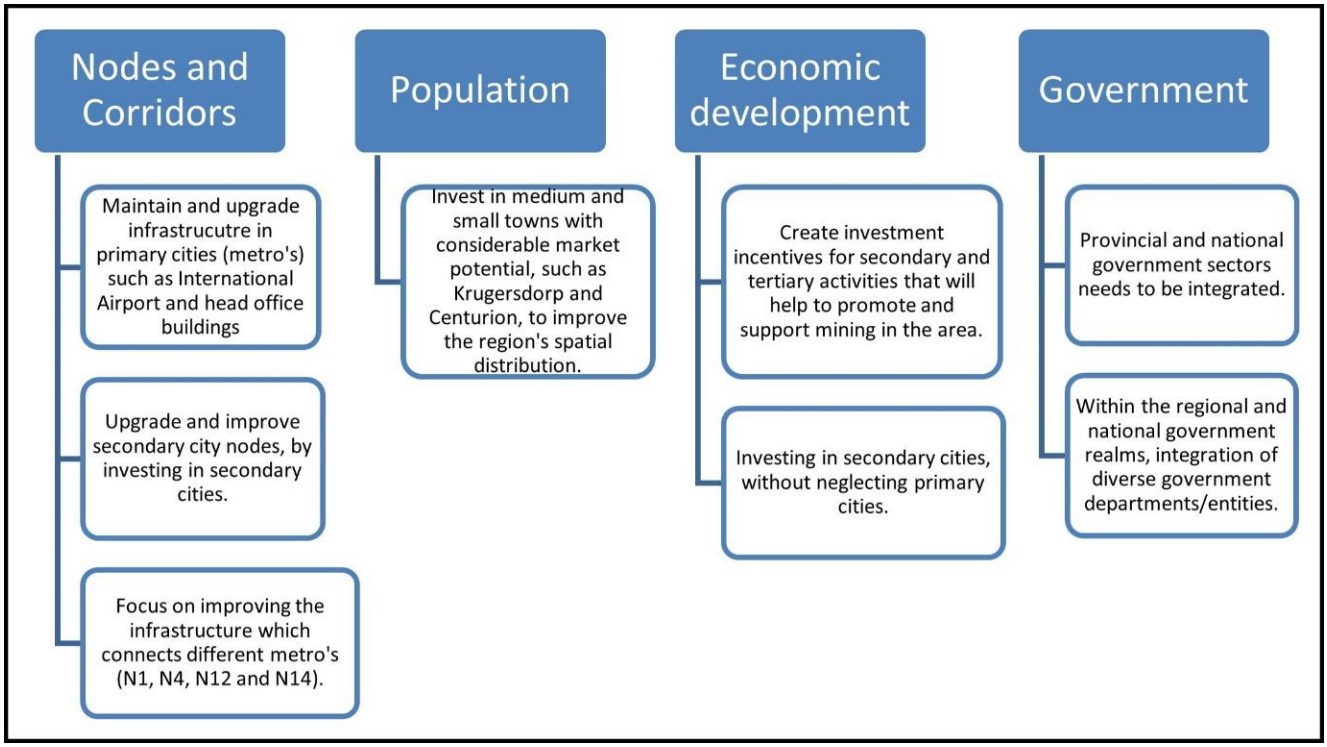


Figure 8-5: Policy recommendations for the Gauteng City Region Development policies

Source: Own compilation

Gauteng has a major imbalanced population distribution, which alternate a clear hierarchy of primary and secondary cities. The highly dense metro's is under major strain to keep up with the daily growth and increase of demand in services and infrastructure. Focusing the economic hub on these metro's alone, representing the majority of employment opportunities, puts immense strain on the transport and social system of the inhabitants. The result is more congested roads that cause inhabitants to take longer to drive from work to home, and vice versa.

The functionality of the urban system as a spatial planning tool will potentially be effective if there is more clear integration between the relevant policies and legislation.

All three strategic spatial planning approaches discussed in Section 4.6.3 were used to make the various recommendations in the above section.

8.4 Limitations of the study

The study had a number of limitations. It was not possible to compile comparable statistical data for the international and national case studies. Recent datasets and statistics were not comparable in all the case studies. Using functional classifications of areas would have been extremely beneficial, because it would have provided a distinct viewpoint on different hierarchies. Comparing regions across national scales proved challenging. In the future, more information, including economic functions, could be combined with population numbers to construct more precise hierarchical rankings.

8.5 Recommendation of future research

In relation to this study, the researcher indicated the following areas for future research:

(a) The research might be replicated in other nations to see how effective these hypotheses are.

(b) The research could be boosted by considering the towns' functional index, that includes its economic size and contribution.

(c) The study area might be expanded to include the entire urban system of South Africa.

(d) A new, more focussed, way of categorizing the urban hierarchy can be developed.

8.6 Conclusion

To promote spatial planning in urban systems, this study advocates a top-down approach with bottom-up components, as well as spatially focused interventions. The synthesis section of the chapter includes the integration and discussion of the research’s aims and objectives, methodology, approach, literature, and empirical inquiry. Proposed interpretations to the literature foundation were offered, which might be used in a variety of study fields. This research creates a platform for other interpretations of the applicable themes by advocating various ways of interpreting these principles.

This chapter's summary was followed by a study and investigation of the function of an urban system as a tool for spatial planning from a regional perspective. A more balanced distribution of nodes could be created using an urban system-approach, possibly leading to a more spatially balanced zone. An integrative strategy in regional planning should be founded on suitable regional planning tools, representing the physical structure, social, and economic features of the region, for holistic planning.

It has been shown that an integrated approach to urban system for regions in a certain development phase (where spatial planning instruments and urban systems are used in combination) should be considered to create regional balance to achieve the objectives. Regardless of national boundaries or data limitations, this approach gives distinct insights based on concepts in literature and various datasets. The urban system as a spatial planning tool could be used in conjunction with other tools to identify potential regions for development.

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