

The role of infrastructural development and economic growth in spatial planning

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Abstract

This study is about the influence that infrastructure development can have on the economy. In the current age of globalisation it is necessary to develop constantly to prevent becoming insignificant in the world economy. It is not enough to let development take its own course anymore, the government and private investors must cooperate to accelerate development or else stand the risk of falling behind. South Africa is trying to move from a Third World country to a First World country. Although some of the regions have developed successfully and show the characteristics of a First World country, large parts of the country are still examples of a Third World country. The reason that the Western Cape Province, for example, is moving forward so rapidly and showing an ever increasing Gross Domestic Product (GDP), is the fact that they have realised the importance of infrastructural investment. Without investing in infrastructure, the economy will be unlikely to grow. This is because there is a positive correlation between infrastructure expenditure and the GDP. While a part of South Africa is focusing on Strictly Social Overhead Capital (SSOC), which entails the development of people, the Western Cape has put more emphasis on Economic Overhead Capital (EOC) such as building roads, bridges. It is argued in this research document that investing in EOC will increase economic growth that will help the region become more developed. If the whole country inherits this approach, it is probable that South Africa remains relevant and even become more competitive in the world economy. When investing in infrastructure the region will maintain their agglomeration advantages and create more comparative advantage ensuring that agglomerations form. Agglomerations form because it is more advantageous to locate at a certain location due to cheaper total costs at these locations. One of the greatest factors influencing an investor's locational preference is transport costs and therefore transport costs must be held to a minimum. Spatial planning must be adjusted in order to ensure that EOC receives the necessary attention. This study will show how this can be achieved.

Opsomming

Hierdie studie handel oor die invloed wat infrastruktuurontwikkeling het op die ekonomie. In die huidige toestand van globalisasie is dit van kardinale belang om voortdurend te ontwikkel om sodoende globale onbelangrikheid te voorkom. Dit is nie meer genoeg om ontwikkeling sy eie gang te laat gaan nie, die regering en privaatinvesteerders moet saam werk om ontwikkeling te versnel, anders gaan mens gou agter raak. Suid-Afrika is besig om te poog om te ontwikkel van 'n Derde Wêreldland na 'n Eerste Wêreldland. Alhoewel sekere dele alreeds suksesvol ontwikkel het en die eienskappe van 'n Eerste Wêreldland vertoon, is die grootste deel van die land steeds 'n voorbeeld van 'n Derde Wêreldland. Die rede hoekom die Wes-Kaap byvoorbeeld besig is om so vinnig vorentoe te beweeg en hul Bruto Binnelandse Produk aanhoudend positiewe groei toon is omdat hulle die belangrikheid van infrastruktuur investering ontdek het. Sonder investering in infrastruktuur is die kans dat die ekonomie sal groei baie skaars. Dit is omdat daar so 'n groot positiewe korrelasie is tussen infrastruktuur investering en die BBP. Terwyl 'n groot deel van Suid-Afrika fokus op SSOC (Uitsluitlik Sosiale Oorhoofse Kapitaal) wat mensontwikkeling en die voldoening aan menslike behoeftes behels, het die Wes-Kaap meer klem gelê op EOC (Ekonomiese Oorhoofse Kapitaal) soos die bou van paaie, brûe ens. Investering in EOC sal ekonomiese groei verseker wat weer die area sal help om te beweeg van ontwikkelend na ontwikkel. As die hele land hierdie benadering sal aanneem sal verseker word dat Suid-Afrika relevant bly en selfs meer mededingend raak in die globale ekonomie. Wanneer 'n streek investeer in infrastruktuur sal agglomerasievoordele behou word en verdere betreklike voordele sal geskep word wat sal lei tot die vorming van agglomerasie-ekonomieë. Agglomerasies vorm omdat dit meer voordelig is om by sekere bestemmings te vestig as by ander as gevolg van laer totale kostes. Een van die belangrikste faktore wat vestiging beïnvloed is vervoerkostes en daarom moet vervoer kostes tot 'n minimum beperk word. Dit is kortliks hoekom dit van absoluut kardinale belang is om in infrastruktuur te ontwikkel. Hierdie studie sal bewys dat ruimtelike beplanning aangepas moet word om meer klem te lê op EOC en sodoende vinniger ekonomiese groei te bewerkstellig.

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Definitions and terms

- *Comparative advantage* – The name for the ability of one business entity to engage in production at a lower opportunity cost than another entity (ANON, 2011b).
- *Economic infrastructure* – That part of an economy's capital stock that produces services to facilitate economic production or serves as inputs to production (DBSA, 2007:4).
- *Globalisation* – Globalisation is the process of integration of the world community into a common system either economical or social (Archytas, 2002).
- *Gross Domestic Product (GDP)* – This is the total value of final goods and services produced within a country's borders over a specified period (normally measured annually) (NSDP, 2006:23).
- *Human Development Index (HDI)* – A tool developed by the United Nations to measure and rank countries' levels of social and economic development based on four criteria: life expectancy at birth, mean years of schooling, expected years of schooling and gross national income per capita, (ANON, 2011a).
- *NSDP* – National Spatial Development Perspective. A planning document that typically provides a rigorous multidimensional analysis of the space economy of a specific administrative area with a view to understanding poverty, economy, environment and migration trends and issues in spatial terms, (NSDP, 2006:24).
- *Social infrastructure* – Provides services such as health education and recreation and has both a direct and indirect impact on the quality of life, (DBSA, 2007:4).

Acronyms

- *BNG* – Breaking New Ground
- *DBSA* – Development Bank of Southern Africa
- *SOC* – Social Overhead Capital
- *EOC* – Economic Overhead Capital
- *GDP* – Gross Domestic Product
- *GDS* – Growth and Development Strategy
- *HDI* – Human Development Index
- *IDP* – Integrated Development Plan
- *MDG* – Millennium Development Goals
- *NMT* – Non-Motorised Transport
- *NSDP* – National Spatial Development Perspective.
- *NWPSDF* – North West Provincial Spatial Development Framework
- *SDF* – Spatial Development Framework
- *SIP* – Strategic Infrastructure Plan
- *SSOC* – Strictly Social Overhead Capital
- *WCPSDF* – Western Cape Province Spatial Development Framework

1. INTRODUCTION

1.1. Introduction

This study is concerned with the impact that infrastructure development can have on the economy. In the current age of globalisation, it is necessary to improve regional competitiveness on a continuous basis. It is important to make use of the limited resources of a country, province or region in the most efficient manner possible. Spatial planning plays a pivotal role in achieving economic growth. There are, however, different opinions as to what constitutes the best way of generating economic growth. Some researchers believe that investing in infrastructure will not help the economy (Crihfield & Panggabean, 1995), while others propound that infrastructure investment is a prerequisite for economic growth in regional planning (Bogetic & Fedderke, 2006; Matthee, 2007; Youngson, 1967). What is necessary in order to bring about economic growth is a subject that has to be further researched, particularly in light of the different opinions found in the literature. This study sets out to clarify the question in the context of South Africa.

1.2. Problem statement

The central problem of the study is: Can more spending on infrastructure help the economy to grow at an increased pace? South Africa finds itself in a situation where more development is needed, but the country is struggling to find the appropriate way of achieving this. While investing in social infrastructure seems to be the norm, investing in economic infrastructure might prove to be more effective. In order to explore this possibility, one therefore needs to consider the following:

- Theories on regional development differ in terms of application and interpretation;
- The objective and character of regional economic growth differ with reference to its interpretation at local and provincial level;
- Those regional planning approaches that will bring about effective regional economic growth in South Africa (this is currently not clear);
- There is a difference of opinion whether infrastructure is advantageous for economic growth;
- It is uncertain what type of infrastructure development will yield significant results.

1.3. Research aims and objectives

This research is concerned with finding effective ways of increasing economic growth through spatial planning. As noted in the problem statement, there are a variety of ways to achieve economic growth and become more developed. Based on the problem statement, the aims of this study are:

- To research the theoretical framework of regional development and economic growth;
- To investigate the South African spatial economy and, in light of this, to determine if South Africa is heading in the right direction and if not, consider changes that must be made;
- To determine the drivers behind effective regional economic growth; and
- To determine the relationship between regional economic growth and infrastructure in South Africa's spatial economy.

A concrete theoretical foundation must be laid before the investigation can begin. By means of this theoretical framework and the related empirical study, the goals stated above will potentially be reached. By the end of this research a measure of clarity will be established regarding what must be done to further economic growth and development, also in terms of a likely way of increasing South Africa's growth.

1.4. Hypothesis

Focused infrastructural investment and development can have a positive effect on regional economic development.

1.5. Chapter division

Chapters two, three and four present the theoretical framework to the study. It is necessary to know what a region entails and how growth in regions takes place before regions can be analysed. Therefore, regional development will be discussed in chapter two. This chapter will include a detailed study of the types of regions there are, how these regions grow, what agglomeration is and how it can help regions, and so forth. Thereafter, an in-depth analysis of infrastructure and transportation and the effects that these have on economic growth will be presented in chapter three. After having explored infrastructure as a factor of economic growth the subsequent section sets out to determine which parts of capital investment will help economic growth and which parts will only constrain it. Chapter four focuses on the transportation section of infrastructure, because of its central role not only for this study, but for

regional development in general. These chapters will form the theoretical basis of this study and will help to substantiate the said findings of the empirical study.

In chapter five, the study focuses on the Western Cape Province. This chapter sets out to present an evaluation of the relationship between economic growth, represented by the GDP, and social and economic infrastructure respectively. The influence that different departments of expenditure have on the GDP is interpreted and a conclusion is presented regarding where, when and how to invest on what to further economic growth in the long run. Chapter six focuses on the North-West Province as an example of a province where infrastructure investment is not taking place efficiently and appropriately. Reasons and solutions for this are subsequently explored.

The final chapter comprises of a conclusion, synthesis and recommendations. In this chapter, a summary of the most important findings in the study is presented, together with basic guidelines on how to adjust the budget in order to advance the economy in an efficient and prudent manner. The hypothesis is addressed by uniting the theoretical basis with the empirical study with a view to form a picture of what the economy can look like with the appropriate initiatives. This study sets out to prove that infrastructure is an important driving force behind economic growth. Proposals on how budgets and spatial planning must be realigned to enhance economic growth are also provided in the final chapter.

1.6. Research methodology

For this study a variety of literature sources has been consulted. Local (Matthee, 2007; Bogetic & Fedderke, 2006) as well as international (Friedman & Weaver, 1979; Hirschman, 1978; Hoover, 1948) theories on growth and development have been consulted with emphasis on literature focusing specifically on infrastructure (Duffy-Deno, 1989; Eberts, 1990). Both hardcopy and electronic resources have been consulted; the literature study helps to ensure a measure of objectivity. The literature study contains classic as well as modern theories of regional development, economic growth models, and opinions about the importance of infrastructure development and the effect that infrastructure development has on the economy. It is important that one should analyse the situation in other countries in order to glean helpful insights that can further growth in the regional economies of South Africa.

The current empirical research is focused on the provincial level. Because of South Africa's structure it was felt best to implement plans like these at a provincial level rather than at national

level, which may be too large and local level too small for purposes of obtaining accurate information. Relevant spatial policies and legislation that guide development and planning in the appropriate regions have been consulted in order to determine their positions on and approaches to development and growth. Data obtained from suitable databases, such as Regional eXplorer, as well as information gathered from annual budgets has been integrated where relevant in order to show the relationship between the GDP per capita for the relevant region and its economic infrastructure and social infrastructure budgets respectively. Finally, interviews with people specialising in this field have been conducted in order to ensure an unbiased view.

2. REGIONAL DEVELOPMENT THEORY

2.1. Introduction

It has been proposed that if an area were to reach its fullest potential, the focus must be shifted away from the core city so that the bigger picture can be evaluated. There are numerous theories on regional development; a number of relevant ones are referred to in the context of the current study. In this chapter, relevant theories explaining how a region develops are explored in order to shed light on where South Africa is currently and how development can help a region. The different phases of development, the importance of creating agglomeration economies for development and the reasons why people choose certain locations are discussed. The difference between balanced and unbalanced growth is also important in order to ensure that there is a good foundation for ascertaining the effect of infrastructure investment.

2.2. Regional economics and growth stages

It is important to understand that every region is unique and, therefore, every region needs to be dealt with separately. However, there are still a number of corresponding issues in terms of standardisation. Regions can be divided into three types. Richardson (1976:19) distinguishes between homogeneous, nodal and planning regions. Homogeneous regions are defined in terms of unifying characteristics where internal differences and intra-regional interactions are considered unimportant. Nodal regions, on the other hand, have little concern for uniformity and are typically concerned with a dominant centre or node to which internal flows, contacts and interdependencies polarise. Planning regions, finally, are regions where the unity derives from political or administrative control. Within these different types of regions, regional growth and economic development take place over time. Rostow (1960, 4-10) explains this growth process in terms of five stages:

Figure 2.1: Rostow's model of development

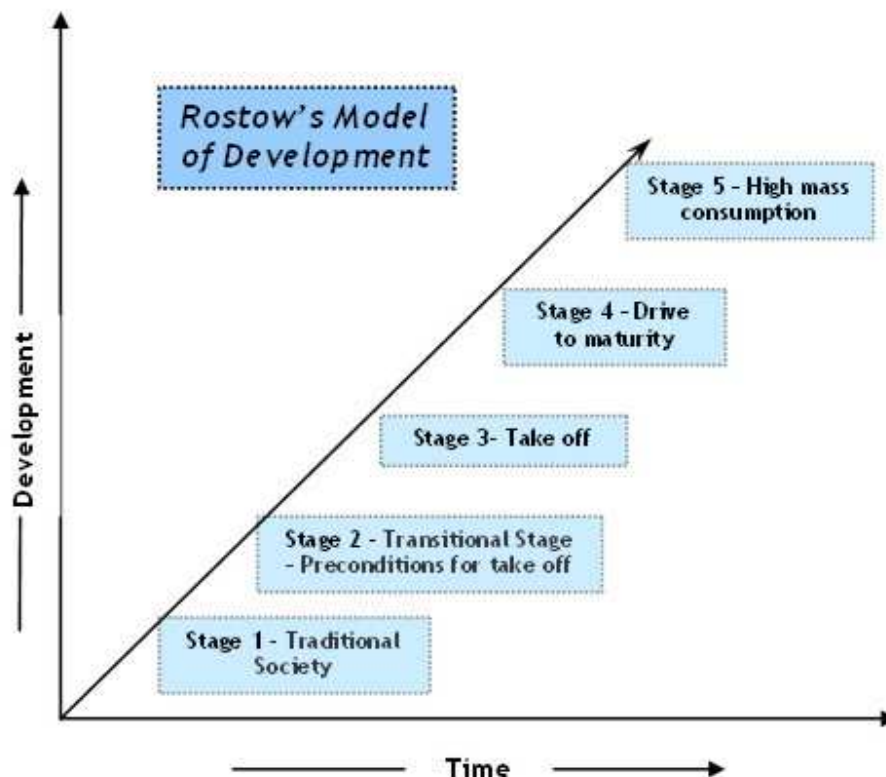


Figure 1: Rostow's Model of Development.

Source: Geography Student BlogSpot (2011)

- The traditional phase - Here the community is “one whose structure is developed within limited production functions, based on pre-Newtonian science and technology, and on pre-Newtonian attitudes towards the physical world,” (Rostow, 1960:4). No interregional relationship exists and productivity is limited with limited trade.
- Prerequisite stage for preamble stage – This stage is the period when the preconditions for take-off are developed (Rostow, 1960:6). Changes are beginning to take place and mobility increases. Inhabitants move away from agriculture and focus more on industrial development. Today outside investment is necessary for a region to proceed from this stage to the preamble stage; the community cannot achieve it on their own steam.
- The preamble stage – Economic growth is foregrounded during this stage. New industries develop at a fast pace while the profits are ploughed back into the region. The region now becomes self-sustained and independent. A lot of investment is necessary for economic growth.

- After preamble to development stage – Industry processes become differentiated and new leading sectors take the place of previous leading sectors: “The make-up of the economy changes unceasingly as technique improves, new industries accelerate, and older industries level off. The economy finds its place in the international economy: goods formerly imported are produced at home, new import requirements develop, and new export commodities to match them. The society makes such terms as it will with the requirements of modern efficient production, balancing off the new against the older values and institutions, or revising the latter” (Rostow, 1960:9).
- Fully developed stage – The focus is now on durable consumer goods. The characteristics of this stage are: “real income per head rose to a point where a large number of persons gained a command over consumption which transcended basic food, shelter, and clothing; and the structure of the working force changed in ways which increased not only the proportion of urban to total populations, but also the proportion of the population working in offices or in skilled factory jobs” (Rostow, 1960:10).

The goal for every region is to proceed from one stage to the next and finally to reach the fully developed stage. There are different ways of achieving this that will be explained further in the following chapters. As a result of globalisation, the world is growing at an ever increasing pace; it is therefore necessary to proceed from one stage to the next as fast as possible. Although a region will theoretically develop from one stage to the next on its own accord, assistance from developed regions will accelerate this process. When leaving a region to develop on its own, it is likely that the region will be left behind in the world economy and will be of no importance to the rest of the world.

According to Richardson (1976:132), regional investment is neglected; the author states that: “The analysis of regional growth is a focal point in a regional economics text since understanding how and why a region grows is critical for the development of effective regional policies” (Richardson, 1976:132). In the neoclassical model¹ the rate of investment in a region is treated as a function of its marginal efficiency of investment (MEI)², with the MEI schedule declining in the usual way since investment projects are undertaken in order, id est the most profitable first. An efficient programme of capital accumulation requires that firms act in order as

¹ The neoclassical model is ‘the process of convergence from an initial capital stock to a steady state growth path’ (King & Rebelo, 1989:1).

² MEI is made under specified conditions and over a stated period of time. A comparison of these rates with the going rate of interest may be used to indicate the profitability of investment (Britannica, 2012).

to equalise the MEIs in all directions. This implies profit-maximising behaviour in general (Richardson, 1976:132-133).

In order to achieve profit-maximising it is important to focus on the inter-dependency between the public sector and private investment. Indeed:

A substantial share of the regional capital stock consists of social and public capital – transportation infrastructure, public buildings and streets, health, education and social-welfare facilities and so on. It is plausible that the scale and spatial distribution of public capital have a substantial impact on subsequent private investment decisions, especially decisions by firms and households (Richardson, 1976:134)³.

According to Richardson (1976:144-146), the problem with regional development is that public expenditure has to be injected in underdeveloped areas with a view to develop these. However, this notion is not properly understood and people tend to rather develop as a response to changes in the economy and to enhance these changes. It has to be remembered that growth in one region is usually at the expense of another. Furthermore, “The basic approach of interregional growth models on this view is that the national growth rate is determined exogenously and the problem is to determine how the given increment to growth will be distributed among regions,” (Richardson, 1976:145). It is therefore important to keep in mind that although expenditure in underdeveloped areas will be at the expense of other areas, it will be beneficial to the country as a whole.

The World Bank (2009:6-7) characterises the geographic transformation as the result of development in three dimensions: density, distance and division. Regardless of how ordinary these three words may sound, they represent the dimensions of economic geography that have to be reshaped if the development challenges are to be met (World Bank, 2009:7). Density is important at a local scale where distances are short and cultural and political divisions are few and shallow. The difficulty lies in getting density right – “harnessing market forces to encourage concentration and promote convergence in living standards between villages and towns and cities” (World Bank, 2009:7). Distance, on the other hand, is more important at the national level: “Distance between areas where economic activity is concentrated and areas that lag is the main dimension. The policy challenge is helping firms and workers reduce their distance from density. The main mechanisms are the mobility of labour and the reduction of transport costs through infrastructure investments,” (World Bank, 2009:7). Although these two dimensions

³ The term social capital will be explained in detail in Chapter Three.

matter at international scale, the third dimension – division – is an important dimension internationally. The World Bank (2009:7) propounds that while distance matters at the international level, for access to world markets, divisions associated with impermeability of borders and differences in currencies and regulations are a more pertinent barrier than distance. If one were to put these three dimensions together, “rising densities of human settlements, migrations of workers and entrepreneurs to shorten distance to markets, and lower divisions caused by differences in currencies and conventions between countries”, according to the World Bank (2009:10); these are believed to result in successful economic development.

It is therefore essential that thorough use must be made of resources and connections if a region wishes to proceed from one stage of development into the other stages as stipulated by Rostow. Furthermore, public expenditure must take place in the right places at the right time in order to ensure optimal output and density; distance and division must also be taken into consideration. With the right approach, regional development will accelerate.

2.3. Central place theory

For the purposes of the current study it is not important to present an in depth discussion of central place theory; instead, an overview of how central places come into being and the role it plays in development will suffice for the present purposes. The point of departure is that by increasing density, reducing distance and lowering divisions, central places can be created. This section provides a brief overview of the relevant aspects of central place theory.

A central place is exactly what it says, and although it is not necessarily located in the middle of an area, it is nonetheless a focus point that provides goods and services for the surrounding area. The amount of services and functions available at a central place determines the location and the size of the central place (Christaller, 1966:18). Central places evolve around threshold and range: “Both of these concepts can be interpreted spatially – where the former is the inner range and the latter is the outer range – two attributes that serve as geographic signatures for each good provided in the system. The inner range encompasses sufficient customers for the typical business to break even (zero profits) and the outer range encompasses all those customers that travel to purchase the good provided” (Mulligan, 1984:407). Therefore, for a central place to exist, the inner range must be large enough – but the profit of the business depends on the size of the outer range. The larger the range, the larger the central place can be: “A continuum of goods and services is envisaged stretching from high-order items having large thresholds (specialised shopping goods) and ranges to low-order items having small

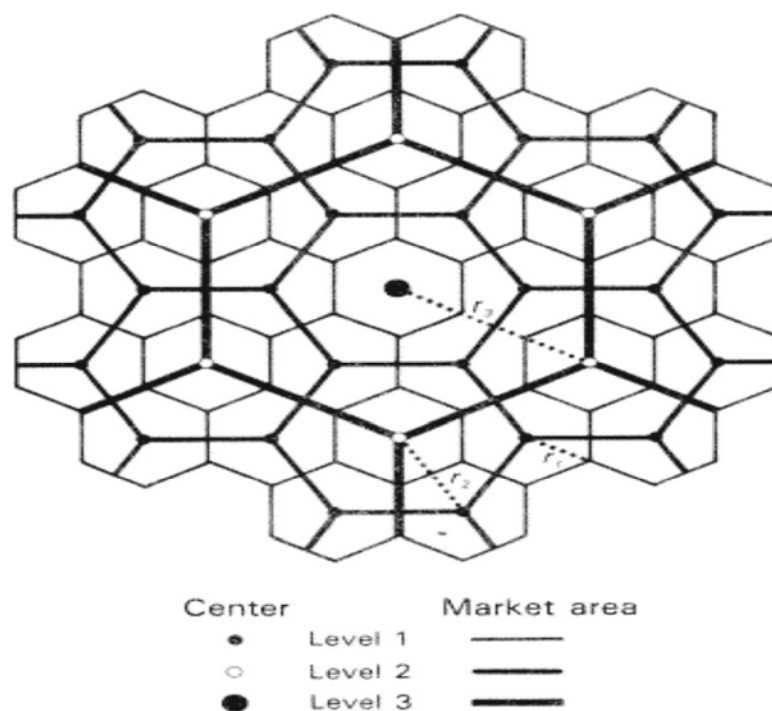
thresholds and ranges (standardised convenience goods)” (Mulligan, 1984:407). People would travel further for specialised goods, but they want a convenience store right around the corner. There must therefore be a hierarchy of places. Mulligan (1984:408) explain this notion as follows: “a central place on one level provides a bundle of goods and services that is specific to that level, as well as all bundles that are specific to all lower levels. As a result, central places on any given level serve a market area containing a number of lower-level places and rural areas” (Mulligan, 1984:408).

Christaller (1966:68-69) distinguishes between three types of urban distributions:

- According to the market principle;
- According to the transportation principle; and
- According to the administrative principle.

Although all three of these types are relevant, the focus will be on the transport principle because of its relevance for this study. According to Christaller (1966:69), the goal is to connect a maximum number of centres with a minimum number of roads. Connectivity must therefore be a maximum and total network length a minimum.

Figure 2.1: A typical Central Place Theory hierarchy of hexagonal market areas



Source: Lösch, 1954

Figure 2.1 is a visual representation of Christaller's theory. Hexagonal patterns will form in the spatial area according to the range and threshold concepts. Each centre will consist of a hexagonal area where it is the main provider of goods and services. However, each area will consist of a main central place, with a number of central places within the main area. This is because of the range of certain goods as explained previously. The outcome of these different sizes of the different nodes will result in a spatial pattern within a region similar to the above Figure.

Lösch (1954:94-97) expands central place theory by suggesting that if the price of a product decreases, the demand for that product will increase, and vice versa. At a certain point, however, the price will be too high and nobody will buy the product. At another point, the price will be too low and it will not be profitable to produce the product. A point must therefore be identified where production costs are a minimum, but where profit-maximisation will take place. As a result of this situation, a hexagonal service area will tend to form. A system of hexagonal areas of corresponding sizes can be formed by classifying products into the same service-area groups (Lösch, 1954:123). If these systems are layered over one another so that one point overlaps in all of them, a central place will form.

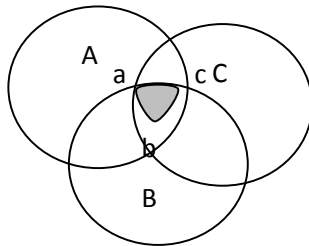
To conclude, a region consists of central places. For these central places to be economically viable, access to these places must be sufficient and affordable. In the context of an adequate transportation system, central places are able to produce goods at lower costs because of lower transportation costs; also, demand will increase, which helps an area to develop. Therefore, adequate transportation and supporting infrastructure are essential for central places. Under typical circumstances, a spatial pattern consisting of hexagons within larger hexagons will form in central spaces. A practical example of this is a highway running right through a country, with smaller roads connecting smaller nodes to the highway and therefore also to larger nodes.

2.4. Agglomeration economies

For regions to grow, agglomeration economies are required instead of economic investment focused broadly on all regions at the same time. Richardson (1976:146) substantiates this notion by proposing that a change in the settlement pattern or a reorganisation on the intra-regional transportation system (in large, the infrastructure system) may improve productive efficiency and promote faster growth. Weber (1929), Richardson (1976), Lösch (1954) and Smith (1971) all support the agglomeration theory. It boils down to the fact that agglomeration economies come into existence when two or more firms agglomerate at the same place

because of collective benefits. Richardson (1976:57) explains this by means of the *critical isodapane*, which is a contour of equal transport costs: “If we plot around the minimum transport cost site at all the loci; for a given level of transport costs higher than at that site, the resulting curve is the isodapane. If transportation is possible in all directions, and if transport rates are the same everywhere, then the isodapane is a circle.”

Figure 2.2 Critical isodapanes and agglomeration



Source: Own compilation based on Richardson (1976:56)

Firms A, B and C are each located at its minimum transport cost site. Agglomeration will be profitable in the shaded area. If A then decides to move to a, B and C must follow in order to avoid dispersed locations. This brings us to an important statement that has a bearing on the study of the effect of infrastructural development on the economy: “The spatial distribution of population and economic activity is explained as the net outcome of influences of economies of scale and transport costs over scale” (Richardson, 1976:61). Although this statement was made long ago, it is still relevant. It seems rather odd that even though the importance of transport costs was realised this early, it is still not handled with enough authority.

Another aspect pertaining to agglomeration and development is the notion that the functions and fortunes of settlements are linked. According to the World Bank (2009:15), industrialised places are different from their agrarian predecessors not just because they are more concentrated, but also because they are more specialised:

The largest cities may be well suited for start-up enterprises; the smaller ones may be better suited for those more established. In agriculture, sowing and reaping must happen in the same place. Not so for industry and business services. Falling transport and communications costs allow firms to spatially separate sowing and reaping. Products may be designed and financed in large cities – and produced in small towns.

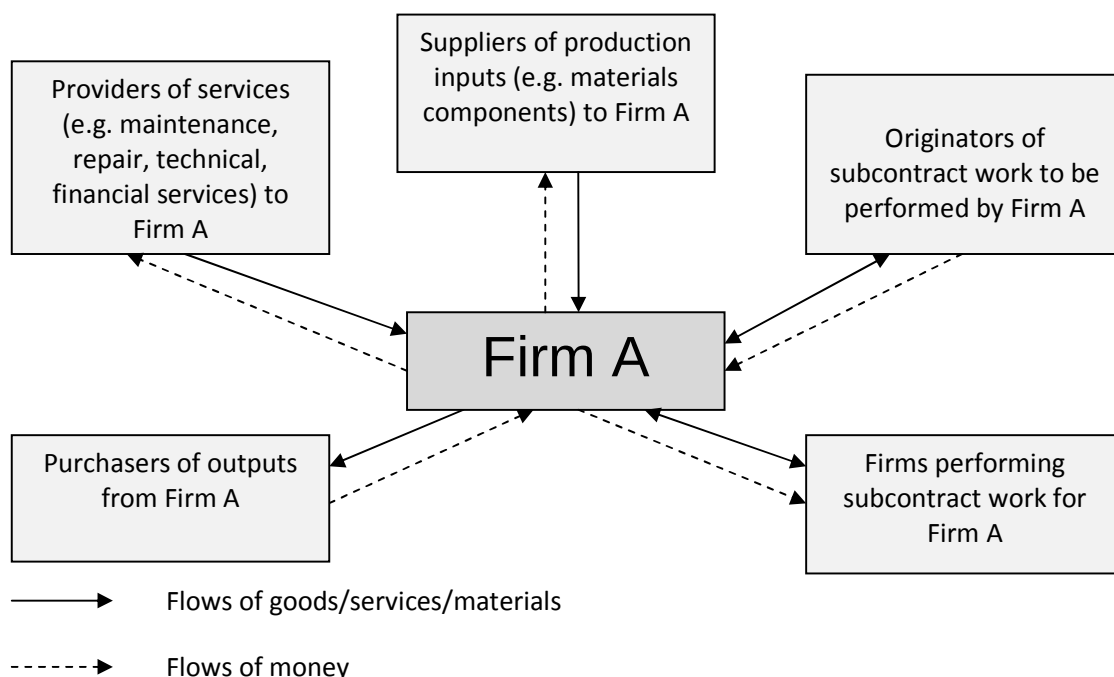
This situation tends to help to balance economic growth. If transport and communications, and therefore infrastructure in general are up to standard, more areas can benefit from growth and the development of areas will be accelerated. It is, however, important to take into account that,

“as firms adjust to changing market conditions, places have to perform different functions or risk decay” (World Bank, 2009:15). The World Bank (2009:15) further propounds that:

... the most immobile of all inputs to production – land – must become mobile between uses. Access to oceans and rivers might be the reason a place is settled, but the nimbleness of its land markets will largely determine how much it will grow. Governments may not be good at picking places that will prosper. But how well they institute regulations, build infrastructure, and intervene to make land use efficient will decide the pace of prosperity for the entire neighbourhood.

The idea that land must become mobile might seem to be confusing, but, it makes perfect sense upon closer investigation. Only when agglomeration economies become linked and each area has a certain function, development will be sustainable. This cannot take place without adequate infrastructure. For agglomeration to be successful, linkages must exist between firms in the spatial region.

Fig.2.3. Major functional linkages of a hypothetical manufacturing firm



Source: Own compilation based on Dicken and Lloyd (1972:288).

Figure 2.3 shows the major linkages of a hypothetical manufacturing firm. According to Dicken and Lloyd (1972:289), the study of agglomeration economies emphasises the connections or linkages between economic activities within a relatively restricted geographic area. Three major

types of linkages can be differentiated: Production linkages, Service linkages and Marketing linkages.

1. *Production linkages* are the physical movements of goods between firms. These linkages can be “forward” to the next firm in the production chain, or “backward” to his supplier.
2. *Service linkages* connect a business to a different sub-set of sub-contractors. These sub-contractors provide services such as cleaning, repairs, and so forth.
3. *Marketing linkages* are the connections to firms who sell or distribute goods. It consists of, “all those who deal with distribution of the good to a final demand or to the next link in the process chain” (Dicken & Lloyd, 1972:289).

These linkages are responsible for the formation of agglomeration economies. In cases where all or some of these linkages are present, a firm’s total cost will be decreased or its revenue increased. It is evident that for agglomeration economies to be sustainable, these “linkages” must work in conjunction with good physical linkages.

Although agglomeration can present disadvantages such as congestion and higher taxes, the advantages seem to outweigh the disadvantages. According to Smith (1971:60), the advantages of agglomeration for a new firm of a location situated among other firms engaged in the same activity are fairly obvious. These include a larger labour pool, more skilled workers, lower costs, collective facilities and ancillary activities. According to Dicken & Lloyd (1972:291), another of the acknowledged benefits of agglomeration for certain industries is the rapidity with which communication can take place between customer and supplier. Together these advantages play an important role when considering a certain location. Large urban-industrial areas also have a variety of advantages for new firms and industries of which well-developed infrastructure⁴ is one (Smith, 1971:61). These services are often unavailable in smaller areas, and therefore firms or locations move to the city with a view to reap the benefits of better infrastructure which will, in turn, help to lower overall production costs.

One fundamental component of infrastructure is transport; Jansen Van Rensburg (2000:77) also confirms that low transport costs encourage the agglomeration of activities by affecting the balance between dispersion and agglomeration forces: “There is therefore a trade-off between the advantage of being close to a larger market and being where factor costs are lower and this

⁴ The definition of infrastructure and all its components will be presented in chapter three.

trade-off depends on the importance of scale economies and transport costs in the industry. This suggests that a positive relation might exist between transport costs and spatial agglomeration.”

Many people believe that the normative approach is outdated (see, for example, Wood, 1969; Dicken, 1971; Pred, 1967; Steed, 1970), but it was demonstrated here that it is still relevant today. According to Dicken (1977:138), the least cost location theory still has some relevance in helping us to understand the spatial organisation of activities, although the scale now differs. Because of globalisation it is necessary to look at the whole world when identifying agglomeration economies and factors that lead to agglomeration. Dicken (1971:139) focused on the agglomeration activities of multinational enterprises which manufacture in more than one country and which serves an international or global market: “In the most highly developed multinational enterprises an international division of labour is practised in which individual plants specialise in those activities for which their comparative advantage is greatest in relation to other plants within the enterprise.”

To summarise this discussion, it can be said that there are different types of regions, and these regions all grow according to certain phases. A region will develop when the drivers of agglomeration are present. Infrastructure investment can be such a driving force. Because of regional investment, agglomeration economies develop – these have a positive impact on the region. Agglomeration theory is predicated on the concept of “least cost location” which means that industries and firms will locate where total costs are lowest. This is a theory that has stood the test of time and still seems valid.

2.5. Balanced vs. unbalanced growth

A region can be developed in two ways, namely by means of a balanced approach or an unbalanced approach. A balanced approach implies equal investment in all areas, while an unbalanced approach implies focusing investment on certain demarcated areas. When development is left in the hands of the market processes, it will likely be unbalanced. Both ways have advantages – the summary below sets out to show the positive and negative aspects of both in order to decide which would allow for development to be faster and more sustainable.

The balanced growth theory proposes that due to important economic interrelationships and complementarities, all sectors of the economy should be developed simultaneously (Litwack & Qian, 1998:1). Yotopoulos and Lau (1970:376) substantiate the balanced theory by saying that

proponents of the balanced growth theory specify positive association between balance on the one hand, and overall growth rate in national income (per capita). They conducted a study to find the relationship between sectoral or subsectoral variability and the rate of growth. It was proven that high sectoral imbalance is associated with low overall rate of growth. However, the authors also conclude that, “although “imbalance is bad for a country,” id est., balanced growth is associated with a higher rate of development; countries generally grow in an unbalanced way after a certain level of development has been achieved” (Yotopoulos & Lau, 1970:377).

Nurkse (quoted by Yotopoulos & Lau, 1970:376) further notes that balanced growth increases the reinvestible surplus; it provides inducements to invest, it creates external economies in complementary industries and, as a result, it leads to higher economic development. Bos (1990:46) also differentiates between interregional balance and intraregional balance. Interregional balance refers to the allocation of resources between regions to enable them to reach their full potential in terms of economic growth, full employment and social equality. The planning of intraregional balance is concerned with the allocation of resources between sub-centres of a region (Bos, 1990:46). Infrastructure is probably one of the important resources necessary to bring about growth; this demonstrates that one does not have to invest equally everywhere, but all regions must enable people to have access to work; without the proper infrastructure, this will not happen.

On the other side of this argument there is unbalanced development – of which Hirschman (1978) is a proponent. Litwack and Qian (1998:1) speak about unbalanced strategies as leading sector investment strategies; they suggest that although a developing country may not have sufficient resources to make large investments in all sectors simultaneously, investing in one or a few key leading sectors could nonetheless have the effect of pulling up other interdependent sectors.

As a spatial region develops, the locational preferences for households and firms begin to change. According to the World Development Report 2009 (World Bank, 2009:2) location matters more for firms and less for families when a region becomes developed, therefore emphasising that economic development leads to even greater prosperity in a virtuous cycle. This basically means that when the ball is set in motion, it will continue rolling until the region is developed. The fastest way to set this development ball in motion is through agglomeration economies; these were addressed in the previous section. An advantage of unbalanced development is that when the allocated region becomes developed, this development will

automatically lead to further development for the larger region. Furthermore, the World Bank (2009:2) states that neighbourhoods matter and that a region's growth and prosperity are soon shared with its neighbours.

Bos (1990:46) explains that all regions do not have the same development potential –he therefore uses Glasson's definition to explain what it means when one wants an area to be balanced: "Balance, in the regional context, does not imply equality, uniformity or conformity. It does however imply equality of opportunity for each region to redress demographic, economic, social and environmental weaknesses and to achieve its full potential, therefore ensuring that the "quality of life" is not a function of the area of the country in which people happen to live and work." Balanced growth does therefore not mean that one has to invest the same amount in all regions. Rather, according to Rosenstein-Rodan (1944:158), it is often not the absolute amount of wealth and income that counts, but distribution, and "there is no doubt that after a hundred, even a hundred and fifty years of industrial revolution and great technical progress, the degree of inequality of distribution of income between as between different nations is greater today than it was a hundred years or even a hundred and fifty years ago" (Rosenstein-Rodan, 1944:158). It is therefore necessary to distribute income to poor areas in order to ensure balanced growth, otherwise the rich will become richer and the poor poorer. For this to be accomplished, government intervention is necessary. Rosenstein-Rodan (1944:158) notes that the productivity of investment in manufacturing industries is lower in poor countries than in rich ones. Any additional manufacturing industry in rich countries can make use of excess capacity of basic industries (transport, public utilities, housing, and the like) at zero or very low capital costs. In poor countries, additional basic industries have to be established for that purpose; more capital is therefore required in a poor country to establish additional manufacturing industries than in a rich one. This argument is related to the argument presented in chapter two, namely that an area will struggle to reach the fully developed stage on its own. So-called backward areas must therefore receive help from outside areas or government incentives in order to become developed. It therefore seems as if unbalanced growth is necessary to achieve a balanced outcome. Indeed, according to the World Bank (2009:20), prosperity will not come to every place at once and therefore unbalanced economic growth must be encouraged.

2.6. Economic growth models

Why and how regions grow and develop has been a topic of discussion from the early 1900s. Development can be viewed from two sides – regional development theories and economic growth theories. Although regional development was discussed in chapter two, it is necessary to

explore the economic side of development with a view to ensure that all aspects of development are covered. This is because regional development and economic development are closely related and can be seen as twin processes.

Also, economics and space are two terms that are closely related to each other. According to Capello (2007:1), economic activity arises, grows and develops in space. The workings of an economic system are also influenced by space:

It is a source of economic advantages (or disadvantages) such as high (or low) endowments of production factors. It also generates geographical advantages, like the easy (or difficult) accessibility of an area, and a high (or low) endowment of raw materials. Space is also the source of advantages springing from the cumulative nature of productive processes in space: in particular, spatial proximity generates economies that reduce production costs (e.g. the transportation costs of activities operating in closely concentrated *filières*) and, in more modern terms, transaction costs) (Capello, 2007:1).

It can therefore be said that economic growth does not stand on its own, but is influenced by space. Economic growth depends on the space where economic activity is generated. Economic space is a far broader concept than geographic space, and this notion gives rise to the belief that economic growth and development are not solely dependent on natural resources. Capello (2007:1) believes that human capital and social fixed capital are determining factors of economic growth.

According to Capello (2007:2), regional economics seeks to answer the following fundamental questions:

- What economic logic explains the location choices of firms and households in space?
- What economic logic explains the configuration of large territorial systems (e.g. city systems)?
- Why are certain areas – regions, cities, individual territories – more developed than others?

Theories attempting to explain these issues can be divided into classical theory, neoclassical growth theory and new growth theory: “The macroeconomic issues of the growth of output, and the distribution of income between wages and profits, were the major preoccupation of all the great classical economists, including Adam Smith, Thomas Malthus, David Ricardo, and last but not least, Karl Marx” (Thirlwall, 1972:123). A relevant aspect of classical theory for the current study is the fact that this theory emphasises the importance of all economic resources and

activities. The classicists pointed out that all economic resources – land, labour, capital, and entrepreneurial ability – as well as all economic activities – agriculture, commerce, production, and international exchange – contribute to a nation's wealth (Brue & Grant, 2007:47).

According to Brue and Grant (2007:275), neoclassical thought, on the other hand, stresses both demand and supply in determining market prices of goods, services and resources with the following conclusions:

- Capital accumulation is more important as a source of growth than total productivity growth, and more important in developing countries than in developed countries.
- Improvements in the *quality* of labour are important through better health, nutrition and education.

Resource shifts are not as important as might have been expected, perhaps due to the general surplus of labour in developing countries and the low capacity to absorb labour into the productive employment in the industrial sector. The new growth theory (Thirlwall, 1972:211) elaborates on this theory by arguing that if the only way that a country's productive potential and per capita income can be increased is through the expansion of the capacity for producing goods, this does not necessarily mean the provision of plant and machinery, but can also include other parts of physical capital such as roads, railways, power lines, water pipes and schools. New growth theory therefore ultimately realises the importance of infrastructure expansion for an increase in per capita income. Johnson (1970:551) notes that capital accumulation provides the difference between a developed country and a developing country: "The condition of being "developed" consist of having accumulated, and having established efficient social and economic mechanisms for maintaining and increasing large stocks of capital per head in the various forms. Similarly the condition of being "underdeveloped" is characterised by the possession of relatively small stocks of the various kinds of capital." Johnson is therefore of the opinion that the amount of capital of a country will determine its level of development. According to Thirlwall (1972:227), the productivity of physical capital depends on the existence of infrastructure investment which will help to diversify production, expand trade and reduce poverty, therefore strengthening the theory even more that infrastructure investment is necessary for development. Hess and Ross (1997:5-7) concur; they propose that improvements in transportation will broaden the extent of the market, and help to render specialisation and the division of labour economical. Wang (2002), Munnell (1992), Aschauer (1989), Bassanini and Scarpetta (2001), and Nayak (2010), agree, noting that for economic growth and development

to take place, investment in infrastructure is a must. A region will then proceed from the traditional stage of development through the five stages as explained in chapter two.

It can therefore be concluded that, at the base of economic growth theory in general, is the fact that for a region to develop, sufficient and productive infrastructure must be in place to ensure optimal output of economic activity and maximum per capita income. It was repeatedly seen that for economic development to take place within regions, infrastructure needs to be up to standard; otherwise no one will settle there.

In the regional development theories as well as the economic growth models discussed so far, it has been established that capital plays a role in economic growth. The subsequent section elaborates on this assumption and sets out to explain how capital can effect economic growth. According to Solow (1970:17), an economy is equipped with a stock capital which it has inherited from the past. If this capital is fixed for a specific year, employment will determine the annual output of the economy.

When investment takes place, the amount of capital increases and the economy will therefore have more to work with. More efficient capital will result in higher output per employer. The same volume of employment will therefore lead to more output with increased capital. According to Solow (1970:17), the new curve relating output to employment will presumably lie wholly above the old curvature. From this one can conclude that increasing a region's capital will result in higher output, bringing about economic growth.

2.7. Conclusion

This chapter presented a brief summary of salient concepts that needed to be explained before proceeding to the next chapter which is concerned with infrastructure and transportation. It can be said that there are three types of regions: homogeneous, nodal and planning regions. These regions all grow at different rates from the first stage, the traditional stage, through the preamble stage, right up to the fifth stage: the fully developed stage. Agglomeration in these regions is an important aspect that helps to bring about growth. Agglomeration refers to the notion of people and industries locating at places with a comparative advantage. Without this comparative advantage, no one will locate in a place and subsequently no economic growth will take place. This is why it is necessary to invest in infrastructure in order to create these advantages and therefore to attract money into the region. This can be achieved through a "top-down" or "bottom-up" approach, where "top-down" is when one plans from a macro region down to the

aggregated regional targets, while “bottom-up” refers to a situation where individual regions first determine the aggregated regional targets and then work them up to reach a macro target. The choice of locations can be divided into the location for a producer and the location of a consumer. Producers need to be close enough to each other to attract consumers, but not too close to steal one another’s” clients. This will lead to the creation of central places. Development can also be achieved by means of balanced or unbalanced growth. Although both of these have their advantages, it was found that unbalanced growth tends to result in faster growth and helps to achieve balance in a region in the long run.

3. INFRASTRUCTURE AND OVERHEAD CAPITAL

3.1. Introduction

The second primary theme of this study focuses on infrastructure as it was seen that infrastructure plays an important role in spatial planning. Before infrastructure can be analysed to determine whether it plays a role in economic growth and development of a region, it is necessary to define the concept infrastructure. Infrastructure is a term used widely and it therefore also has a variety of meanings. It is therefore necessary to determine a concrete definition of infrastructure for this research. In this chapter, infrastructure will be defined and some of its subsectors will be discussed in order to provide greater clarity on what part of infrastructure has the largest influence on the regional economic growth.

3.2. Defining infrastructure and its subsectors

When investigating the role that infrastructure plays in development, a definition of infrastructure is necessary. There are, however, an enormous number of definitions offered in the academic literature. This section will elaborate on the relevant definitions.

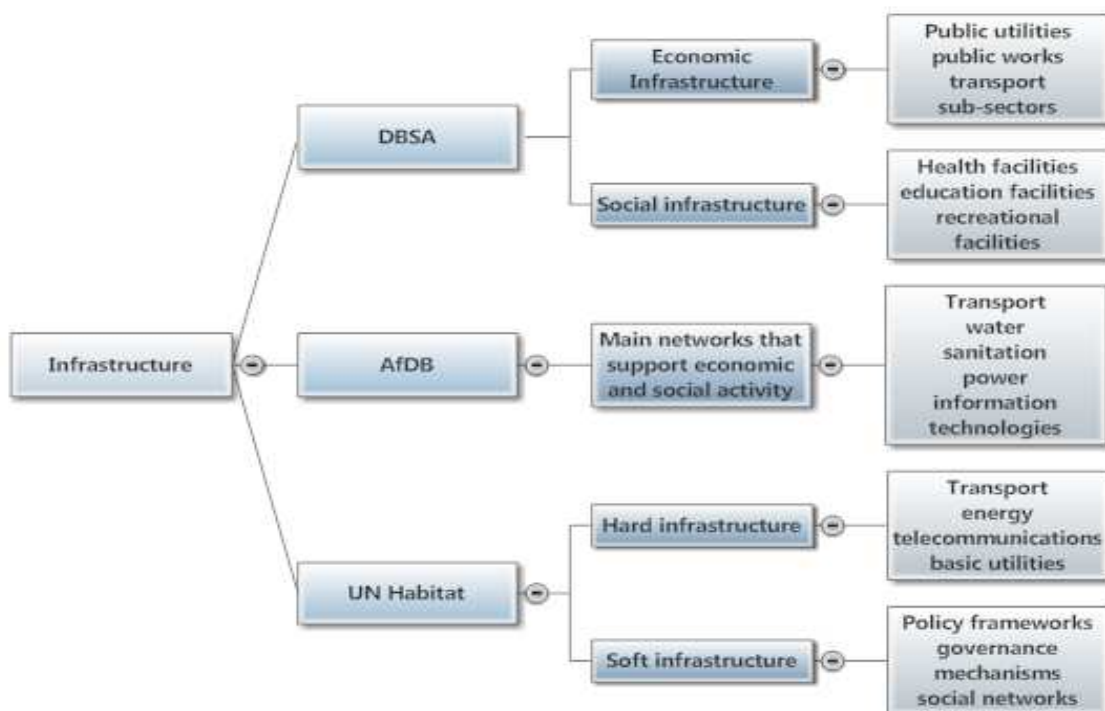
According to the United Nations Habitat (2012:5), infrastructure is typically discussed in terms of its characteristics. These characteristics are:

- Essentially public goods, providing in principle, non-exclusive goods accessible to all;
- Fixed investments, bulky and lump-sum with long (or no) payback periods;
- Having considerable variation in earning power capacity (e.g. telecommunications vs. water);
- Output mostly paid for in local currency (less true for ports and airports);
- Until recently, the public sector playing a dominant role (finance, regulation); and
- Sensitive to corruption and political shifts.

Although these characteristics of infrastructure have remained the same over the years, the meaning of infrastructure is constantly changing. Nayak (2010:1) takes the term infrastructure and analyse it according to its literal sense: “it is a term coined by joining the words *infra* and *structure*, meaning thereby subordinate parts, substructure or foundation of an undertaking”. Nurske (quoted by Button, 1998:150) lists features such as, “provides services basic to any production capacity”; “cannot be imported from abroad” and “large and costly installations”. In South Africa the National Infrastructure Maintenance Strategy posits that infrastructure is a

means to an end – “It supports quality of life and the economy if it delivers accessible and reliable services that individuals and institutions need” (Department of Public Works, 2006:5). Adequate infrastructure can therefore help to enhance the quality of life. According to Calderon and Serven (2004:6), infrastructure helps poorer individuals and underdeveloped areas to get connected to core economic activities. Quality of life, however, is dependent on economic and social aspects. The realisation of the importance of infrastructure is ever increasing, and ways of determining a region’s infrastructure is therefore receiving more attention. Infrastructure can be measured in financial or physical terms. Fedderke and Garlick (2008:2) propounds that financial measures simply calculate the depreciated value of the accumulated investment in a particular piece of infrastructure such as road, school or power grid, while physical measures vary across different infrastructure measures: total length of paved roads, number of classrooms, and so forth. The AfDB (2011), the DBSA (2007) and the UN (UN-Habitat, 2012) all have different subsectors of infrastructure as indicated in Figure 4.1.

Figure 3.1: Subsectors of infrastructure



Own compilation based on DBSA 2007, AfDB 2011, UN-Habitat 2012.

Although there are minor differences between the three definitions, all share the central concept namely that infrastructure entails those basic facilities without which a society cannot function.

The different parts of infrastructure are a necessity without which a region cannot function. As stated by the DBSA (2007:4) – and this corresponds with a number of studies – social infrastructure is seen as a key factor for development, while economic infrastructure's importance is somewhat minimised. However, although social infrastructure will benefit the people, economic infrastructure will benefit the economy, helping people in the long run in a more sustainable way.

This definition provides a picture of what infrastructure is, but infrastructure is also synonymous with the term overhead capital (Youngson, 1967; Hulten, 1996; Eberts, 1990; Button, 1998). This means that further investigation is required for purposes of the current discussion. These terms will be discussed in the following section in order to illuminate the notion of infrastructure from a different angle.

3.2.1. Overhead capital

According to Fraser (1937:250), capital is wealth looked at from a particular point of view. The amount of capital a region has can therefore be seen as synonymous to the region's wealth. Because of the social aspect of infrastructure, it is regularly used in conjunction with the term "social overhead capital" (SOC).

Youngson (1967:12) is of the opinion that overhead capital seldom produces direct effects only, because the output of overhead capital is usually an input elsewhere in the economic system; in other words, overhead assets do not as a rule produce final output. Because of this people do not realise the large effect that infrastructure development has on the economy and do not invest in it accordingly. People want to see results immediately and therefore it is of greater importance to them to have warm water, rather than having paved roads, because they get "nothing" from paved roads. Kindleberger and Herring (1977:1) divide SOC into two concepts: Economic Overhead Capital (EOC) and Strictly Social Overhead Capital (SSOC). According to the authors (in Nayak, 2010:1), EOC are nothing but public utilities in the form of transport, communication, road, railways, electricity, and forth, whereas SSOC includes the plants and equipment required for providing services in the form of education, health and housing.

Hirschman (1978) defines infrastructure as "capital that provides public services". Therefore, Fourie's (2006:531) opinion on infrastructure is valid: infrastructure consists of two elements – "capitalness" and "publicness"

The first element is used to distinguish between infrastructure (defined as a stock variable⁵) and public goods (defined as a flow variable⁶). The latter element involves the general properties of non-rivalry and non-excludability. A distinction can, thus, be made between infrastructure and public capital where infrastructure would include goods that have a capital character, but are not necessarily public. Such goods could include privately owned telecommunications, but would exclude publicly owned military equipment (which are public capital, but does not provide public services). Thus, a common feature of infrastructure seems to be that there is at least a strong public involvement in the use thereof" (Fourie, 2006:531).

Fedderke and Garlick (2008:2) explain that although infrastructure has historically been defined as consumption expenditure by either government or the private sector, it is now near-universally defined as capital expenditure.

This section shows that infrastructure is synonymous with overhead capital. In recent times, the norm seems to be to invest in strictly social overhead capital such as schools, but this is not necessarily the correct way. This study will show that the economic part of overhead capital is more advantageous to a society and to regional economic growth.

3.2.2. The influence of public capital

Now that a definition of infrastructure has been provided, it is necessary to determine the influence that infrastructure investment can have on the regional economy. It was previously stated that infrastructure is synonymous with overhead capital (see section 4.2 and 4.3), and therefore infrastructure investment is synonymous with capital investment as public infrastructure can also be seen as public capital. This is because capital is, "wealth in the form of money or assets, taken as a sign of the financial strength of an individual, organization or nation, and assumed to be available for development or investment" (Businessdictionary.com). The influence of public capital must be explored to ultimately demonstrate the influence of infrastructure investment.

National Government is in charge of public capital investment and they therefore decide on the size of investment. To persuade the government to increase spending on public capital, the advantageous nature of public capital must be shown. Wang (2002) discusses a variety of effects resulting from investment in infrastructure. Positive effects are, for example:

- It can raise productivity; and

⁵ A stock variable is measured at one specific time, and represents a quantity existing at that point in time, which may have been accumulated in the past.

⁶ A flow variable is measured over an interval of time. Therefore a flow would be measured per unit of time.

- It can stimulate growth.

It can further have a significant, positive effect on private sector output, productivity and capital formation. Services provided by public capital are assumed to enter both directly and indirectly the private production process and therefore raise the productivity of the private sector (Wang, 2002). This concurs with Munnell's (1992:192) theory that public capital has a positive impact on several measures of state-level economic activity: output, investment, and employment. According to Munnell (1992:191), public capital investment can expand the productive capacity of an area, both by increasing resources and by enhancing the productivity of existing resources. She gives a practical example of a truck driving on a highway. If a highway is up to standard, the truck does not need to use circuitous back roads which take longer to traverse and wear and tear will be greater; this is a simple example showing why public capital investment is so important.

Munnell (1992:191) suggests that the impact of aggregate public capital on private sector output and productivity is very large: if public capital stock increases by 1 per cent, output will increase by 0.34 per cent. These results correspond with studies by Aschauer (1990:16) who found that "increases in GNP resulting from increased public infrastructure spending are estimated to exceed those from private investment by a factor of between two and five." This implies that infrastructure investment will lead to increases in output.

A consequence of globalisation is that the world is changing at a faster pace every day. Investment must not just happen at the right time, but also at the right pace. Bassanini and Scarpetta (2001:13-14) argue that the rate of accumulation of physical capital is one of the main factors determining the level of real output per capita – although, as stressed above, its effects could be more or less permanent depending on the extent to which technological innovation is embodied in new capital. Whatever the transition mechanism from capital accumulation to growth, the significant differences in the investment rate across countries and over time point to it as a possible source of cross-country differences in output per capita. The money invested must therefore be correctly applied in order to ensure that the capital that it will provide is useful and will bring about growth. To give a simple example: building bridges worth millions of Rands on roads that carry fewer than ten motor vehicles a day will not be economical.

The effect that public capital investment has is more far-reaching than originally anticipated, especially once one begins to analyse the bigger picture. According to Bassanini and Scarpetta

(2001:14), recent studies on growth also assume that formal skills and experience embodied in the labour force represent a form of (human) capital. In order to ensure a high quality of public capital, human capital must be increased. It will be beneficial for a country to build and upgrade its own infrastructure, instead of importing qualified people. The importance of training can, however, not be overstated. Investing in infrastructure therefore entails investment in both training and education. Infrastructure projects can also be beneficial to the community by increasing their skilled workforce.

Furthermore, it is important to keep in mind that increased spending on public infrastructure does not have to mean building new infrastructure from scratch; it can entail the upgrading of existing stock. Munnell (1992:196) uses Winston and his colleagues (Winston, 1990, 1991; Small, Winston & Evans, 1989) as an example. They contend that the condition of the nation's highways could be improved and congestion reduced with the same or less investment by making three changes:

1. Building roads thicker than prevailing engineering standards would produce great savings.
2. Shifting from a tax on the number of truck axles to one on weight per axle would greatly encourage efficient use of highways and would also minimise damage.
3. Increasing the use of congestion taxes would reduce peak-period congestion and increase the services provided by existing capacity.

It was therefore seen from the above section that infrastructure has the ability to enhance development processes. The effect of infrastructure investment is large enough to be taken into consideration when preparing regional development frameworks / schemes. Although new infrastructure is likely to yield great results, sometimes only upgrading of existing infrastructure stock is required. The most important aspect is probably the fact that the infrastructure supplied must be of outstanding quality in order to avoid unnecessary spending on upgrading.

3.2.3. Conclusion

This section first provided a definition of infrastructure and its subsectors, there is no better way to summarise it as defined by Nayak (2010:2):

Infrastructures are basically certain facilities and services rendered to the society on which the structure of the economy largely depends. As it is multidimensional and multipurpose in nature it is accepted as a complementary sector and a boom to other sectors of the economy by creating external economies. Because of its long gestation period and huge establishment and maintenance cost it is generally financed by the government without having any profit motive” (Nayak, 2010:2).

It was also proven that it is absolutely essential to invest in public capital or public infrastructure. Such investment will benefit society in a variety of ways: it can increase productivity, stimulate growth, increase employment and even increase level of skilled workforce. However, investment must be planned carefully in advance to ensure that money is not wasted. One first needs to determine if new infrastructure is necessary and whether upgrading will do the trick. Ensuring that infrastructure is up to standard and maintaining infrastructure will also save money in the long run.

3.3. The role of infrastructure investment on the regional economy

3.3.1. Introduction

It was explained above that infrastructure can be divided into social infrastructure and economic infrastructure. The same can be said about the role of infrastructure; it has a social role and an economic role. These two roles are discussed in the following section. Without adequate infrastructure, an economy will not be able to function because it will not be able to transport goods, communicate, or produce goods. Infrastructure can therefore be seen as the core of society.

3.3.2. Infrastructure investment and social development

Infrastructure investment has a variety of effects on society – both direct and indirect. The social effects will be clarified in this section. To summarise the role of infrastructure it can be said that: “infrastructure plays a central role in improving competitiveness, facilitating domestic and international trade, and enhancing the continent’s integration into the global economy. Coupled with better human development outcomes that improved infrastructure promises, the spillover effects and the dynamism that would be generated could support the continent’s economic growth and poverty reduction efforts. Similarly, improved infrastructure could help eliminate

some of the binding constraints to the realisation of the benefits of globalisation” (ANON, 2011a). According to Kandiero (2009:1), the African Development Bank substantiates this statement by recognising that infrastructure investment has a central role in the development agenda, and that it is necessary for supporting economic growth, poverty reduction and the achievement of the Millennium Development Goals (MDGs). The Millennium Development Goals are, in short, a promise that 189 nations made in 2000 to free people from extreme poverty and multiple deprivations. The pledge consists of eight Millennium Development Goals:

1. Eradicate extreme poverty and hunger
2. Achieve universal primary education
3. Promote gender equality and empower women
4. Reduce child mortality
5. Improve maternal health
6. Combat HIV/AIDS, malaria and other diseases
7. Ensure environmental sustainability
8. Develop a global partnership for development.

The question can now be asked: how will investing in infrastructure help to achieve the MDGs? The answer may be quite simple – investing in infrastructure has advantages for almost every part of society. According to Estache (quoted by Calderon & Serven, 2004:6) infrastructure helps poorer individuals and underdeveloped areas to become connected to core economic activities, therefore allowing them to access additional productive activities. Furthermore, infrastructure development can also have a disproportionate impact on human capital of the poor; this was noted by Calderon and Server (2004:6) who found that if the availability and quality of infrastructure services for the poor are enhanced, their health and/or education will be affected positively, also indirectly influencing their income and welfare. By improving access to hospitals, the poor will be able to decrease child mortality and improve their health, in this way achieving two of the MDGs. It is however, important to realise that it is insufficient to provide hospitals and schools in poor areas. Rather, what is of the importance is that access to hospitals and schools must be provided. Without proper access the social infrastructure will be of no use to society. Infrastructure can therefore also help to decrease inequality by improving the living standards of the poor. Fourie (2006:542) notes that if there is a sufficiently large “trickle-down” effect in the economy, economic growth will lead to higher incomes for the poor. The DBSA (2007:65) concurs and argues that infrastructure supports human development, which enhances productivity that, in turn, helps to improve the distribution of income.

According to Meyer (2007:62), the extent of the benefits of economic growth for the poor depends on the degree of involvement of the poor in the economy and the prevailing income gap. An increase in economic growth will therefore not necessarily help to alleviate poverty. To ensure that the poor will benefit, they must participate in the process in an active manner. It must be taken into account that there are various reasons why poverty exists; it follows that the steps that have to be taken to reduce this poverty will also differ. The question is ultimately where one should invest. By investing in SSOC, the current community will be helped and immediate effects will be seen, but results of investing in factors that will ensure local economic development (like EOC), will not be immediately visible. However, these effects will be more lasting and not only would the present community benefit from such investment, but also the generations to come. In the end, Trah (quoted by Meyer, 2007:63) is of the opinion that the extent to which the path of economic development directly or indirectly addresses poverty and the distribution of income remains a question of priorities as well as the specific opportunities and resources available in a given area.

3.3.3. Infrastructure investment and economic development

Apart from the social aspects of infrastructure, infrastructure helps the economy in a variety of ways. The different ways in which infrastructure investment can influence economic development are discussed in this section.

According to Fourie (2006:539-540), infrastructure in general impacts on economic growth primarily in three ways:

- It lowers the cost of input factors in the production process (direct effect);
- It improves the productivity of other factors (indirect effect); and
- It brings about job creation in the construction industry with spin-offs in other industries.

This shows that infrastructure plays a role in any economy. Fedderke and Garlick (2008:4-6) concur and summarise the role of infrastructure as follows:

- Infrastructure is a complement to other factors:
 - o Improvements in infrastructure may lower the cost of production;
 - o Inadequate infrastructure, on the other hand, creates a number of costs for firms; and

- o Good infrastructure raises the productivity of other inputs in the production process.
- Infrastructure is a stimulus to factor accumulation:
 - o Infrastructure, in the form of schools, roads used to access schools and electricity provided to schools, is likely to be an important factor in the human capital production function.
- Infrastructure is a stimulus to aggregate demand:
 - o Significant expenditure during construction increases aggregate demand.
- Infrastructure is a tool of industrial policy:
 - o Government can activate this channel by investing in specific infrastructure projects with the intention of guiding private-sector investment decisions.

Improving employment opportunities combines the social and economic benefits of infrastructure. The economy will benefit because of lower levels of unemployment and an increase in GDP, while the community will benefit socially because more people will be able to be independent and improve their own living conditions. Infrastructure can affect employment through two ways. According to Button (1998:153), the first concern is the substitution/complementary effects that may occur between production factors due to infrastructure availability. The second relates to the differentiated impacts that infrastructure investments may have on the competitive position of regions or countries.

Infrastructure also plays a role in international trade. Due to the rise of globalisation and the concomitant world economy, it is becoming increasingly more important to promote international business associations. The contacts and connections made through international trade will lead to more foreign direct investment which will, in turn, bring about economic growth. "Highly mobile international and domestic investors naturally want stable national environments, but they also value quality infrastructure, basic services, facilities, financial service and local management" (DBSA, 2007:52). If a stable environment is not created, foreign direct investment will decrease and that will make it more difficult to promote economic growth:

For our purposes, the infrastructure requirements of such investors are, of course, paramount but competent local governments are also crucial. They must at least plan for and facilitate the establishment of infrastructure, regulate or manage the provision and maintenance of services, and secure the necessary revenue to do so. Incompetence in any of these areas leads to unproductive and underutilised urban infrastructure. Poor management and maintenance incur additional costs and inefficiencies in both the public and private sectors. Cumbersome and inefficient regulation lowers productivity while

creating disincentives for investment; for example, globally mobile investors are unlikely to tolerate permit delays. When private costs to support infrastructure rise...investors may well decide to look for other locations (DBSA, 2007:52).

It must be kept in mind that for every action there is a reaction. When developing infrastructure in a certain area, production costs in that particular area will decrease because of lower transport costs; this will help to make exports cheaper. Inter-regional trade will be stimulated. This, however, has a negative influence on the sphere of import – Button (1998:154) explains that while consumers in the region of import are able to buy at lower prices, employment in this region decreases. At the same time, of course, employment in exporting regions will increase. It is therefore important that when deciding to develop infrastructure, the right places are chosen. By developing infrastructure in backward areas, the unbalanced relationship between this area and its more developed neighbours can be addressed. Development must, however, be of such a nature that it will not disable the developed neighbours' economy.

3.3.4. Conclusion

From this section it has emerged that infrastructure plays a role in society. Significantly, infrastructure does not benefit only one part of society; every aspect of society will benefit from investment in infrastructure. This has social as well as economic benefits. The implementation of infrastructure is important, but if infrastructure implementation is applied wrongly, it has the potential to be detrimental to growth instead of enhancing it. The needs of a certain region must first be thoroughly assessed before making changes in order to ensure that the actual needs of the community are met. Infrastructure or social capital is a part of society without which it would not be able to function. When looking at South Africa as a whole, it is important to realise that developing countries like China are investing much in infrastructure. Therefore, if South Africa does not follow the same path, it will become the import region with ever increasing unemployment. Instead, South Africa must work towards better development by realising the importance of infrastructure and ensuring that it remains relevant in the global economy – not only as a country for imports, but also as one of export.

4. TRANSPORTATION AND ITS INFLUENCE ON THE REGIONAL ECONOMY

4.1. Introduction

In chapter two, regional development was explained and it was found that agglomeration economies have to be established with a view to enhance economic growth in regions. For agglomeration to realise, there has to be comparative advantage. It was seen in chapters two and three that one way of creating comparative advantage in a region is by means of adequate infrastructure. The role and advantages of infrastructure were emphasised. At the core of infrastructure development is transportation. Without adequate transportation as a foundation, regional development will not take place. This finding emerged from all of the previous chapters. It is therefore necessary to expand on transportation as a crucial part of infrastructure.

4.2. Transport orientation

When studying the influence of infrastructure on regional development, it is important to look at the effect of transportation. Weber (1929:39) even went as far as proposing that the cost of transportation and labour costs are the only regional factors that influence location, and that transport cost is the primary location factor. He identified the problem of how transportation costs influence the distribution of industries, assuming that no other factors influencing the location of industries exist: "It is clear that it will be drawn to those locations which have the lowest costs of transportation, having regard both for the place of consumption and the place of deposits of materials" (Weber, 1929:41). The fundamental factors that determine transportation costs are the weight to be transported and the distance to be covered. The production point will therefore ideally be situated where ton-miles are the cheapest, therefore where transportation costs are a minimum.

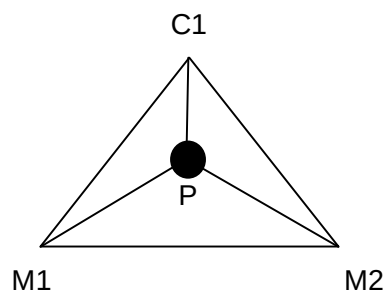
Apart from weight and distance three more factors can be identified that have a bearing on transport cost (Weber, 1929:42):

1. The type of the transportation system and the extent of its use;
2. The nature of the region and its type of roads;
3. The nature of the goods themselves, id est the qualities which, besides weight, determine the facility of transportation.

According to Weber (1929:43), the transportation system will determine the cost of production. He propounded that even in a uniform system, the different parts of the system are used with

varying intensity, and this varying intensity causes differences in the cost of transporting a given weight a given distance. The cost per ton-mile will also vary according to the volume of traffic and, “higher rates per mile prevail for small shipments and for shipments over short distances” (Weber, 1929:45). The second factor, namely the nature of locality, determines the cost of road construction, and on the other hand it affects the cost of operation according to Weber (1929:45). The third factor is that of special qualities of the goods transported. According to Weber (1929:46), bulky goods require more space, and therefore increase the cost by requiring more rolling stock. Perishable and explosive goods necessitate great care. Moreover, certain kinds of goods are given higher rates, which, because of the high value of goods, do not increase costs particularly.

Figure 4.1: Location of production point



Source: Own compilation based on Weber (1929:46)

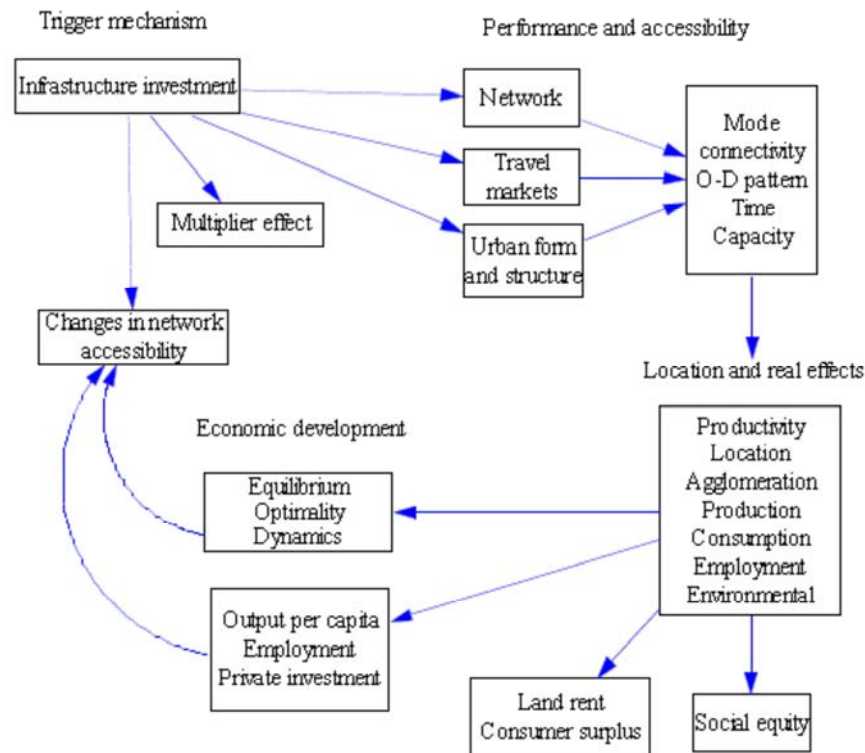
The location of production point is dependent on the location of consumption (C1) and the location of materials (M1 & M2). Every corner has a pull force on the production point that is determined by the weight being transported. Point P (point of production) is where PM1, PM2 and PC1 are in equilibrium, therefore where transportation costs are a minimum. This model can be used for numerous points of materials and consumption. When only one material and one point of consumption is necessary, the triangle will become a line and the point will still be where it is the most economic.

According to Hurd (1924:11-13), land value is the single most important factor influencing the location of land uses. This view seems to differ from Weber’s theory. However, “since value depends on economical rent, and rent on location, and location on convenience, and convenience on nearness, we may eliminate the intermediate steps to say that value depends on nearness,” (Hurd, 1924:13) and since nearness is affected by transportation, it can be deduced that Hurd concurs with Weber. Haig elaborates on Weber’s view with the “cost of

friction" concept (in Ratcliff, 1972:302). According to Haig (in Ratcliff, 1972:302), the most important forces that one should consider when deciding location are rent and transport costs. Friction costs exist for each location and the firm or industry that will locate there will be the one for which friction costs are a minimum. These friction costs are dependent on rent and transport costs. The more efficient the means of transportation, the less the friction costs will be. Transport infrastructure investment will therefore lead to less friction. Although the factors differ (Haig uses rent and transport costs and Weber uses material index and locational weight), this idea is related to Weber's theory. More particularly, Weber (1929:60-61) differentiated between material index and locational weight. Material index measures the total weight to be moved, while the locational weight is this total weight to be moved in a locational figure per unit of product. The conclusion is that the material index and locational weight must not be greater than one and two respectively. The transportational orientation of industries depends upon two factors. These two factors determine the material index of every industry. One is the size of the weight losses of localised materials during the process of production, and the other is the weight of the ubiquities used. Every increase of the weight losses in production increases the material index; and every increase in the use of ubiquities decreases it, and vice versa (Weber, 1929:73).

Hoover (1948:46) explains the locational preferences and patterns by saying that transfer costs affect the locational preference of a producer unless his supplier and customer "absorb" these costs completely, which rarely happens. The relative economy of long-distance transfer favours location at material sources and markets, but intermediate points have special transfer advantages when they are transshipment points or junctions and the processing establishment draws from several material sources or sell to several markets. In this last case, the sequence of material sources, junctions, and markets on the transfer network plays a large part in determining the orientation of production in different regions. As a rough generalisation, one can say that early stages of production are material-orientated and late stages are market-orientated, while intermediate stages are relatively "foot-loose" as to transfer considerations. Flexibility in the combinations of materials used or of products turned out increases the area of locational choice and generally favours orientation to material sources or markets rather than intermediate points.

Figure 4.2: The basic causality paradigm of the relationship between transport infrastructure investment and economic development



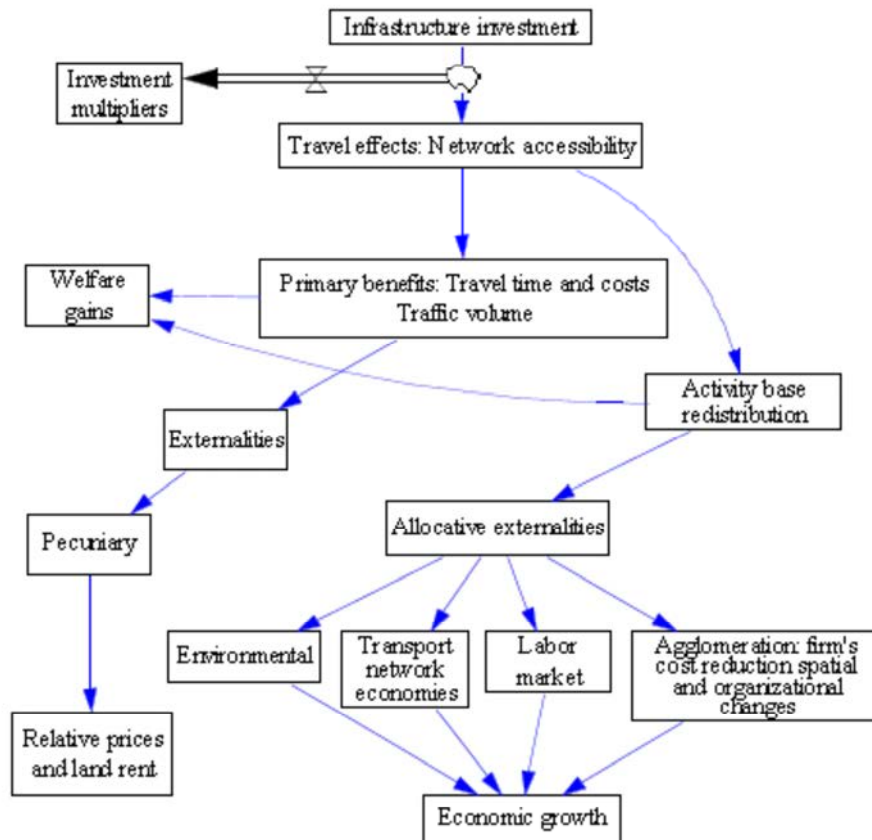
Source: Radopoulou et al (2011)

Radopoulou *et al.* (2011:5) used the paradigm created by Banister and Berechman (2001) to explain the relationship between transport orientation and economic development. This provides us with a visual indication of the exact effects that can be obtained from transport infrastructure. It becomes evident that infrastructure investment does not have a direct bearing on the economy; it first increases performance and accessibility which in turn have locational and real effects on, for example, productivity and then these lead to economic development. The benefits resulting from transport infrastructure are wide and far-reaching. Primary benefits are reduced travel time and costs as well as traffic volume that result in welfare gains. It also has an effect on environmental qualities, transport network economies, labour market and agglomeration – all which tend to result in economic growth.

Figure 4.2 basically explains that transport infrastructure investment leads to regional development and ultimately economic growth in a variety of ways. Investment will change the

entire spatial form of a region. It will enhance the formation of agglomeration economies and will improve locational preference. When combining this with Weber's theory of transportation, one can postulate that a region will form where development can take place at a reasonable tempo.

Figure 4.3: The scheme of evaluating economic growth benefits from transport infrastructure investments



Source: Radopoulou et al. (2011)

Figure 4.3 explains the process by means of which transport infrastructure investment ultimately leads to economic growth. Firstly, it will affect accessibility which will in turn mean a decrease in travel time and costs. This has an effect on the environment, transport network economies, labour market and agglomeration. There are also welfare gains that can be obtained through transport infrastructure investment, and an improvement in the transport network will affect relative prices and land rent in the areas of investment. All of these effects will lead to economic growth which will bring about regional development.

To conclude: the infrastructure system is divided into parts which, although co-operating technically, operate as economically independent units. Each part is at liberty to make its own rates. Different systems are therefore in competition with each other. The production point will obviously not be at the exact ideal point, but must approximately be as closely as possible, depending on the location of the transportation system. The point needs to be at a place of transportation. When more than one transport means are available, the most economic one will be chosen. For example, if there are a waterway and a railway, and the waterway is a bit further from the ideal point than the railway but the waterway is cheaper and safer, the production point will be at the waterway.

4.3. Transportation of people

While Weber (1929) mainly focused on the transportation of goods, Hoover (1948:16-17) emphasised that not only is the transportation of goods important, but also the transportation of people. Communication agencies and passenger transport systems are necessary for the buyer and the seller. These include mailing systems, telecommunication and the like that are necessary to promote, sell or buy a product.

The overhead costs in transfer agencies are responsible for the leeway in apportioning charges among shipments. "At the same time, the extensive nature of transfer operations and the economies of large-scale unified operations limit competition," according to Hoover (1948:17). There is therefore a large difference between the rates charged and any reasonably assignable costs. Although a longer distance usually means greater costs, the route also has an impact on cost. The most economical route must be taken; in this regard one should keep in mind that mountains, swamps, rivers and desserts are all physical features that can affect costs (Hoover, 1948:18).

According to Hoover (1948:18), a denser network of routes permits less roundabout transfer and increases the number of points to be considered as possible production locations. The route network density depends on the volume of traffic offered and on the economic characteristics of the transfer agency. Distance does not have a significant effect on transfer costs, because terminal costs and some other expenses are independent of distance (Hoover, 1948:19). The direction of travel also plays a role: "In the direction of lighter traffic flow, a relatively low rate may be quoted, since it costs little more to run with a load than empty," (Hoover, 1948:22).

This point can be summarised as follows:

Producers have an incentive to locate as near as possible to their suppliers and markets in order to reduce transfer costs. Transfer costs, however, do not vary simply and directly with distance. Transfer is canalised along routes forming coarse or fine networks. Costs and rates are generally less than proportionately greater for longer hauls on one route, lower in the direction of light traffic flow, graduated discontinuously upward with increasing distance, lower for large shipments and large shippers, and lower for compact and easily handled goods and goods of low value in proportion to weight (Hoover, 1948:26).

4.4. Transport systems

4.4.1. Introduction

Based on the discussion in the previous chapter, it can be propounded that transport costs must be kept at a minimum if regional development is to take place efficiently. According to Tolley and Turton (1995:11), different locations have different requirements that are necessary to meet the needs of individuals, groups and industries for links between places.

“Transport was indeed accepted by many geographers and economists as the principal factor promoting economic growth ... it is seen now as a permissive rather than as a deterministic factor,” (Tolley & Turton, 1995:74). But although its importance for economic growth has decreased, it is still important and it can be argued that growth cannot take place without adequate transportation networks. Therefore, although some see transport as more permissive, this is not necessarily the correct view. This study will potentially prove that transportation remains one of the salient factors determining economic growth and must therefore still be seen as such. Matthee (2007:34) does, in fact, argue that one of the main drivers of globalisation is the reduction in transport costs.

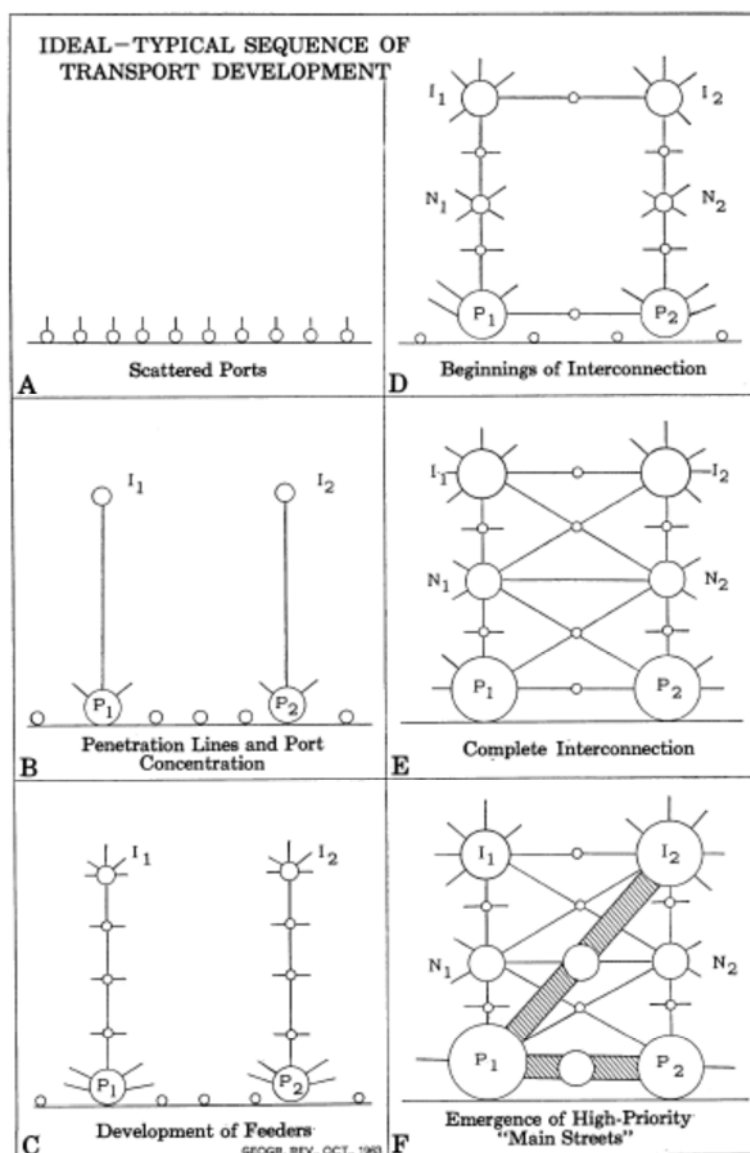
4.4.2. New and improved transport facilities

When looking at improving transportation and transportation networks one has to take into account the surrounding area as well as the study area and the resulting effects for the entire area.

According to Tolley and Turton (1995:75), analyses of the impact of new transport facilities suggest three possible results in terms of how a local or regional economy may be affected. In the most favourable circumstances, there will be a measurable increase in agricultural or industrial output which can be positively attributed to the benefits brought about by the new road

or railway. Alternatively, a neutral effect may be identified, whereby the investment in transport does not bring about any discernible change in the local economy. Finally, a negative effect may be recognised whereby the introduction of a new transport facility may be detrimental to the economy. This is why it is so important to know when, where and how to invest in transportation infrastructure. According to Taaffe *et al.* (1963), the sequence of transport development is important. The following figure is a visual representation of the path that infrastructure development must take.

Figure 4.4: Ideal typical sequence of transport development



Source: Taaffe *et al.* (1963)

The first phase (A) consists of a scattering of small ports and trading posts along the seacoast. There is little lateral interconnection except for small indigenous fishing craft and irregularly scheduled trading vessels, and each port has an extremely limited hinterland. With the emergence of major lines of penetration (B), hinterland transportation costs are reduced for certain ports. Markets expand both at the port and at the interior centre. Port concentration then begins, as illustrated by the circles P1 and P2. Feeder routes begin to focus on the major ports and internal centres (C). These feeder routes give rise to a sort of hinterland piracy that permits the major port to enlarge its hinterland at the expense of adjacent smaller ports. Small nodes begin to develop along the main lines of penetration, and as feeder development continues (D), certain of the nodes, exemplified by N1 and N2, become focal points for feeder networks of their own. Interior concentration then begins, and N1 and N2 pirate the hinterlands of the smaller nodes on each side. As the feeder networks continue to develop around the ports, interior centres, and main on-line nodes, certain of the larger feeders begin to link up (E). Lateral interconnection should theoretically continue until all ports, interior centres and main nodes are linked. It is postulated that once this level is reached, or even before, the next phase consist of the development of national trunk-line routes or “main streets” (F). In a sense, this is the process of concentration repeated, but at a higher level (Taaffe *et al.*, 1963)

The relationship between transport and settlement is complex at the urban scale, but planners and geographers are also concerned with the role of transport in rural areas, particularly with respect to the absence or decline of village facilities and the problems of accessibility to essential services (Tolley & Turton, 1995:94).

4.4.3. People-centred approach

It is interesting to note that, according to Tolley and Turton (1995:233), 15 to 20km is the average distance that people in rural African societies have to walk to the nearest services, such as schools and clinics. A great deal of valuable time is therefore wasted every day by walking. This time could be used more efficiently and economically. It follows that infrastructure, and more importantly transportation, can make a difference and are indeed needed to make a difference. However, it is not just the fact that transport facilities need to be available to these people to shorten their journeys – the requirement is also that adequate transport must be available at the right places. Substantiating this notion, Tolley and Turton makes a crucial statement – “throughout the developing world, it is the poor physical condition of the rural road network which is one of the principle constraints upon plans for economic expansion and the

upgrading of social facilities" (1995:235). This statement provides even more reason to make infrastructure development one of the key aspects of the development plan for a certain region.

How to invest is of importance; this is because it is not so much, for example car ownership, that is important, but rather access to transportation (Tolley & Turton, 1995:302). Simply building transportation infrastructure everywhere will therefore not help the economy in any way and will be useless expenditure. It is of greater concern to ensure that roads are built together with a means of transport for the poor for which motor vehicles are usually not accessible.

Tolley and Turton (1995:302) suggest that if we were to try and develop a framework for this people-centred approach to transport, it would still be difficult to better the guidelines set out by Appleyard in 1971. His set of social goals for transport development for the metropolitan environment of the future was:

1. Increasing the availability of transport services to deprived segments of the population;
2. Better choice and quality of travel for all of society;
3. Lowering the undesirable impacts of transport on the human and natural environments;
and
4. Enhancing environmental quality through improved transport planning.

Tolley and Turton further note that poverty is associated with ill health, because of a lack of accessibility to medical facilities. People either cannot afford transport or facilities are too far from home to walk (Tolley & Turton, 1995:304). It can therefore be concluded that poor communities struggle the most because they do not have the necessary income to obtain motor vehicles; in order to address their needs, an entire transportation system must be developed. By improving and accelerating access to work opportunities, the poor will finally be able to ensure a better and more sustainable future for themselves.

4.4.4. The impact of transport costs

Industries and people locate at certain places because of a range of determining factors. Lösch (1954:5) explains specific locations as follows: The choice of location for an economic unit can be broken into two parts – the location for a producer and the location of a consumer. For the location of a producer means of production, competition and consumption are determining factors, while the location of a consumer depends on the location of the producer. There are,

however, certain repercussions of individual choices of location. Competitors and their locations have a certain influence; they have to be nearby but not too close to steal clients.

Transport infrastructure has a bearing on transport costs. If a lack of adequate transport infrastructure exists, it will lead to an increase in transport costs that will, in turn, mean an increase in total production cost. On the whole, this will impair the economy. According to Matthee (2007:2-3),

... transport costs are influenced by geographical factors such as distance to markets and access to ports which, in turn, have an effect on manufactured exports and long-term economic growth. Countries with lower transport costs have experienced more rapid growth in manufactured exports as well as in overall economic growth during the past three decades, compared with countries with higher transport costs.

Therefore, decreasing transport costs will help the economy to grow; this can be achieved by means of improving the transport infrastructure. Radelet and Sachs (quoted by Matthee, 2007:3) made the sobering finding that doubling transport costs are associated with a decrease in Gross Domestic Product (GDP) growth of slightly more than one and a half percentage points.

A number of studies on trade focus on capital and labour as key factors that affect prices in a frictionless world. This, however, is not true in reality; transport costs differ from region to region and must therefore be included in studies. Matthee (2007:19) explains the core-periphery model that proves that transport costs do indeed matter for trade and therefore for economic growth. For example, one could take two regions, region 1 and region 2, where a large number of firms are located near region 1 therefore ensuring a wider variety of products. The income increases in region 1 and the market expands correspondingly. Region 2's market is now smaller than region 1's market. This is called the "home market" effect. Agglomeration occurs in region 1 and even more firms locate there. This means that, "Transport costs are the determining factor for the 'home-market' effect. By locating near the larger market, firms are able to achieve increasing returns to scale and at the same time minimise their transport costs," (Matthee, 2007:20). Matthee (2007:20) further suggests that if transport costs were too high in this region, trade would not take place because it is too costly, but if transport costs were low there would also be no trade because there would be no forces between the two regions. From this argument one can conclude that transport does indeed matter for trade and that if transport costs are too high, no growth would take place. Van Rensburg (2000:76) substantiates this notion by saying that the historical development of transport in trade and economic development

suggests that transport systems together with their ability to reduce transport costs are important with a view to increase the international competitiveness of a country or region.

According to the World Bank (2009:19), the falling costs of transportation and communication have made the world smaller; but this state of affairs also implied that economic activity tends to be more geographically concentrated. The size of urban regions can now increase; developed and developing regions become connected and this leads to a concentration of economic activity through agglomeration; and therefore trade increases.

Certain scholars believe that transport does not have a significant effect on the economy. Strong arguments exist to counter this sentiment. It is possible to provide substantial proof that transport, and reduced transport costs, can help to improve the economy and can therefore be of great value to the country's development. The link between transport and infrastructure emerged and it is obvious from this section that infrastructure development must revolve around transport development. Nonetheless, it is important to realise that not all investment in infrastructure will bring about positive growth in the economy. Much research must be conducted in advance to determine the exact needs of the allocated region. The result must be an effective transportation system that succeeds in decreasing the time and costs associated with travelling. This will, in turn, increase trade as proven above; and it will also increase productivity since people can save time. Therefore, increasing investment in infrastructure is non-negotiable.

4.5. Influence of transport on high technology clusters

In the modern age of globalisation, the development of high-technology clusters is important for development: "The role of high-quality infrastructural provision in facilitating the location of high-technology activities is a recurrent theme across the international literature," (Rogerson, 1998:884).

Locational preferences of industries have already been discussed previously, and it was found that transport costs are one of the major factors influencing location. According to Begg (quoted by Rogerson, 1998:884), telecommunications, roads and airport linkages in an area have to be of a high standard for high-technology clusters to establish themselves in such areas. The only difference today is that while road transport used to be seen as an influential factor, access to air transport is now of even greater importance. Without adequate access to sufficient air transport, a high-technology cluster will not be successful. The importance of airport access can

be seen all over the world: "For example, in Ireland the clustering of high-technology electronics activities occurs in the Limerick area close to Shannon International Airport" (Delaney, 1988). In addition, in the United Kingdom access to airports through high-quality infrastructure is also important for small independent firms given their unusual degree of national and international marketing activities. Overall, the importance of infrastructure as a locational influence on high-technology activities is emphasised particularly by Begg who asserts that, in the United Kingdom, "major infrastructure developments are likely to affect the way high-technology activity is distributed in the late 1990's," (in Rogerson, 1998:885).

In the case of South Africa, it has been found that the advantage of centrality is inseparable from the quality of transport provision (Rogerson, 1998:897). The entire Johannesburg region can be seen as a technology cluster. According to the Midrand high-technology firms, the only disadvantages that they encounter are traffic congestion because of rapid growth, and the poor state of local road maintenance (Rogerson, 1998:897). Some companies in this area are considering relocation. When companies start to move away from an area, the agglomeration advantages will become non-existent and the area will therefore lose its attractiveness. Therefore, the importance of infrastructural development can never be underestimated.

4.6. Economic backwardness

Certain areas are economically backward; indeed according to Friedmann (1979:140), economic backwardness is a universal problem which is one of the main reasons for polarised development. Many of the areas earmarked for RDP development can still be seen as backward or distressed areas; and this is something that is not realised until the exact meaning of a distressed area is known. According to Friedmann (1979:141), a distressed area is usually defined as an area that, at a given moment in time and in one respect or more, is economically at a disadvantage in comparison with other regions or, especially, with the country as a whole. One should note that, in practice, two main variables enter into the definition of a distressed area: the level of unemployment and the level of income.

On the other hand, Robinson (1969:147-148) provides an elaborate rationalisation of why little, if anything, should be done to alleviate conditions of regional economic backwardness. The author proposes that:

- Combating regional economic backwardness is an inefficient practice undertaken in the name of equity;

- Regional poverty is not an imposed condition but a consequence of deficiencies inherent in the area itself – area already lacked comparative advantage, lacked favourable locations, *its infrastructure was inadequate*, its location was distant from expanding markets, its social structure was rigid;
- Regional backwardness is to be functionally interpreted and
- Areal dislocations will continue to occur, requiring an accompanying process of adjustment and adaptation.

4.7. Conclusion

The effect that infrastructure has on the regional economy was discussed in the previous section and in this section it was seen that of the different parts of infrastructure, transport infrastructure is one of the most important factors to consider when choosing a location. Basically, households and industries will locate where transport costs are a minimum. The type of transportation infrastructure also plays a role; households and industries will not be attracted to an area if the only means of transportation is through private motor vehicles. It follows that one has to provide a variety of transportation means that will satisfy everyone's needs. In order to attract people, it is necessary to invest not only in the transfer of goods, but also in the transfer of people and therefore communication agencies and public transport are key role-players. The fact that different locations have different requirements must also be kept in mind.

When investment in infrastructure/transport does not occur correctly, it can have a negative effect on the economy and money will be wasted. For instance filling potholes incorrectly will only improve the problem temporarily and result in more money spent as the potholes will form again and will have to be fixed over and over again. Therefore when, where and how to invest must be investigated beforehand to ensure a positive effect. Although we know that public participation is necessary in planning, it is important to remember that when investing in infrastructure, the public's voice must be heard. This is because different communities' transportation needs vary and therefore one cannot have a blueprint that will always yield positive effects.

When correctly applied, public infrastructure will help the economy to grow through:

- Augmenting the productivity of private inputs;
- Its direct contribution to output; and
- Increasing public income directly or indirectly; and so forth.

5. EMPIRICAL STUDY: WESTERN CAPE PROVINCE, SOUTH AFRICA

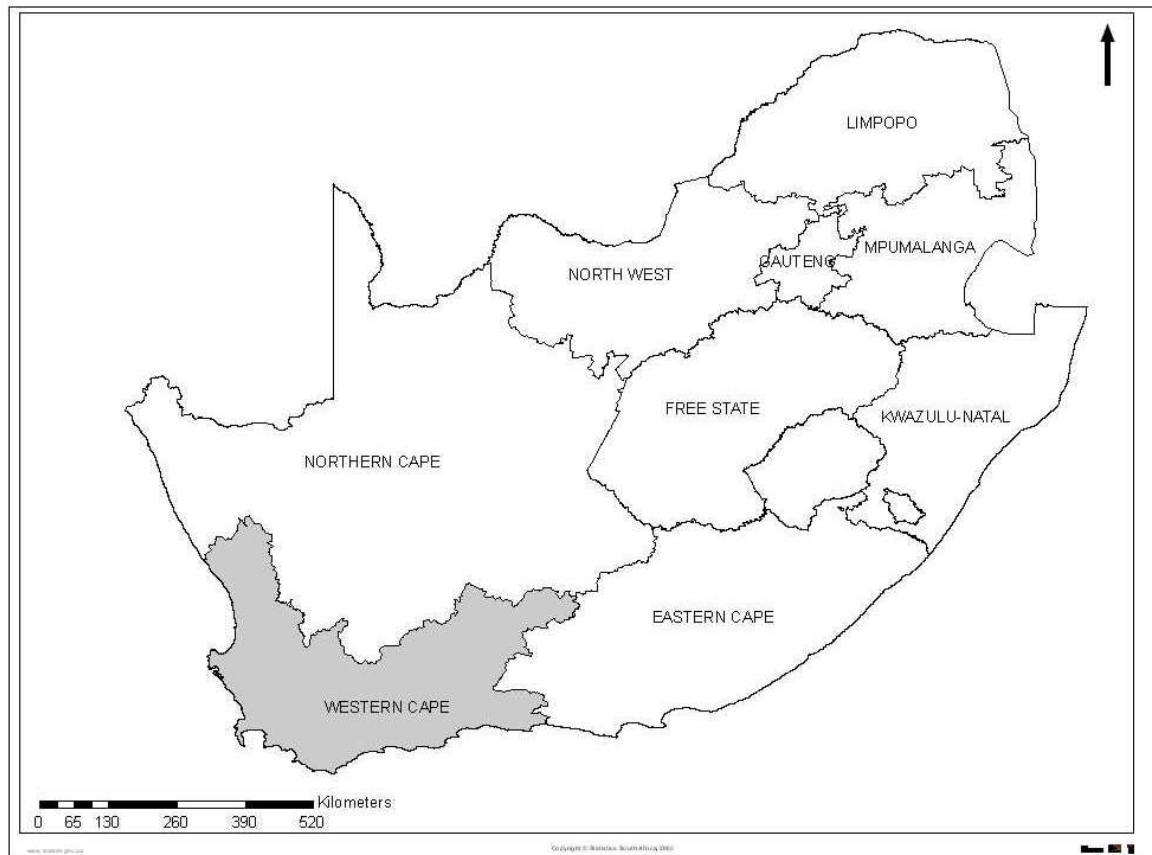
5.1. Introduction

The empirical study is based on South Africa which is divided into nine provinces. Planning is administered mainly on provincial level and therefore the study's focus will be on this level. Further reason for this is that it was seen throughout the theoretical background that an area must create comparative advantage to be successful. Researching the effect of infrastructural development on a national level will therefore be ineffective because of its size and the disparities between the different provinces. Trying to determine the relationship between infrastructural development and economic growth on a local level will not yield sufficient results, as the budget is determined on provincial level and a number of the infrastructure projects have a provincial nature. For this study the Western Cape Province will be used to explain the relevance of infrastructure development to obtain economic growth. The Western Cape is a maturing province showing high growth. Although this growth can be contributed to a wide variety of factors, it will be shown that the influence of infrastructure; and more specifically transport infrastructure; on economic growth is far larger than generally realised. This section consists of a short background of the Western Cape Province and the relevant policies and legislation that guides planning in this province. Thereafter a study will be done to discover the impact of infrastructure development represented by EOC in opposition to the impact of SSOC.

5.2. Socio-economic perspective

The Western Cape Province is one of the nine provinces of South Africa. It grew from a population of 4468172 people in 2000 to 5178928 people in 2010 (IHS Global Insight, 2010). When comparing the population structure of the Western Cape Province to South Africa it is interesting to see that while South Africa shows rapid growth and are still in the acceleration phase, the Western Cape Province shows more constrictive growth and has the profile of a more developed area.

Figure 5.1: The location of the Western Cape Province in South Africa

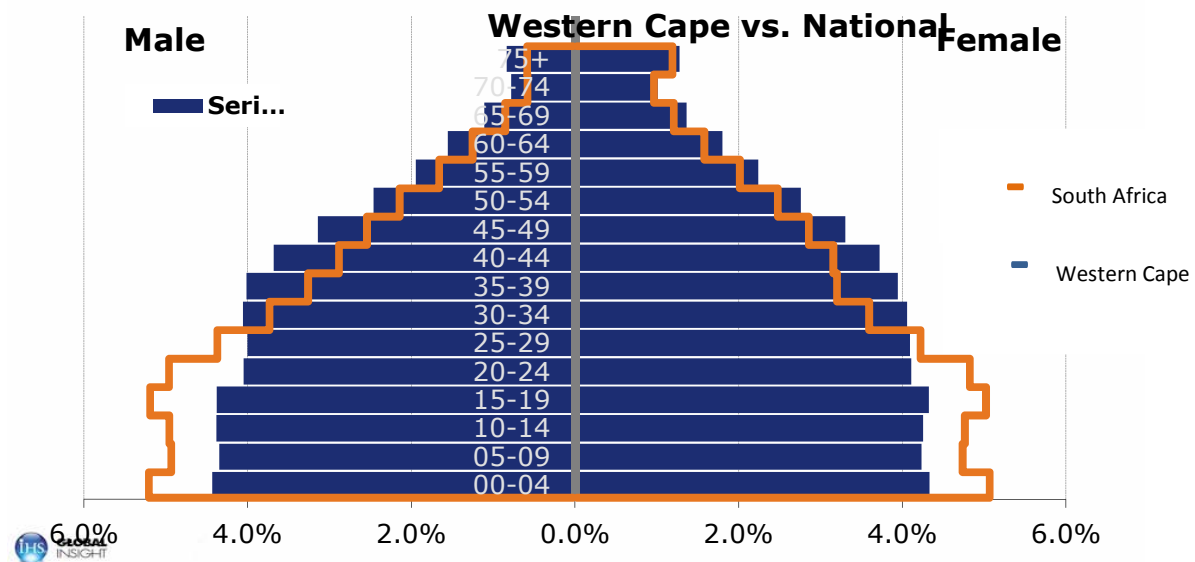


Source: Statistics South Africa (2009)

The reason the Western Cape Province was chosen for this research is because it is seen as an area of national economic significance (South Africa, 2006:20). It has one of the highest percentage of people formally employed and the lowest percentage of unemployment of all the provinces in South Africa (South Africa, 2006:53) and its GDP per capita at constant prices are far more than most of the other provinces, with only Gauteng having a higher GDP per capita (IHS, 2010).

Figure 5.2: Population structure of the Western Cape Province in relation to South Africa

Population structure, Total, 2010



Source: IHS Global Insight Regional eXplorer

Although the Western Cape Province is moving from an expansive pyramid to a constrictive pyramid, meaning the province is becoming more developed with a lower birth rate and higher percentage economic active population, it still has a healthy growth rate of 1.2%. The HDI is also greater than that of South Africa. It has a HDI of 0.71⁷. This shows that the Western Cape Province has a high level of human development, characteristic of more developed areas. The economic active population is 2,225,873 and the formally employed people are 1,527,273. The total number of people employed is 1,741,461 (IHS Global Insight, 2010). From this it can be deduced that only about 200,000 of the employed people are active in the informal sector, which shows that not only is the Western Cape Province developed, but also, a large number of people are formally employed which is good for the economy. We can also deduce that of the economic active population 2,225,873 (78%) are employed. Not only is the level of employment directly related to poverty reduction and development (Hull, 2009:69), the economy will benefit from higher levels of formal employment. This is because of the fact that the money made by people active in the informal sector does not contribute to the GDP and the economy. There is

⁷ The Human Development Index (HDI) is a tool developed by the United Nations to measure and rank levels of social and economic development based on four criteria: life expectancy at birth, mean years of schooling, expected years of schooling and gross national income per capita (ANON, 2011a).

therefore a high level of development in the Western Cape Province. With this background in mind it will be explained why the Western Cape Province is moving forward faster than some of the other provinces.

5.3. Relevant policies & legislation

5.3.1. Introduction

It is not allowed to develop and expand when, where and how you want; certain guidelines must be followed and the development must be in line with relevant policies and legislation. Some policies and legislation on national level have an impact at provincial level and then there are policies and legislation at provincial level. Important policies guiding development in the Western Cape Province's relevance towards infrastructure development will be explained.

5.3.2. National policies

A national policy that influences the Western Cape Province is the NSDP (National Spatial Development Perspective). Its purpose is to provide a comprehensive and incisive analysis of current and future trends, of the factors/forces driving these trends and of the strategic implications thereof in spatial terms (South Africa, 2006:11). The NSDP identified the Western Cape Province as one of the regions in South Africa that is of national economic significance (South Africa, 2006:20). The Western Cape Province forms part of the 26 locations that represent the engine of the South African economy. "These areas and their immediate hinterlands are home to 77.3% of all people living below the minimum level in the country, 84.5% of the total population and generate 95.6% of the national Gross Value Added. Hence government's policy objectives of promoting sustainable economic growth and alleviating poverty operate largely in the same space." (South Africa, 2006:21). The Western Cape Province interpreted the NSDP and obtained the following normative principles that guide the WCPSPDF (Western Cape, 2005):

- Government spending on fixed investment should prioritise areas of economic growth or economic potential;
- Efforts to address past and current social inequalities should focus more on people than on places;

- Settlement growth and economic development opportunities should be channelled into activity corridors and nodes adjacent to or linked to the main growth centres;
- Because the market has not rectified the space economy since 1994 there is a need for intervention;
- Future urban and rural development of the Province should significantly change current patterns of resource use so that there is a meaningful reduction in their consumption in order that all future generations also benefit.

At national level you also have the Breaking New Ground (BNG). This new human settlements plan reinforces the vision of the Department of Housing, to promote the achievement of a non-racial, integrated society through the development of sustainable human settlements and quality housing. In this strategy they are beginning to move away from SSOC investment alone and realise the need for EOC investment to bring about more sustainable communities. Within this broader vision, the Department is committed to meeting the following specific objectives (South Africa, 2004):

- Accelerating the delivery of housing as a key strategy for poverty alleviation.
- Utilising provision of housing as a major job creation strategy.
- Ensuring property can be accessed by all as an asset for wealth creation and empowerment.
- Leveraging growth in the economy.
- Combating crime, promoting social cohesion and improving quality of life for the poor.
- Supporting the functioning of the *entire single residential property market* to reduce duality within the sector by breaking the barriers between the first economy residential property boom and the second economy slump.
- Utilising housing as an instrument for the development of *sustainable human settlements*, in support of spatial restructuring (South Africa, 2004).

From this it is adamant that what the Western Cape Province obtained from the BNG is that sustainable development is a prerogative. Although housing is a key priority, it must rather be seen as a tool that must be utilised to ensure economic growth. The BNG's focus is obviously social or soft infrastructure, and although this study advocates the importance of economic infrastructure, it does not eliminate the importance of social infrastructure for community development. There must however be a shift in the importance of the different types of

infrastructure to ensure economic growth. Although it will be shown that the Western Cape Province focuses more on economic infrastructure, social infrastructure development is never abolished.

Government also published a Sustainable Rural Development Strategy in 2003. This policy moves away from SSOC investment principles and puts more emphasis on the improved provision of services, improved physical infrastructure, and local economic development (LED). This shift in strategy is because of the realisation that EOC will enable poor people to earn more, invest in themselves and their communities, and to contribute towards the maintenance of the infrastructure which is a key contributor to their livelihoods. (South Africa, 2005:41)

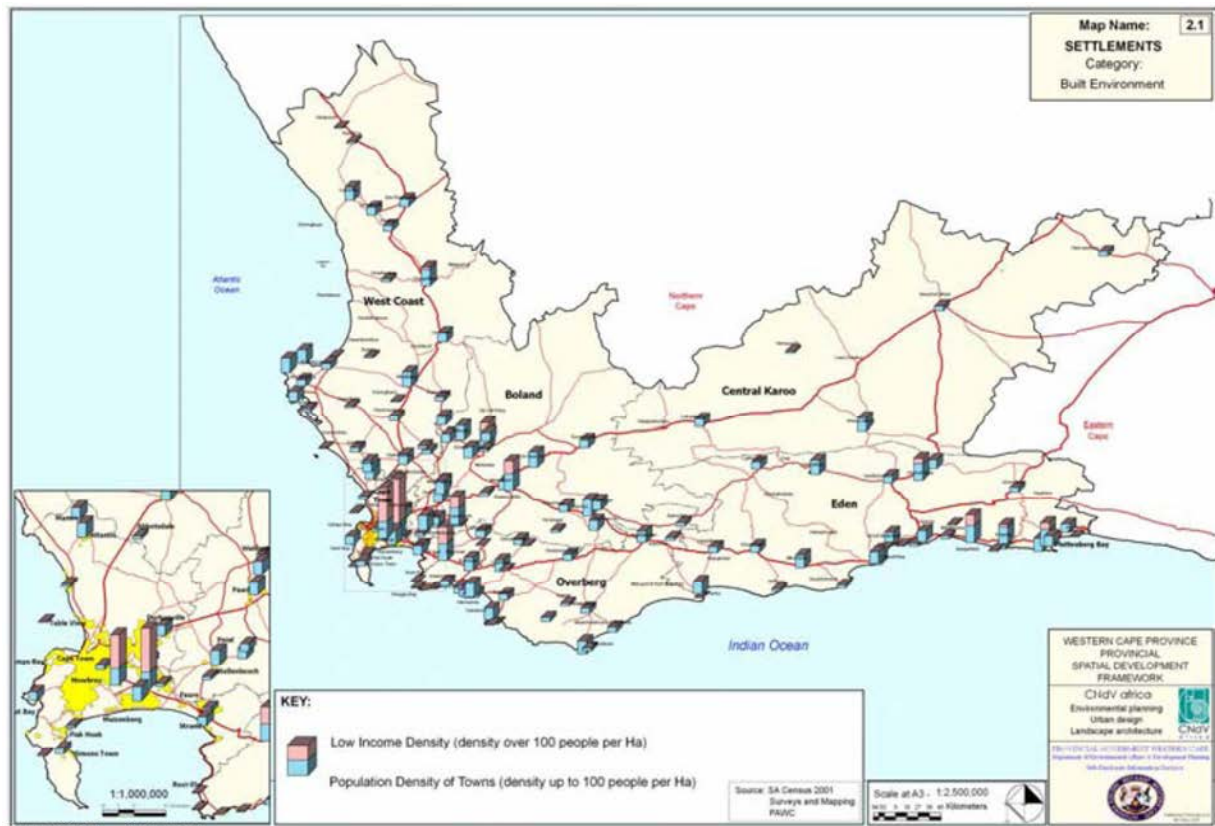
5.3.3. Spatial Development Framework

At provincial level there is the Western Cape Provincial Spatial Development Framework. The purpose of the WCPSPDF is to (Western Cape, 2005):

- Be the spatial expression of the Provincial Growth and Development Strategy (PGDS);
- Guide municipal (district, local and metropolitan) Integrated Development Plans (IDPs) and Spatial Development Frameworks (SDFs) and provincial and municipal Spatial Development Plans (SDPs);
- Help prioritise and align investment and infrastructure plans of other provincial departments, as well as national departments' and parastatals' plans and programmes in the Province;
- Provide signals to the private sector about desired development directions;
- Increase predictability in the development environment, for example by establishing 'no go', 'maybe' and 'go' areas for development;
- Redress the spatial legacy of apartheid.

The purpose of the WCPSPDF is therefore ultimately to be a guideline for development in the province as well as a voice for the national policies and legislation. By earmarking certain areas for development, the Western Cape Province is ensuring that the spatial inequalities of the past are being addressed and that the areas with comparative advantage receive the desired development to ensure its ongoing advantage.

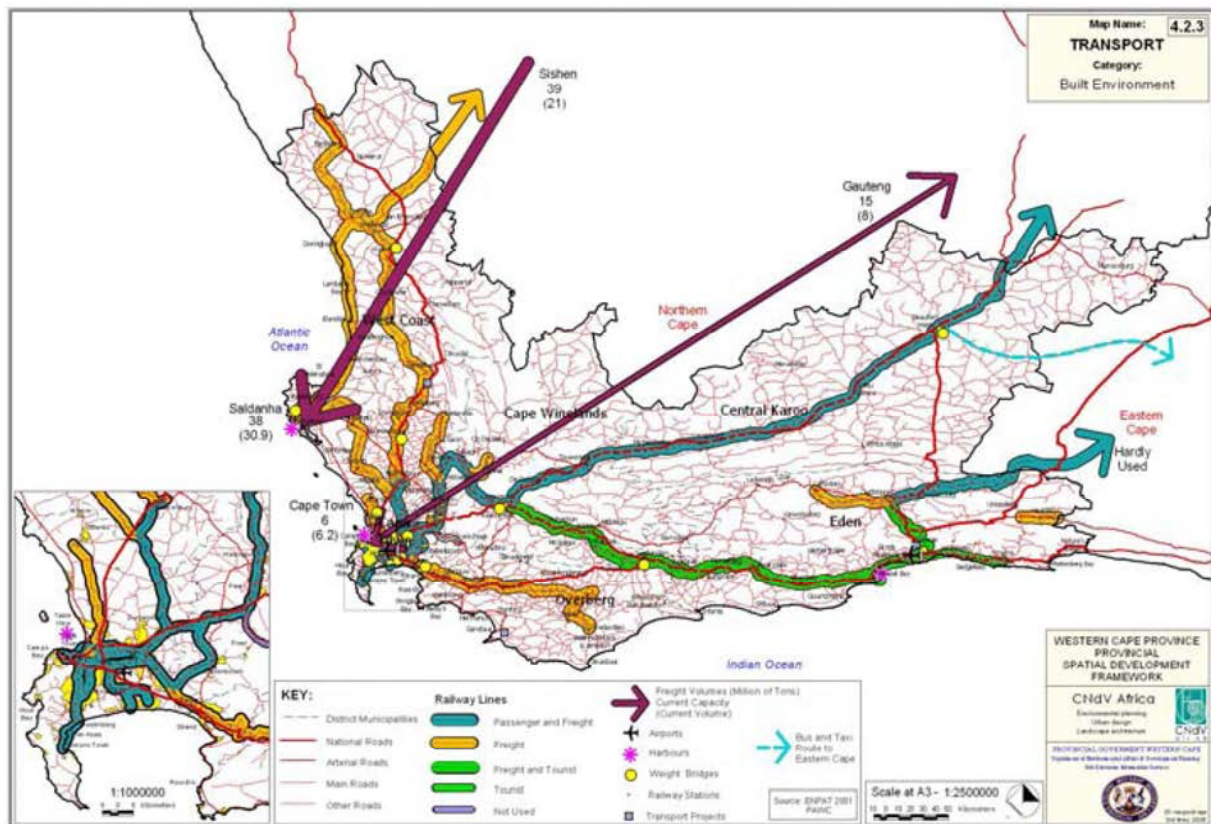
Figure 5.3: Population and income density of the Western Cape Province



Source: Western Cape Province (2005)

The WCPSPDF realises the importance of infrastructure development and makes it one of its key goals: “One of the underlying success factors of any regional economy relates to the movement of goods, people and services. It is important that the role and functioning of the different modes of transport and the impact on the infrastructure are understood in order to focus different investment on the areas of opportunity and need. Without strategic investment in infrastructure and especially public transport, the Western Cape Province will struggle to compete effectively nationally and internationally, attract international and domestic investment and ensure the future economic growth and socio-economic development of the Province’s inhabitants,” (Western Cape, 2005). As seen above, the WCPSPDF concentrates on infrastructure development and within infrastructure, transport infrastructure forms the core for development as shown in Figure 5.4.

Figure 5.4: Transport analysis of the Western Cape Province



Source: Western Cape (2005)

The SDF (Western Cape, 2005) focuses on the following key principles in terms of infrastructure:

- Policy should focus on the intensification of land uses within walking distance from stations and public transport corridors;
- Contact points of rail and land use at and around stations will ensure high intensity development that will create the thresholds that will make the rail service successful;
- Improved and safer pedestrian circulation, cycling and other means of non-motorised transport;
- Develop a cost-effective, integrated, yet pragmatic bundle of land use and transport investment and management strategies to contain and redress the increasing level of automobile dependence that is caused by crime, overcrowding on public transport, dispersal of job opportunities and the dominance of “car culture”;
- Priority should be given to the main gateways, but the capacity of the other facilities, should be utilised to facilitate economic opportunity;

- Rural transport improvements can increase market access and thereby lower agricultural production costs and also facilitate the development of the non-agricultural rural economy;
- Urban transport improvements can increase labour market efficiency and access to amenities;
- Inter-urban transport improvements can facilitate domestic and international trade by speeding up the movement of freight and people;
- Potential key public transport links are identified;
- Invest in tourism related transport;
- Options to provide local mobility to rural population through alternatives such as NMT initiatives (for example bicycles) are being investigated.

The Western Cape Province is trying to develop an integrated transport network making use of all the different transport modes. This will ensure access to transport facilities to all parts of the population. They are moving away from a private vehicle-dependent manner and focusing more on making services and amenities available through walking or making use of public transport. This will decrease congestion and travelling time, it will also increase the accessibility to working opportunities for the poor that were previously unable to access a variety of opportunities. This just shows that the Western Cape Province is trying to improve the infrastructure network by utilising all available opportunities. They are putting emphasis on infrastructure because they have realised the importance of infrastructure for economic growth. Although they are criticised for their methods, it is clear according to the theoretical basis of this study, that they are making the right changes and are moving in the right direction to become a World City. It is also interesting to see that every section of the SDF mentions infrastructure development at least once, whether it is a section on economic development or environmental development. The Western Cape Province have realised that infrastructure does not stand on its own but is an indispensable part of every sector of activity. Without adequate infrastructure and associated transportation networks, the region will lose its competitiveness. As previously stated the fact that economic infrastructure, and more importantly transport infrastructure, is one of the main instigators of economic growth and development in the Western Cape Province, does not mean that they are ignoring the role of social infrastructure. The WCPSDF still incorporates the guidelines for social infrastructure and social development into its framework, ensuring that it is in line with national perspectives. It will be seen in the investment focus that SSOC still comprises a large section of the budget, but the EOC investment increased. From this it can be

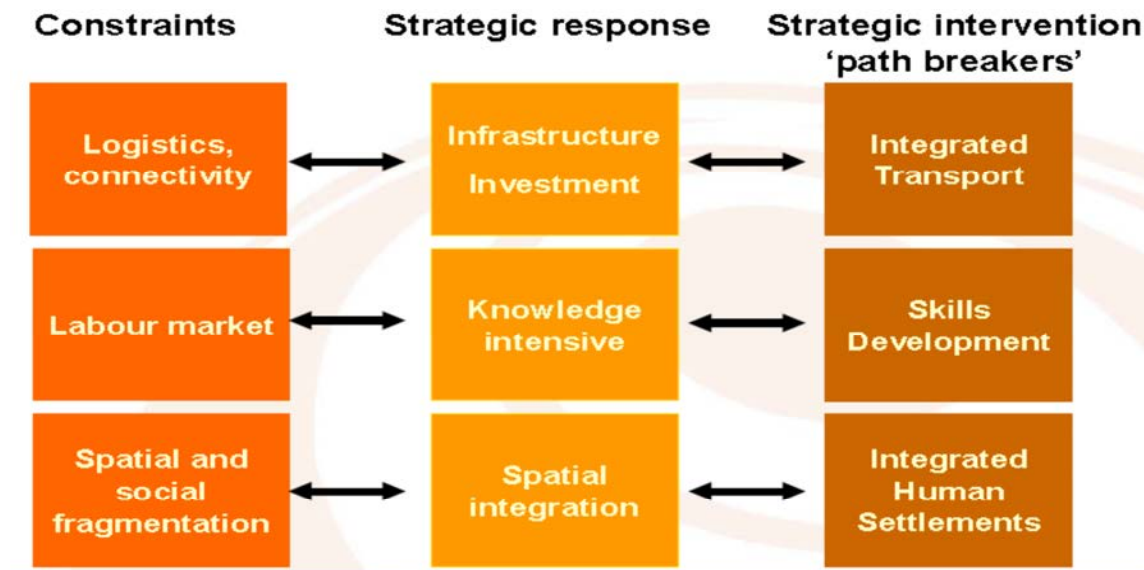
concluded that the Western Cape Province is increasing the focus on EOC because of its influence on economic growth, while dampening the focus on SSOC, although it is still seen as an important part of the budget.

5.3.4. Provincial Growth & Development Strategy

“iKapa Elihlumayo is a series of strategies giving rise to a framework for the growth and development of the Western Cape Province, which faces formidable development challenges” (Western Cape, 2005). In order to materialise this, the Western Cape Province has realised that it is necessary for the coordination and integration of budgets of the national, provincial and local spheres of government. The key purpose of the iKapa Elihlumayo strategy is to grow the economy of the Western Cape Province through catalytic socio-economic interventions that will increase wage employment and per capita income, strengthen sectors, grow new enterprises, raise skill levels, reduce disparities, and broaden meaningful economic participation by all (Western Cape, 2007:71). The GDS focuses largely on infrastructure development: “The iKapa GDS is firmly based on the recognition that the linkage between household infrastructure dedicated to improving basic needs and economic infrastructure aimed at growth and job creation, needs to be jointly considered as the path-breaker to achieving shared growth and integrated, sustainable development” (Western Cape, 2007:86).

This strategy consists of a spectrum of programmes, for example the Strategic Infrastructure Plan (SIP). It basically entails that the Western Cape Province “spend strategically on infrastructure in locations where the economic and social returns will be the highest,” (Western Cape, 2005). One of the other programmes includes social capital, but what is important is that in the SIP they bring EOC and SSOC together and focus on the fact that EOC is necessary to bring about SSOC. While other provinces focus on SSOC and EOC separately, the Western Cape Province realise that all the money cannot be invested in SSOC because it will not bring about the same growth in the economy.

Figure 5.5: Shared growth and integrated development



Source: Western Cape White Paper: iKapa GDS (2008)

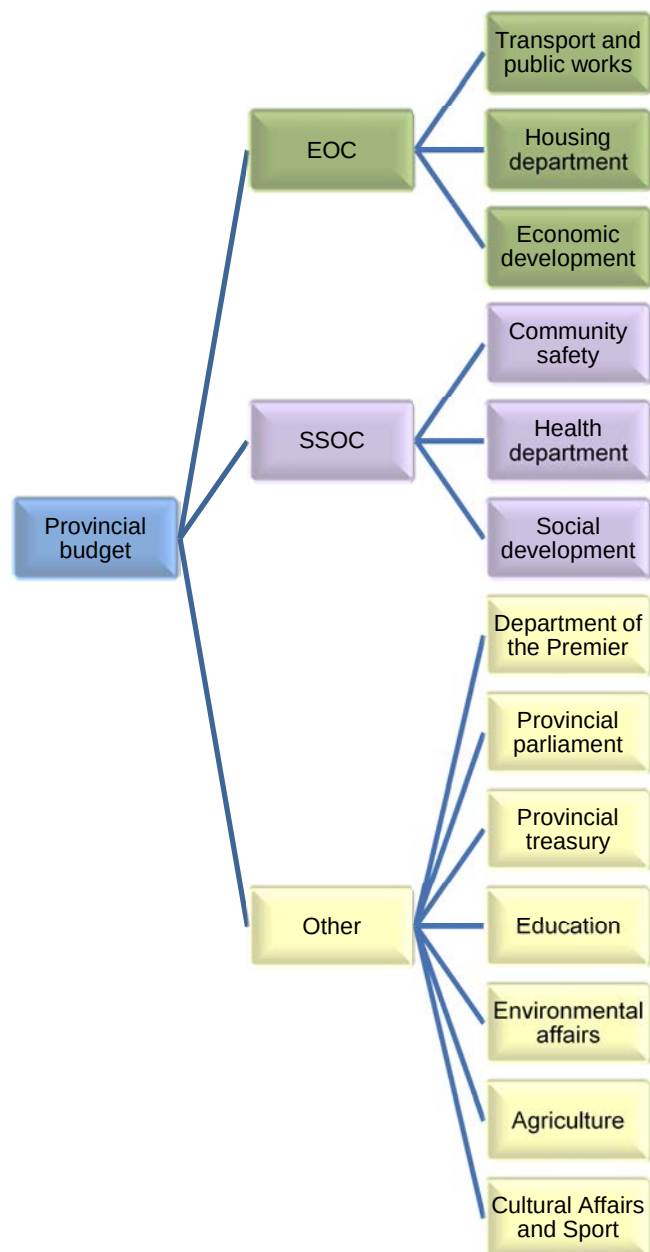
Figure 5.5 shows certain constraints and the responses and interventions the iKapa GDS will use to combat these constraints. The responses combine infrastructure investment, knowledge intensives and spatial integration. This, however, is not where they stop as they realise that these general responses will not give enough measures as to what needs to be done to ease these constraints. Therefore they identify certain strategic interventions to ensure that something concrete is done about the constraints. By focusing on integrated transport as strategic intervention, infrastructure investment will take place and this will increase connectivity. Skills development will form part of the knowledge intensive to help the labour market. Integrated human settlements will help bring about spatial integration and combat existing conditions of spatial and social fragmentation. These interventions will bring about sustainable development through lifting existing constraints in the Western Cape Province (Western Cape, 2007:60-90). This shows once again that the Western Cape Province is moving beyond the development of their plans to ensure that these plans are also implemented. This is an important part of development as strategies alone will not be of any help, spatial planning encompasses not only planning, but also implementation.

5.4. Investment focus

To evaluate the effect of infrastructure on the economy, the influence that Economic Overhead Capital (EOC) and Strictly Social Overhead Capital (SSOC) had on the Gross Domestic Product per capita (GDP per capita) were evaluated. This section will show the results of a detailed

study of the Western Cape Province. The budget of the Western Cape Province for years 2000 to 2010 were divided into different sectors. EOC consisted of the transport and public works department as well as the housing department (because it includes sanitation, electricity) and the economic development department. SSOC consisted of community safety department, health department and the social development department (Krugell, 2011).

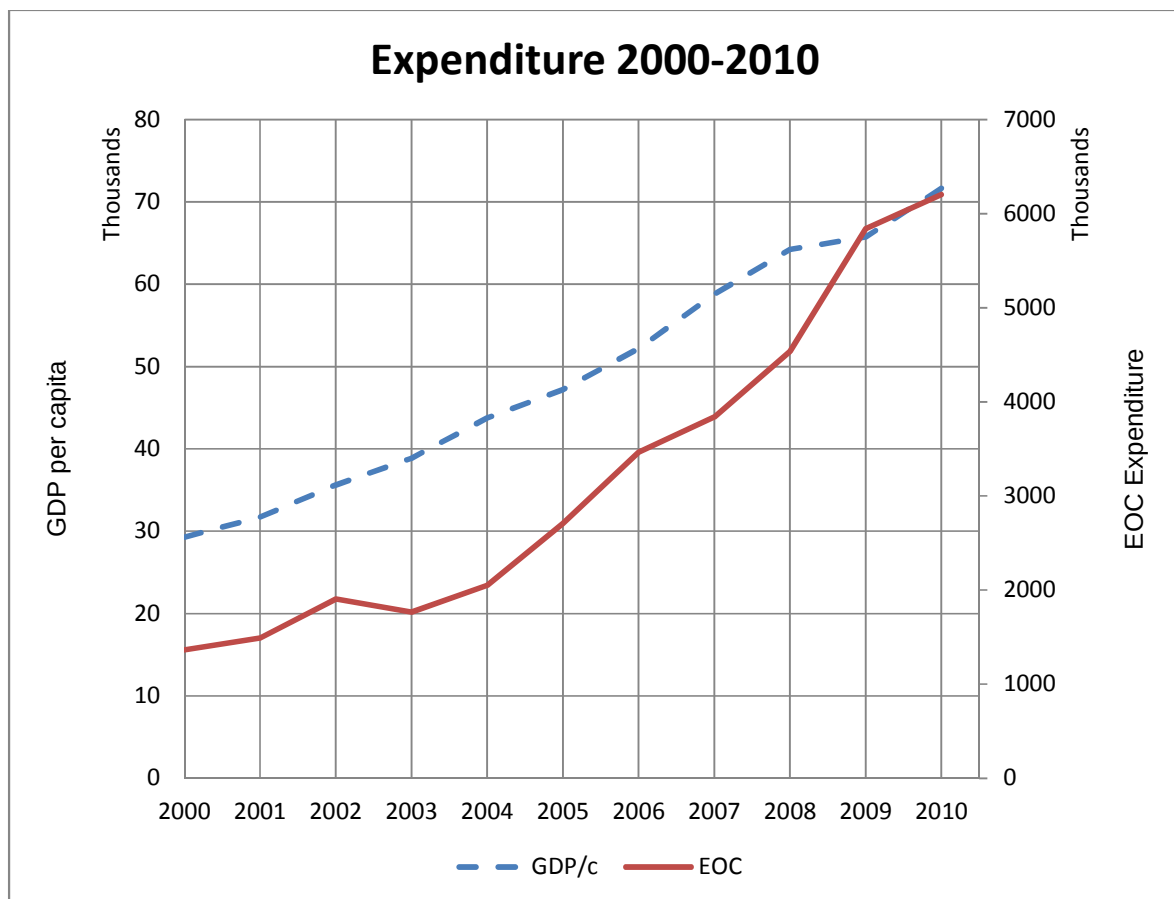
Figure 5.6: Provincial budget breakdown



Source: Own compilation based on Department of National Treasury (2011)

According to Bos (1990:24) economists and planners focused mainly on the fact that the highest return on capital can be acquired through investing in the industrial sector. This will bring about growth in the GDP and therefore the GDP was the main focus. This however changed over the years since development was not only measured in economic terms; politics, social and cultural measures are now also to be taken into account (Bos, 1990:32). But the problem is that the economic measures are now being forgotten and the focus shifted only towards political, cultural and social measures. For a region to develop there must be economic growth and this is why this study will focus on the effect that the EOC and the SSOC has on the GDP per capita.

Figure 5.7: Expenditure on EOC 2000-2010 plotted against GDP

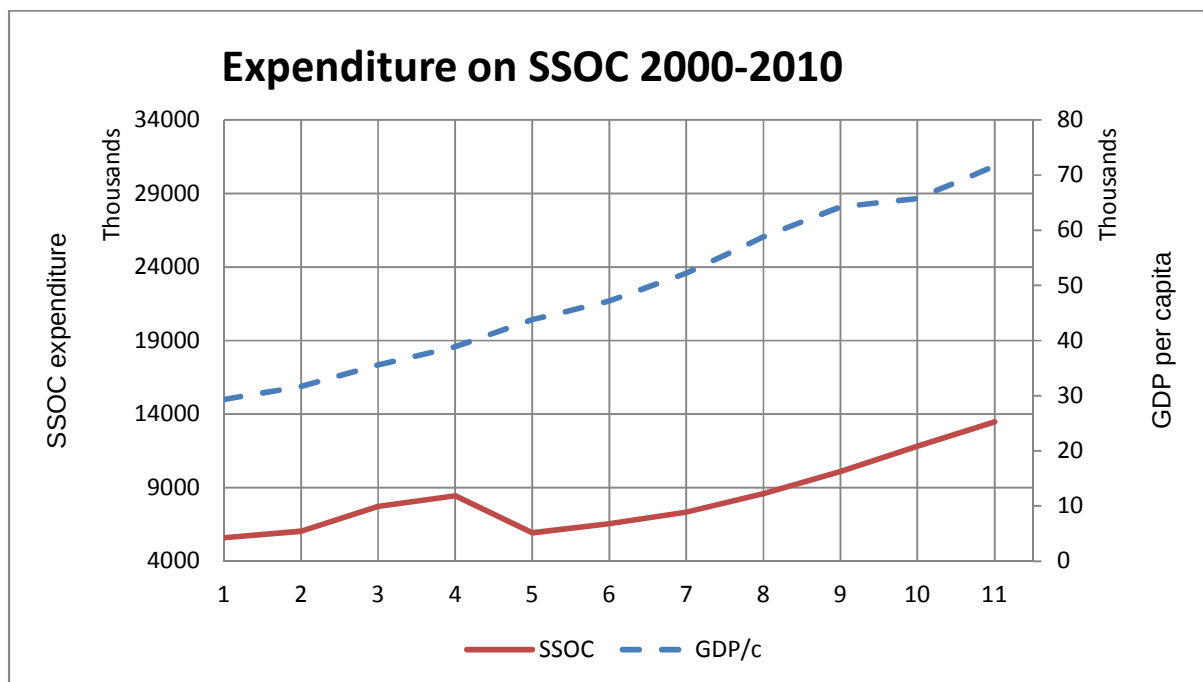


Source: Author's own calculations based on Global Insight - ReX, 2011

The red line represents the EOC expenditure over the years 2000 to 2010. There is a definite increase in EOC expenditure from 2000 to 2010 and this leads to the question if there is a relationship between this increase and the increase in GDP per capita over the same years represented by the blue line. The increase in EOC also leads to the belief that there must be a

change in the amount of the total budget allocated to EOC that will be explored later on. This figure shows that the EOC increased within the 2000 to 2010, implying that there was an increase in the compilation of sectors making up EOC. It will later be assessed which of these sectors was responsible for the increase in EOC. What is of importance for now is that together with the increase in EOC, the GDP per capita also increased, letting us to believe that there is a relationship between EOC and the GDP per capita. When comparing this with the theoretical framework of the first few chapters we can come to the conclusion that this is indeed not just possible, but likely. The percentage of the total expenditure on EOC also increased over the years. In 2000 it was a mere 11,889% and it grew until it reached 18,103% in 2010 (South Africa, 2011).

Figure 5.8: Expenditure on SSOC 2000-2010 plotted against GDP



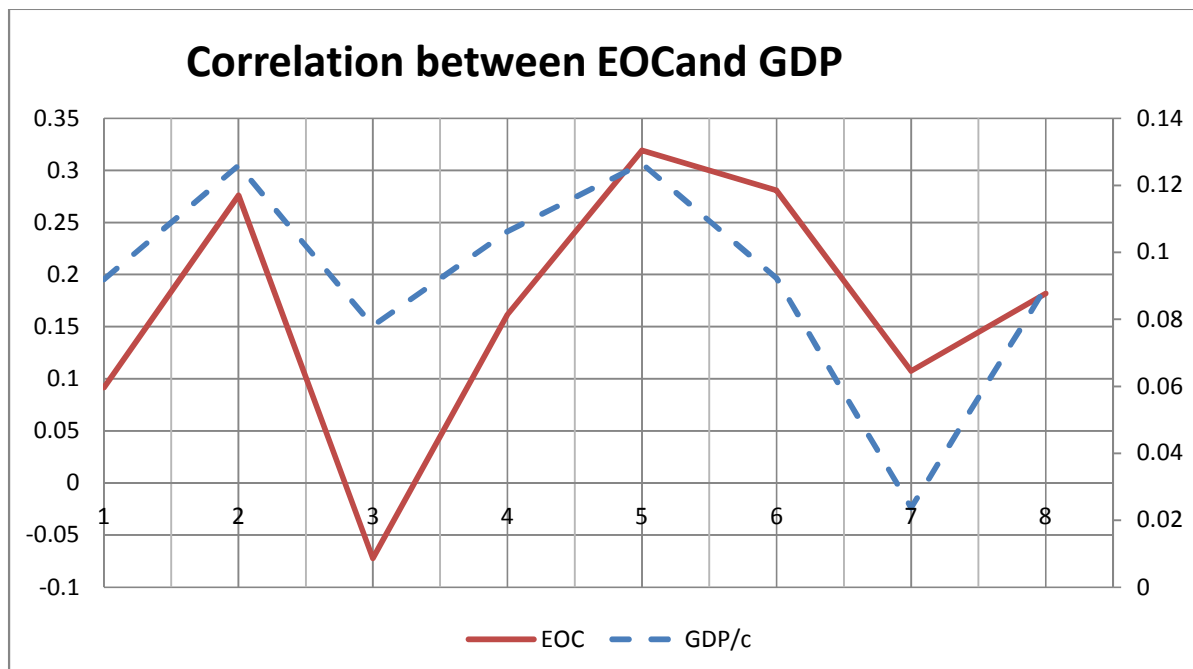
Source: Author's own calculations based on Global Insight - ReX, 2011

Although an increase in SSOC can be seen, the increase is significantly smaller. This increase is basically just the normal increase because of the increase in the total budget. The SSOC as percentage of the total annual budget decreased. In 2000 an exorbitant 48,699% of the total budget was spent on SSOC. This decreased with about 10% over ten years and was 39,329% in 2010 (South Africa, 2011), implying that the increase in GDP per capita cannot be related to SSOC, as SSOC's percentage decreased and therefore EOC is of greater importance to

achieve economic growth. Therefore the correlation between EOC and the GDP per capita will be further investigated.

These two figures basically show that the relationship between the EOC and the GDP per capita is far greater than the relationship between the SSOC and the GDP per capita. Figure 6.7 shows that when there is an increase in EOC, the GDP per capita will increase in about two years after the increase in EOC. Although Figure 6.8 shows that the SSOC also increased in this same period, it can be seen that the relationship between the increase in SSOC and the increase in GDP per capita is not similar.

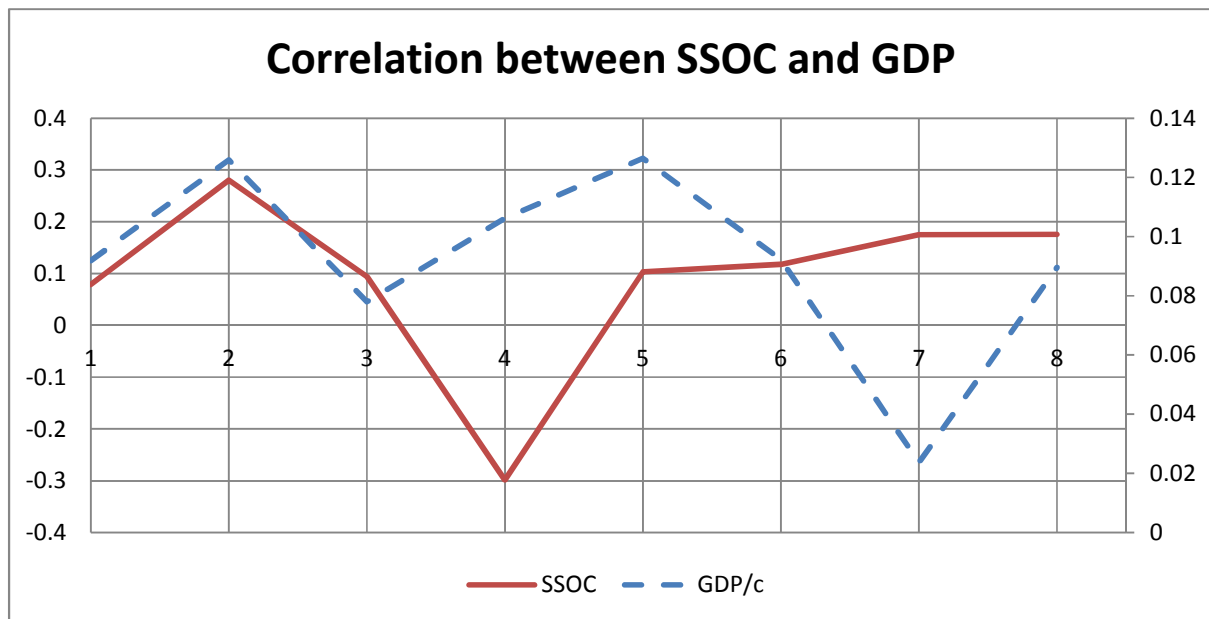
Figure 5.9: Correlation between EOC and GDP (two years later)



Source: Author's own calculations based on Global Insight - ReX, 2011

This figure is a visual representation of the increase or decrease of the EOC from year to year plotted against the increase or decrease of the GDP per capita two years later as it was seen that investment in EOC takes approximately two years to have an effect on the GDP per capita. It seems that there is a direct relation between the two factors. Increasing the EOC will seemingly result in an increase in GDP per capita. The result of the increase in EOC can be seen in approximately two years' time, meaning that when increasing the EOC for 2010 the results will be seen only after two years. When studying only the present, this effect will not be noticed and this is greatly why the relationship has not been classified so concretely in the past.

Figure 5.10: Correlation between SSOC and GDP (two years later)



Source: Author's own calculations based on Global Insight - ReX, 2011

Figure 5.10 is the same as the previous one, the only difference being that SSOC is now used instead of the EOC. It is interesting to note that not only is the correlation far worse, an increase or decrease in SSOC will likely result in the exact opposite in the GDP per capita, meaning that when the SSOC decreases it will have a positive effect on the GDP per capita and economic growth is bound to take place if this is together with an increase in EOC.

The regression analysis of the GDP and EOC also showed a regression coefficient of 0.96 which is high and means the 96% of the variation in GDP can be explained by the variation of the EOC expenditure. This suggests that investing in the EOC helped the Western Cape provincial economy to grow. The correlation coefficient between SSOC and GDP is also much lower at only 0.67, which means that variation in SSOC explains much less of the variation of the GDP. Therefore if the economy has to grow and the GDP per capita has to increase, more should be spend on EOC. When the Western Cape started to decrease the amount of expenditure on SSOC, the GDP per capita increased.

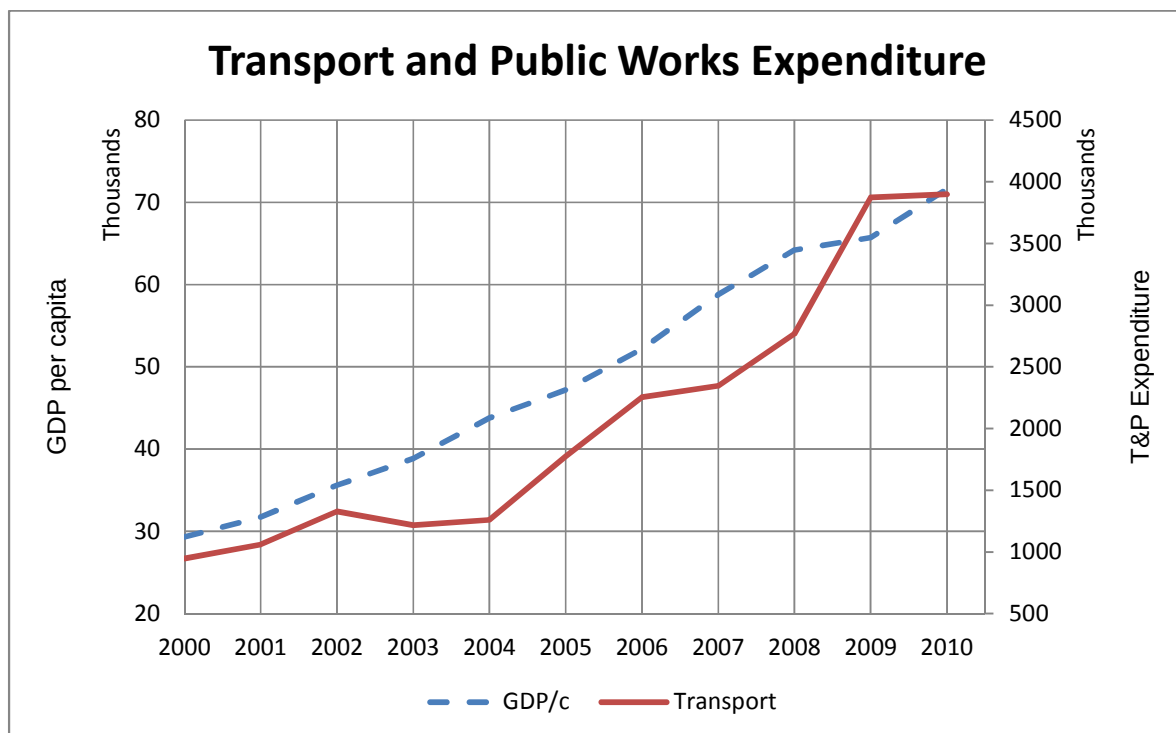
This analysis illustrates that to accomplish economic growth expenditure on EOC should increase and exceed expenditure on SSOC. However, the EOC is a wide and differing concept and it is therefore necessary to do further investigation and determine what department of EOC has the greatest effect on the GDP. Now that it is known that it is imperative to invest in EOC it

must be determined where this money must be allocated to and this will be explained in the following section.

5.5. Impact of transport sectors

In the previous section was shown that EOC had a positive correlation with the GDP while SSOC had a negative correlation with the GDP, therefore the different departments that made up the EOC were evaluated individually. The findings will be discussed in this part of the chapter, shedding light on what it is that influences the GDP positively and will in effect help the economy to grow.

Figure 5.11: The relationship between Transport and Public Works and the GDP for 2000-2010



Source: Author's own calculations based on Global Insight - ReX, 2011

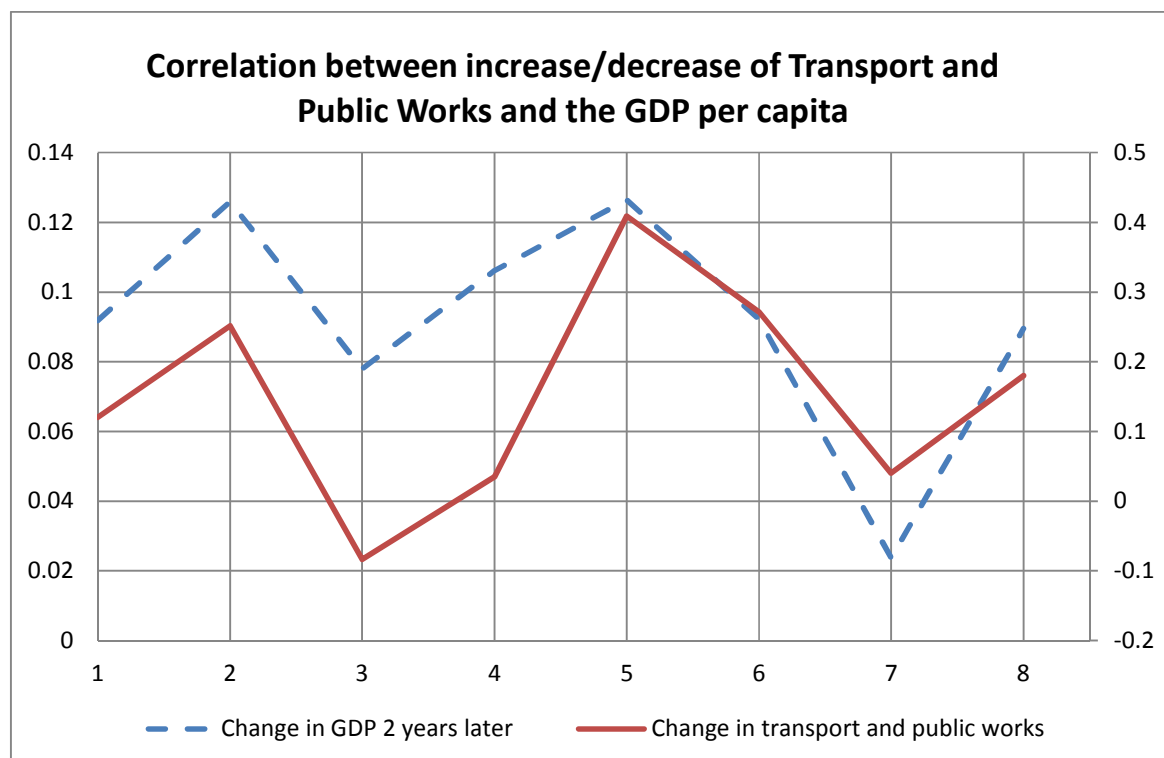
Study showed that the transport and public works department had a big influence on the GDP. When plotting the GDP against Transport and Public Works⁸ a definitive relationship can be seen between the two, an increase in transport and public works will show an increase in the GDP per capita in two years' time and vice versa. For example, in 2004 and 2005 the amount of

⁸ It is difficult to extract transport from Transport and Public Works, but as it encompasses the largest part of the sector and since Public Works are related to Transport it is not necessary to divide the two.

expenditure in transport and public works increased drastically and correspondingly the GDP per capita increased in 2006 and 2007. When the increase in expenditure on transport and public works declined in 2006, the increase in the GDP also declined in 2008, although both still show an increase.

This however does not show the direct correlation between these two factors. When comparing the increase or decrease from year to year in the expenditure on transport and public works for the years 2000-2010 with the increase or decrease from year to year in the GDP two years later, it was found that the coefficient of correlation is 0,95. (See addendum A for a detailed report). This means that the variation in expenditure on transport and public works explains 95% of the variation in the GDP per capita in the Western Cape Province. Therefore, spending your money on transport and public works will be bound to show results. This corresponds with the correlation between the EOC and the GDP per capita; proving that the transport and public works department is what is making the EOC such a positive investment to help the GDP.

Figure 5.12: Correlation between increase or decrease in Transport and Public Works Department and the GDP per capita (two years later)



Source: Author's own calculations based on Global Insight - ReX, 2011

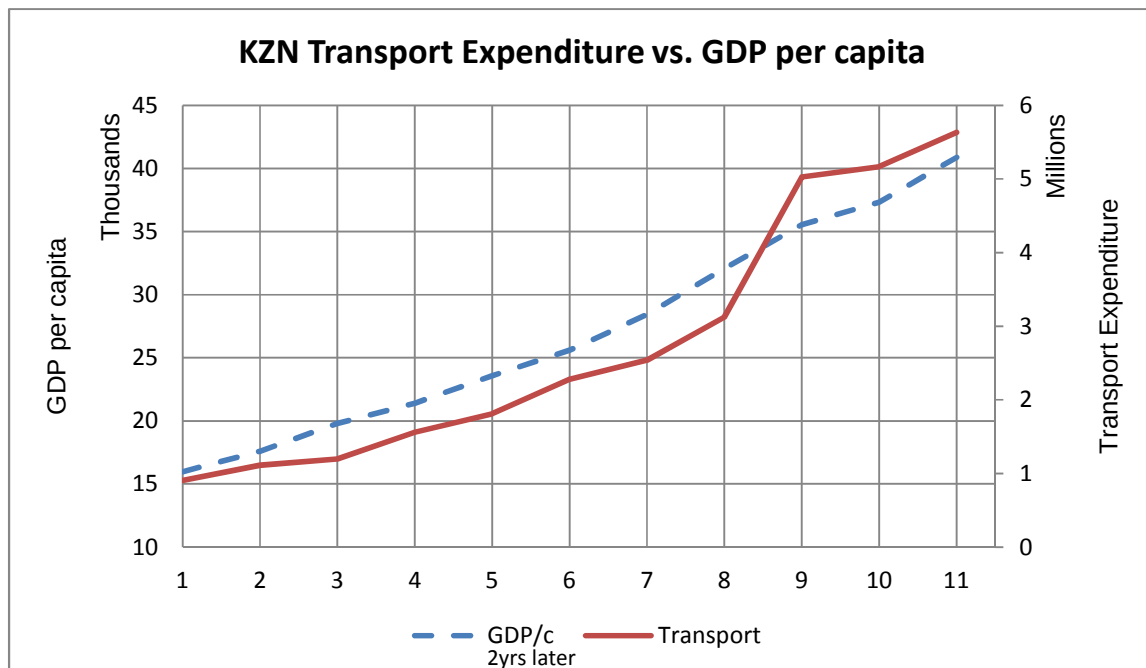
When the DBSA (2007:6) said that infrastructure provision affects, and is affected by, both the level of economic development and its change over time, they were correct. This just showed that increasing expenditure on transport and public works will have a 95% possibility of increasing the GDP per capita and therefore investing in infrastructure, and most importantly in transport, will decidedly help the economy to grow.

This study can also help to determine future amounts of GDP per capita. On average a 3.365% variation in the expenditure on transport and public works of one year defines the variation in GDP per capita two years later (see Addendum A for an explanation). At the amount budgeted for the year 2012 to 2011 on transport and public works of R3 897 827, the average GDP per capita in the year 2012 to 2013 will be R131 161. It must however be remembered that there are other factors also playing a role in the GDP per capita and this will be the case if all else remain the same (*ceteris paribus*).

5.6. Other case studies

It is possible to think that this was coincidental and that this is only the case for the Western Cape Province. It is therefore necessary to test this theory in other provinces as well. KwaZulu-Natal Province is used to find out if the same results will apply to other provinces as well.

Figure 5.13: KZN Transport expenditure vs. GDP per capita two years later



Source: Author's own calculations based on Global Insight - ReX, 2011

It can be seen that there is a similarity between this figure and Figure 5.11. An increase in the amount invested in transport goes hand in hand with an increase in GDP per capita for Kwa-Zulu Natal province. It was also found that the coefficient correlation between transport in Kwa-Zulu Natal and the GDP per capita for this province was a large 0.93, indicating that increasing transport expenditure will result in an increase in the GDP per capita.

Through calculations it was discovered that the percentage of total expenditure for the Western Cape Province allocated for EOC investment increased from 11,889% in 2000 to 18,667% in 2010 while the amount allocated for SSOC decreased from 48,699% in 2000 to 40,556% in 2010. For KwaZulu-Natal EOC investment increased from 8,291% in 2000 to 15,008% in 2010. KwaZulu-Natal can therefore continue to increase the EOC expenditure further to attain higher levels of development through a larger increase in GDP per capita. As the increase in EOC expenditure is about the same as the decrease for SSOC expenditure in the Western Cape Province, it can be assumed that to increase EOC expenditure the necessary amount can be taken directly from the amount spent on SSOC, therefore not affecting other expenditure departments of the budget.

5.7. Conclusion

This chapter's goal was to show that infrastructure plays a role in helping the economy to grow faster. It was not just proven here that investing in infrastructure will influence economic growth, but also that without infrastructure investment the chances of the economy growing at all is slim. While investment in SSOC has a minimum, or possibly a negative, effect on the economy, investment in EOC will assist the economy to grow. Investment in transport in particular will have a big influence on the GDP per capita and therefore on the economy as a whole. It is generally thought that to help the people better their circumstances you must better their living conditions and provide them all with access to for example hospitals to supply them with humanity. This study, however, showed that by doing this you will not be helping the economy and therefore the poverty that dominates this country will not be eradicated. Although investment in infrastructure development will not provide everyone with a warm bed and roof over his or her head, it will have a marked influence in the long-term on not only the economy, but also on the people. According to the DBSA (2007:6-7) developmental infrastructure concerns more than just economic growth and diversification. "One measure of its empowering effects is its contribution to reducing poverty. The vulnerability of poor people can be countered by redressing low income levels, hazardous physical conditions, social powerlessness and

isolation. Infrastructure has considerable potential in this regard. For example, energy provision can ensure a better work and study environment, access to information via the media and more time for productive activities. Improved transport provides access to markets, employment opportunities, social and medical services, education opportunities and friends and family.” (DBSA, 2007:6-7). Therefore, rather invest in infrastructure and then people will be able to better their living conditions on their own and they will then be able to pay for the hospitals, etc that makes up SSOC. This will save the economy money by decreasing the need for subsidies and free health care and services.

6. EMPIRICAL STUDY: NORTH WEST PROVINCE

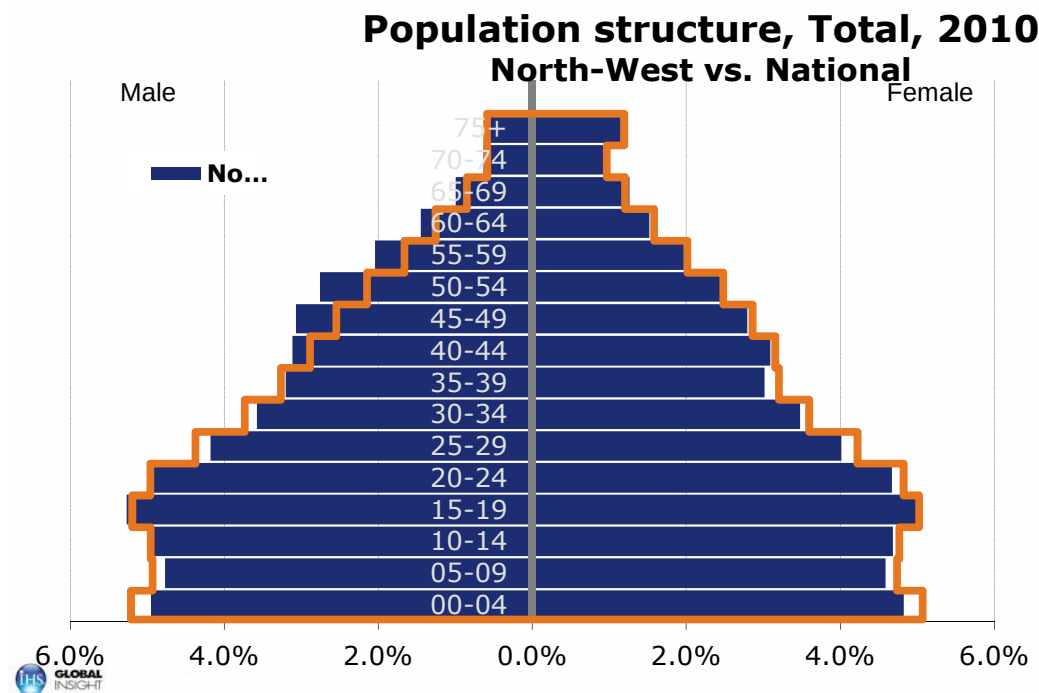
6.1. Introduction

While the Western Cape is a maturing province, moving ahead of the other South African provinces, the North West Province is lagging behind. In the previous chapter it was established that infrastructure development (EOC expenditure) is a prerequisite for growth. This gives a starting block when evaluating the North West Province. This chapter will determine if the North West Province's slow growth can be attributed to a lack of investment in infrastructure and a deteriorating state of established infrastructure that can hamper progress.

6.2. Socio-economic perspective

Different from the Western Cape Province, the North West Province has not grown substantially over the last years. While the Western Cape Province showed a more developed population pyramid, the North West Province's population pyramid is in accordance with the South African population pyramid – that of a still developing region. The HDI of the North West of 2010 is 0.51, while South Africa's HDI was 0.58 and the Western Cape Province's 0.78 as previously stated. This shows that while the Western Cape Province is well ahead of South Africa, the North West Province is struggling to even keep up with South Africa. Although poverty has decreased over the years, this decrease is a minimum and the percentage of poverty is still above 40%, meaning nearly half of the province is still living below minimum living levels.

Figure 6.1: North West Province population structure



Source: IHS Global Insight Regional eXplorer version 626

6.3. Relevant policies and legislation

6.3.1. Introduction

The reasons for giving a summary of the relevant policies and legislation have been explained in the section on the Western Cape Province. Although the national policies and legislation are the same for both provinces, the interpretation differs for each province. It is therefore necessary to determine the principles and objectives the North West Province learnt from national policies and legislation. The provincial policies and legislation of the North West Province must be evaluated to find out what guides development in the province and what differentiates the North West Province from the Western Cape Province.

6.3.2. National policies

Because of the different spheres of government, provincial legislation cannot stand on its own. It must be aligned with national policies and legislation, ensuring that development takes place according to plan. The National Spatial Development Perspective (NSDP) plays a big role in determining provincial policies. The North West Province (2009:9) summarised the points of departure of the NSDP combined with those of the Provincial Growth and Development Strategy as follows:

- Focusing economic growth in economically sustainable areas by formally adopting economic growth as a prerequisite for the achievement of all other policy objectives;
- Spending on fixed investment, beyond the constitutional obligation to provide basic services to all citizens should be focused on localities of economic growth and / or economic potential;
- Efforts to address past and current social inequalities should focus on people not places. In these areas only the constitutionally mandated minimum level of services should be provided. Investment in these areas should be in people (which are mobile).

The North West Province obtained certain principles from the NSDP that guide development decisions in any specific area in the Province. The North West Province (2009:9) summarised it as follows:

- *Principle One:* Economic growth is the prerequisite for the achievement of other policy objectives such as poverty eradication and equitable development;
- *Principle Two:* Government infrastructure investment – beyond basic service delivery – will be in areas of high development potential or economic growth;
- *Principle Three:* Efforts to address inequalities should focus on people and not places;
- *Principle Four:* Areas with high levels of poverty and high development potential should receive investment to provide basic services to exploit this potential;
- *Principle Five:* Areas with high levels of poverty and low development potential should receive investment to provide basic services as well as social transfers;
- *Principle Six:* Focusing future settlement and economic development opportunities into activity corridors and nodes adjacent to, or linked to main growth centres;

- *Principle Seven:* Rather increase the footprint of existing urban areas through incremental development and densification than to initiate new greenfield developments far removed from all existing infrastructure and economic activity.

These principles will form the basis of development in the North West Province. From the principles it can be seen that infrastructure development receives attention. It also focuses on unbalanced development by focusing on activity corridors and administering more money to areas with development potential and only providing basic services to those areas with little potential.

6.3.3. Provincial Growth and Development Strategy

The North West Provincial Growth and Development Strategy is a strategy to guide development in the province for 2004-2014. It states what should be done in the province during this decade. Its goals are integrated and sustainable growth and economic development (North West, 2004:4). Its goals and objectives can be summarised as follows:

Figure 6.2: Provincial Growth and Development Strategy: Goals and Objectives



Source: Own compilation based on North West, 2004

During the Provincial Growth and Development Summit (August 2004) the following growth pillars were identified to achieve these goals and objectives (North West, 2004:21):

- Growth and Investment;
- Agriculture and Rural Development;
- Mining and Energy;
- Manufacturing;
- Tourism;
- Construction and Infrastructure;
- SMME;
- Training and Skills Development.

Under the Construction and Infrastructure Pillar it is stated that the costs and benefits of specific projects in terms of their contribution to social development and leveraging of economic growth must be evaluated, implying that the North West Province understands the importance of infrastructural development for economic growth (North West, 2004:22). Later in the document good governance in the public service is stated as critical for the successful implementation of government programmes through which services are delivered. It was however seen that a lack of good governance seems to be the problem with infrastructure development.

6.3.4. North West Spatial Development Framework

The North West Provincial Spatial Development Framework is there to guide and orchestrate development in the province. Its spatial vision is to (North West, 2009:9):

- Jointly focus and deliver on key national and provincial priorities;
- Deliver services and channel resources in the most effective, efficient and sustainable way;
- Significantly reduce the dualistic nature of the Provincial economy into a single and integrated economy that benefits all.

This vision is economically orientated. The way the province aims to achieve this is through the following means:

- Develop economic sectors and spatial localities in accordance with people's need and potential;
- Deliver on the constitutional obligation to provide basic services to all citizens.

- Address past and current social inequalities in specific areas by focusing on *people* and not places;
- Offer the poor access to opportunities to exercise choices in improving their quality of life and work together towards a single and integrated economy in a dignified manner;
- Protect the integrity of the natural resource base and use the natural resource base of the province in a sustainable manner.

Although they state that access must be improved, hinting at infrastructure investment, infrastructure investment is not a core aspect. From the third bullet it is obvious to see that the NWPSDF will place more focus on the people, in other words – SSOC investment.

They do, however, have principle led responses that must be applied, which are the following (North West, 2009:13):

- Economic growth and development is the prerequisite for the achievement of other policy objectives such as poverty eradication and equitable development;
- Government infrastructure investment – beyond basic service delivery – will be in areas of high development potential or economic growth;
- Areas with high levels of poverty and high development potential should receive investment beyond basic services to exploit this potential;
- Focusing future settlement and economic development opportunities into activity corridors and nodes adjacent to, or linked to, main growth centres.

From this it can be deduced that although infrastructure investment may not be the main development approach, it does receive attention and they realise the importance of infrastructure investment for economic growth.

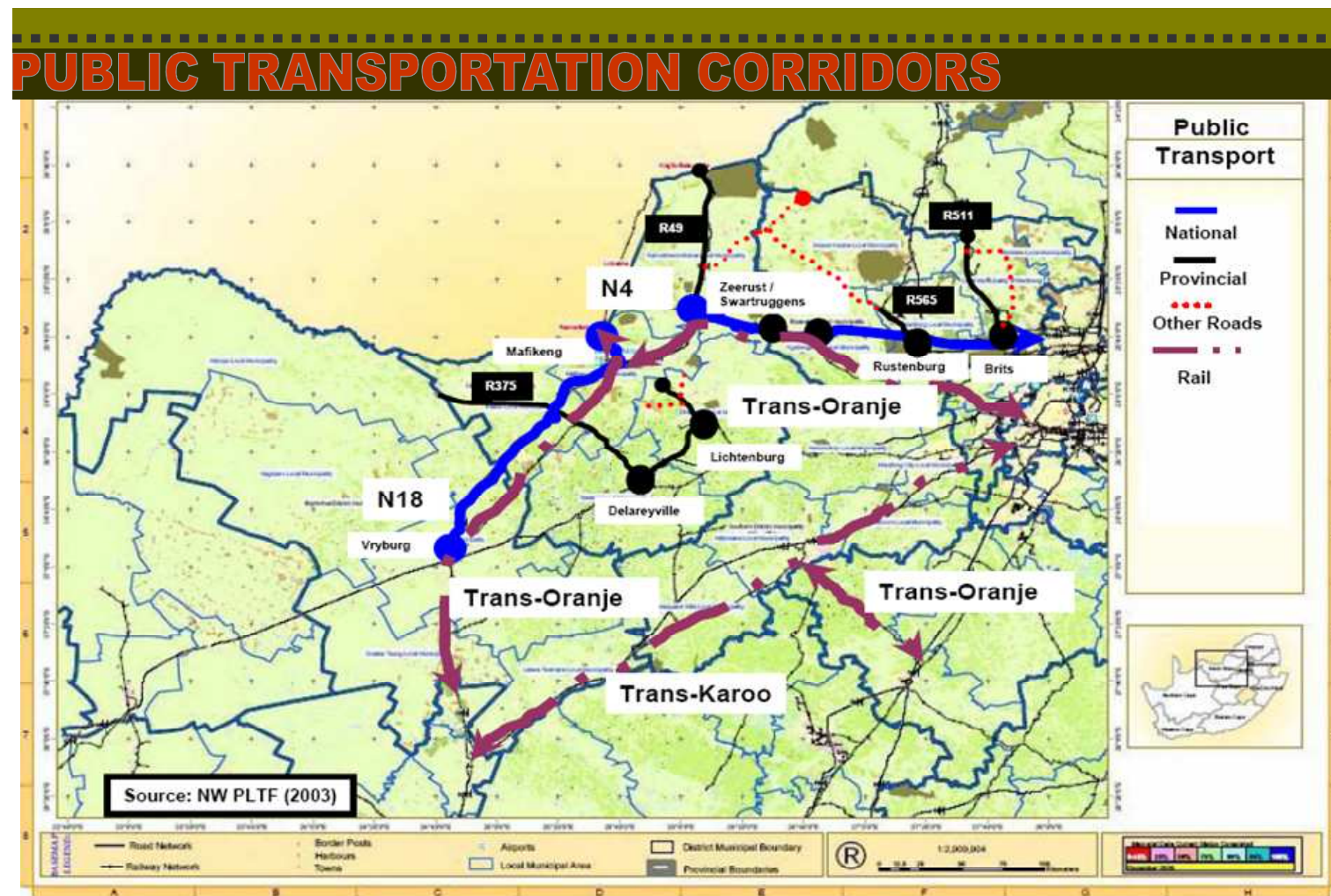
The NWPSDF makes use of spatial structuring elements to guide development. One of these elements is “Corridors and Transport Infrastructure”. They plan on reinforcing the following corridors (North West, 2009:24):

- The Platinum Corridor is focused on the North West portion of the East West Corridor that links Maputo in the East with Walvisbay in the West through Nelspruit-Pretoria-Rustenburg-Lobatse-Windhoek;
- The Treasure Corridor is strengthening developments from Johannesburg to Potchefstroom, Klerksdorp and further south along the N12 national road;

- The Western Corridor is intended to strengthen a North- South initiative from SADCC through Botswana southwards. This corridor simultaneously links the Platinum Corridor with the Treasure Corridor through the Mafikeng airport and industrial zone and the Taung irrigation scheme and promoting the development and growth in between;
- Proposed new corridor from Potchefstroom through Ventersdorp, Coligny, Lichtenburg, Mafikeng to Botswana to promote North-South interaction to markets and mobility.

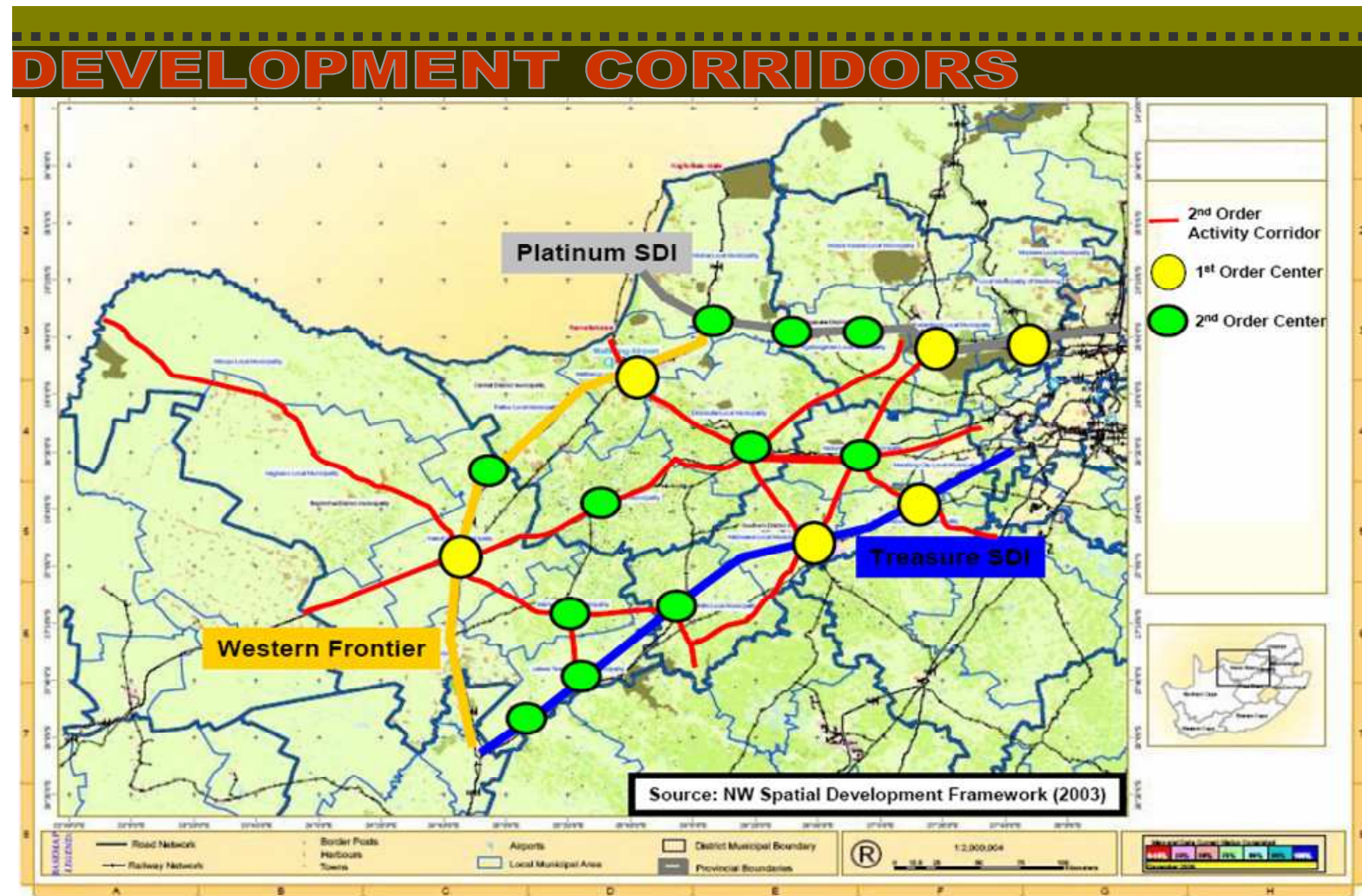
Figure 6.3 and 6.4 are visual representations of these corridors.

Figure 6.3: North West Province public transport corridors



Source: North West, 2009

Figure 6.4: North West Province development corridors



Source: North West, 2009

The NWPSDF makes use of the NWGDS to explain the plans for infrastructure and construction in the province (North West: 2009:28). Here infrastructure development and construction is one of the key pillars of the Provincial Growth and Development Strategy. The objectives identified include (North West, 2009:28):

- Improve infrastructure linkages with neighbouring provinces and countries:
 - o The emerging strategy and planning focus of the Gauteng City Region (GCR) is particularly relevant for the development of the Rustenburg Area. In particular, the future need for diversification of the city's provincial economy, and the increasing importance of innovation and knowledge-based industries, implies a focus on building relationships with universities, research institutions and leading-edge companies, located within the GCR;
- Improve provincial public transport system and implement public transport facilities in line with requirements of taxi recapitalisation programme:
 - o An effective public transport system is a vital requirement for economic development;
- Promote a functional hierarchy of towns and cities:
 - o To enhance the development of primary nodes to develop into organized, well planned urban areas;
 - o To reduce the number of small unsustainable settlements with 50% over a period of between 20 and 30 years;
- Linkages with Gauteng Province
 - o Upgrading of the N4 to Rustenburg to a dual carriageway by 2008;
 - o Upgrading of P16-1 between Gauteng and Rustenburg to a single carriageway with extended shoulders;
 - o Upgrading of the N12 Potchefstroom to a dual carriageway;
- Initiate urban regeneration programs in key provincial nodes:
 - o An urban regeneration programme must be developed for key provincial development nodes in line with the PSDF. These urban regeneration programmes will focus on two key aspects:
 - Revitalisation and regeneration of Central Business Districts;
 - Key development of Previously Disadvantaged Areas in terms of the provision of basic economic infrastructure in terms of the human settlement redevelopment programme;

- Formalising unsustainable settlements:
 - o To reduce the number of small unsustainable settlements with 50% over a period of 20 to 30 years;
 - o To establish centralised multi-purpose service centres in rural areas;
 - o Increase private landownership with 10% over the next decade.

It can be concluded by saying that a certain degree of attention is given to infrastructure, and although the focus is more on the people, infrastructure is still identified as prerequisite for economic growth.

6.3.5. Policies guiding transport development

Although the main policies and legislation guiding development in the North West Province was discussed above, there are numerous other policies and legislation influencing specifically transport development in the North West Province.

Figure 6.5: Policies guiding transport development in the North West Province

Document	Purpose	Status quo
Policy Documents		
Draft Provincial Transport Policy	Review the state of transport in NW Province with a view to understanding the major problems affecting the delivery of transport infrastructure, and freight and passenger services to businesses, households and citizens.	White Paper pending approval by the Executive Council.
Legislative Documents		
Provincial Land and Transport Bill	Intended to provide for the restructuring and transformation of the provincial land transport system in a coordinated and comprehensive manner. The Bill will also accommodate the promotion of public transport in line with the National Land Transport Act 05 of 2009 and the White Paper on National Transport Policy.	Pending adoption

Document	Purpose	Status quo
Strategic Documents		
Rail Pre-Feasibility Study (Tshwane-Rustenburg)	This study was used to gauge economic viability for a rail passenger transport service between Rustenburg and Tshwane.	Complete
Rail Infrastructure Audit	To assess current rail infrastructure conditions within the province.	Complete
Freight Data Bank	This electronic database system will facilitate, bring improvement and allow monitoring of freight movement across the province.	Due for update
Rural Transport Strategy (RTS)	To develop a sufficiently balanced, developmentally effective and sustainable rural transport system in the province.	Complete
SABS Specifications for Animal Drawn Carts	This project is in line with the National Policy to reduce commuting on foot to at least 6km within the next twenty years and to provide means of transport that is affordable, reliable, safe and accessible to people with disabilities.	Completed for Animal Drawn Carts
Provincial Land Transport Framework (PLTF)	To ensure that the province follows the norms and standards including the planning objective, policies and strategies as prescribed in the National Land Transport Strategic Framework (NLTSF) 2006 – 2011	Complete
Current Public Transport Records (CPTR)	Provides information on all existing public transport operators, facilities and services.	Ngaka Modiri Molema – Completed Dr Ruth Segomotsi Mompati – Completed Bojanala – Completed Dr Kenneth Kaunda – Completed
Operating License Strategy (OLS)	Provides recommendations to the Provincial Operating License Board in its evaluation or disposal of route	Ngaka Modiri Molema – Completed Dr Ruth Segomotsi Mompati – Completed

Document	Purpose	Status quo
	operating license applications.	Bojanala – Completed Dr Kenneth Kaunda – Completed
Rationalisation Plan (RatPlan)	Propose a strategy for rationalising bus services prior to their conversion to subsidised contract services.	Ngaka Modiri Molema – Completed Dr Ruth Segomotsi Mompoti – Completed Bojanala – Not Finalised Dr Kenneth Kaunda – Completed
Integrated Transport Plans (ITP)	Contains the strategies for public transport infrastructure and operations.	Ngaka Modiri Molema – Completed Dr Ruth Segomotsi Mompoti – Completed Bojanala – Not Finalised pending finalisation of CPTR, OLS & PTP Dr Kenneth Kaunda – Completed
Public transport Plan (PTP)	Contains the strategies for public transport infrastructure and operations.	Ngaka Modiri Molema – Completed Dr Ruth Segomotsi Mompoti – Completed Bojanala – Not Finalised Dr Kenneth Kaunda – Completed

The conclusion can be made that a great deal of time and effort is spent on transport planning and how to improve the transport network. It must however be determined whether all of these policies and strategies do in fact yield benefits, or if they are rather just time ill spent. The question can be asked whether this time would not have been better spent if there were one or two overarching policies and the focus was more on implementing them. When there is this amount of policies and strategies, it is easy that discrepancies start to form and the budget and attention become so divided between plans, that none of them are fully implemented.

After evaluation of the policies and legislation guiding development in the North West Province it was found that although infrastructure investment does not receive as much attention as in the Western Cape Province, it still forms part of the development initiatives and guidelines of the North West Province. There are room for improvement of the policies and legislation, but it would seem that the problem is rather with implementation than with planning. All the policies

and legislation necessary to ensure effective development are in place, they must now only be implemented correctly and justly.

6.4. Investment focus

6.4.1. Introduction

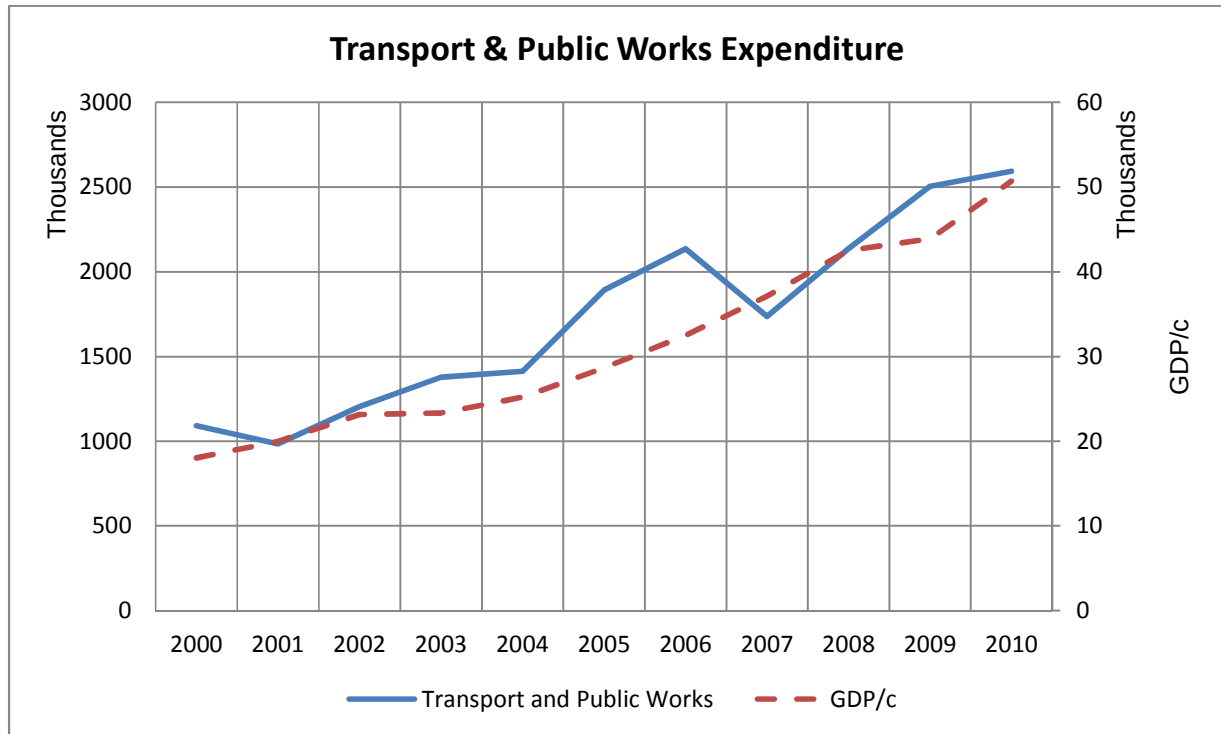
Since it was already seen in the empirical study done on the Western Cape Province that infrastructure, and more directly transport infrastructure, influences GDP per capita and therefore ultimately economic growth, it is not necessary to repeat a detailed analysis of the relationship between infrastructure and economic growth. It will however be shown in this section that the same relationship can be seen in the North West Province, making a further study of the North West Province's stance on infrastructure development and its recent infrastructure projects, relevant. The focus for this section will be on determining what the North West Province may be doing wrong and where must they improve, what change must take place, in order for them to move forward faster.

6.4.2. Impact of transport sector

The same procedure that was followed for the Western Cape Province was used here. Transport and Public Works Expenditure, which forms a department of the provincial budget, was plotted against GDP per capita to determine the relationship between these two factors.

From Figure 6.6 it can be seen that the same relationship that was seen in the Western Cape Province and KwaZulu-Natal Province, can be seen here as well. When expenditure on transport and public works increases, the GDP per capita also increases. The increase in GDP per capita of the North West Province, however, is much smaller than that of the Western Cape Province. According to Figure 6.6 the GDP per capita can easily be increased by increasing the expenditure on transport and public works. An analysis of the North West Province's transport infrastructure will follow to show where there are gaps in the infrastructure provision and where and how investment must take place to ensure GDP per capita growth and therefore economic growth.

Figure 6.6: Transport and Public Works Expenditure of the North West Province in relation to GDP per capita



Source: Author's own calculations based on Global Insight - ReX, 2011

6.4.3. Infrastructural background

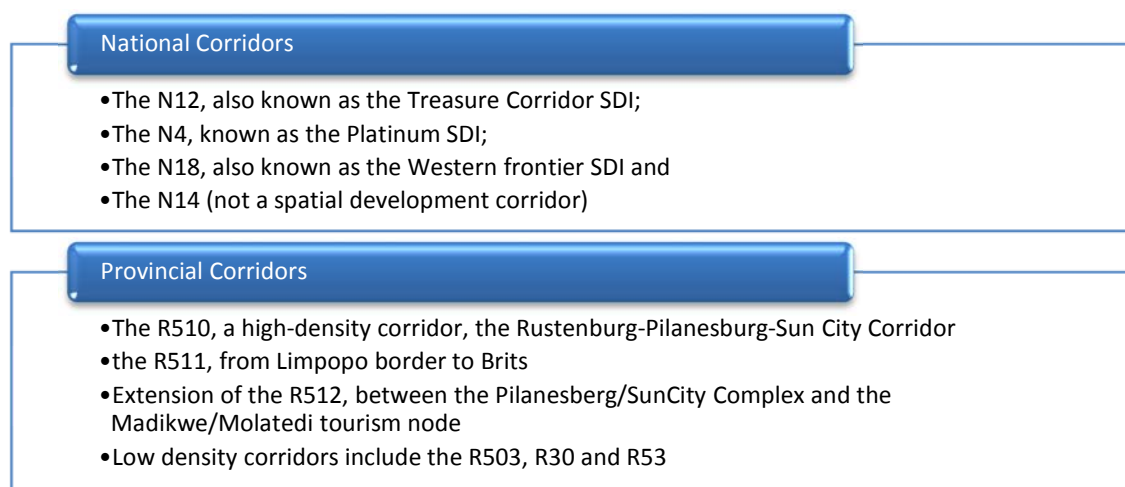
The North West Province is characterised by rural communities situated in remote places which makes infrastructure development and service development difficult and expensive. According to studies done by Natmap (South Africa, 2005:10) the province has extensive infrastructure in terms of its road, rail and pipeline network. However, a number of the networks are in a fair to poor condition, with only heavy haul rail lines in a generally good condition. Of the road network, with a total length of 23 698 km, 7 140 km is paved and 16 558 km is unpaved. In other words, only 30% of the road network is paved (South Africa, 2005:83). Of the paved network 22% is in a very poor condition, 36% in a fair condition, 29% in a good condition, and only 13% in a very good condition. The North West Province classified its roads as follows:

Figure 6.7: North West Province road classes

Class	Description
Class A	National primary roads by the SANRAL on behalf of the National Department of Transport
Class B	Provincial primary roads, which promote inter-provincial, inter-city and inter-regional mobility
Class C	Provincial secondary roads, which promote intra-regional and inter-district mobility
Class D	Provincial tertiary roads with an intra-district mobility function
Class E	Local access roads to provide access to the higher-class road network for isolated communities and centres of economic activity

Source: Own compilation based on Natmap (South Africa, 2005:74-75)

Figure 6.8: North West Province corridors



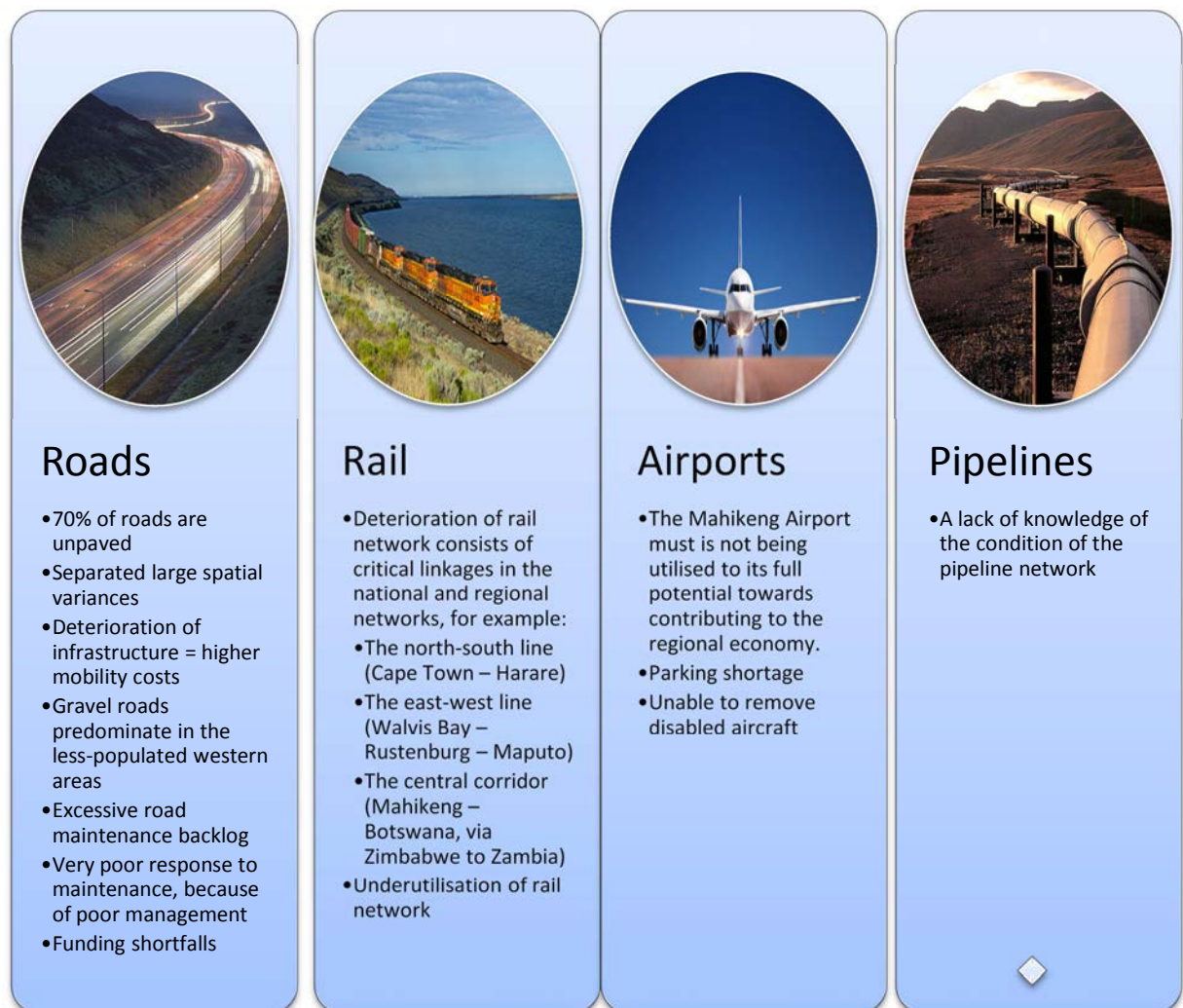
Source: Own compilation based on Natmap (South Africa, 2005:74-75)

Because of the incompetence of the North West Provincial Government, SANRAL has taken over some of the provincially declared roads, namely:

- The N12 route from Gauteng Border – Potchefstroom – Klerksdorp – Wolmaranstad – Christiana – Northern Cape Province Border;
- The N14 route from Gauteng Border (Tarlton) – Ventersdorp – Coligny – Biesiesvlei – Sannieshof – Delareyville – Vryburg – Northern Cape Province Border;
- The N18 route from the Northern Cape Province Border – Vryburg – Mahikeng – Ramatlabama Border Post (Natmap, 2005:79)

This, however, is not the only problem relating to the North West Province infrastructure. Natmap (South Africa, 2008:106) summarises the issues and concerns relating to transport infrastructure in the North West Province as follows:

Figure 6.9: Issues and concerns relating to transport in the North West Province



Source: Natmap (South Africa, 2008:106)

Natmap (South Africa, 2008:81) came to the conclusions that:

- Private vehicles and minibus taxis dominate transport traversing to and from the province;
- Bus modes carries less than 25% of passengers;
- Rail and air carries less than 5% passengers;
- Upgrading is necessary on the following roads:
 - o N12 from Matlosana to Potchefstroom requires an additional one lane for 2005, 2030 and 2050;

- o N4 / R510 / R30 around Rustenburg requires an additional one lane for 2005 and 2030;
- o N4 between Brits and Gauteng Province requires an additional one lane for 2005, 2030 and 2050;
- o R52 around Lichtenburg will require an additional one lane for 2050;
- o N4 around Rustenburg area will require an additional two lanes for 2050.

It can be seen that there are a lot of upgrading and investment in transport infrastructure needed in the North West Province. Although some flaws have been recognised in the policies and legislation guiding development in the North West Province, it seems that the core aspects do exist. The question that must therefore be asked is, what is the North West Province doing wrong? Natmap (South Africa, 2008:78-79) summarised the current passenger planning in the North West Province as follows:

Provincial Land Transport Framework

- Public Transport Strategy Issues:
 - o Poor integration of land use and transport planning;
 - o Dispersed rural settlements;
 - o Lack of modal integration;
 - o Poor public transport infrastructure;
 - o Lack of dedicated public transport lanes in densely populated towns;
 - o Inadequate public transport funding;
 - o Slow progress in taxi recapitalisation.
- Transport Infrastructure Strategy Issues:
 - o Current spare capacity on road and rail;
 - o Poor road condition;
 - o Large road maintenance and upgrading backlog;
 - o Underutilisation of provincial airports;
 - o Lack of access to public transport by rural communities;
 - o Poor public transport facilities.

It can therefore be concluded by saying that the North West Province possesses a large amount of infrastructure. This infrastructure is, however, not in the best condition or not used to its full potential. Because of the incompetence of the North West Provincial Government, the National

Government had to take control of some of the infrastructure. The North West Province is not using their funds correctly and is inhibiting economic growth.

6.5. Conclusion

It can be seen that the North West Province is in need of change to diminish the problems stated above. Although some improvements can be made to the relevant policies and legislation, it would seem that the problem is rather implementation of the strategies. Even though the Western Cape Province and the North West Province differs, some aspects of the Western Cape Province's way of doing things can be implemented in the North West, and in any province struggling to obtain growth and development. When comparing the North West Province, who is struggling to move forward, with a blossoming province like the Western Cape Province, the first distinction can be made between the two province's policies and legislation. Although the North West Province covers most of the necessary aspects and states what must be achieved, the way to achieve its goals is not all that clear. As seen in Section 6.3., the Western Cape Province determines its goals and then lays down a plan to achieve these goals. It can therefore be concluded that the problem is not necessarily the lack of knowing the importance of infrastructure development, because the North West Province have realised this, but rather a plan of implementation that will help to achieve the necessary goals and objectives. Changes must be made to the budget, but more important than the changes is the alignment of the different levels of the budgets. Complete integration between the different budgets is necessary to ensure that the funds allocated to specific sectors and specific projects go to those places. Better planning and integration of the budget will help to avoid the recurring problem of projects like the Lichtenburg-Koster road. Making minor changes can have a large effect on economic growth in the province and will help the province to fasten development. Spatial planning plays a pivotal role in this as it has the ability to guide development and spending in the province. Complete integration between spatial planning policies and strategies and the provincial budget is therefore needed in order to ensure effective change. The next chapter will elaborate on the recommendations to ensure economic growth through infrastructure investment.

7. CONCLUSION

7.1. Introduction

Throughout this research document it was found that infrastructure supports sustainable economic development if it is utilised correctly. In a nutshell this is what this study was all about. Through research and calculations it was proven that infrastructure does indeed have a positive influence on the economy.

This study started off with a theoretical basis that explained regional economics; how infrastructure fits in with development and the influence that infrastructure can have on the economy. Thereafter a study was done to prove that infrastructure can indeed effect economic growth. A summary of the core theoretical work will now be followed by findings made in the empirical study and proposals for future development.

7.2. Synthesis

There can be differentiated between a homogenous, nodal or planning region. Growth within these regions takes place according to five different stages:

- Traditional stage;
- Prerequisite stage for preamble stage;
- Preamble stage;
- After preamble to development stage.
- Fully developed stage.

Although there are three types of regions and although every region is unique and therefore develops at a different speed and manner, the aim of every region is to become developed. This will be achieved by functioning at its optimal level. A place must not only attract producers, but also consumers to be economically viable. This can be obtained through growth and development, moving from the one stage to the next.

This growth can be limited through wrongful investment and enhanced through the right type of investment at the right time. A region's growth can therefore be accelerated by certain factors. Richardson said that public expenditure has to be injected in underdeveloped areas to develop them, but this is not understood and people tend to rather develop as a response to changes in the economy; which means that growth will not be accelerated at the current approach. One

way to bring about growth is through agglomeration economies. It is more advantageous for industries to settle close to each other to minimise transport costs, and so forth. Regional investment can lead to the establishment of agglomeration economies that will eventually bring about economic growth. When industries locate at a certain point, the people will automatically follow and therefore the region will grow. Growth can further be generated through a balanced or unbalanced approach. In a balanced approach investment will take place in all regions while only some areas will be partial to investment when using an unbalanced approach. A balanced approach does not, however, necessarily mean that investment must be the same everywhere; it rather implies an equal opportunity to all people with regards to work and living standards.

It is evident that infrastructure development is necessary to bring about growth. The costs of infrastructure, like transport, will affect the location and therefore needs to be at least a minimum for a region to have comparative advantage that will yield an agglomeration economy. Transport costs form a large part of infrastructure costs. These costs are affected by the route travelled, the thing to be distributed, be it people or goods, and the transport system in use. Improving transportation and the transportation system can therefore decrease transport costs that will decrease overall costs, attracting people and industries. It is however not a given that investment in infrastructure will bring about growth. If not applied correctly it can be detrimental to growth, this is why it is important to decide how, where and when to invest. It was explained in detail that how to invest is important because it is not, for example car ownership, which matters but individual access to its availability. Only focusing on building roads will not have the desired effect because it will not lessen travelling time if it is not supplemented with adequate transport facilities. It was also discovered that the importance of public capital for regional growth stems from its effect on production and location decisions of private industries. Infrastructure development can stimulate economic activity through augmenting the productivity of private inputs or through its direct contribution to output.

The theories explored show that there are a variety of ways to fight poor living conditions, but some ways to do it is through community planning, public participation, reducing densities while still remaining compact, and so forth. Because a city has a life quite its own, there is a limit to what you can do to its physical structure and its moral order. But proper planning will create cities with working opportunities for all, therefore although we cannot plan every single thing, certain steps must still be taken and when infrastructure receives enough attention beforehand it will not be necessary to plan reactively. Proactive planning is the only way forward.

It must be determined if growth will take place according to a people centred or place centred approach. When investing in people (for example giving grants) growth will be bound to take place, but people tend to constantly move around and the place will therefore not benefit from this type of investment. However, investing in the place will attract people and keep them there through a variety of work opportunities that will exist because of industries locating there to benefit from agglomeration. Investing in the place will therefore be beneficial to both the place and the people, while investing in the people will only help the people.

But for the people to benefit from place-centred investment, the needs of the people must be incorporated into planning. Economic growth contributes to significant poverty reduction only when an increasing number of the poor is actively involved in the economy and purchasing power is generated. This again is dependent on the existing social structures, the educational status of the poor, the patterns of equality and inequality in society and a number of other factors. This type of investment can be called Strictly Social Overhead Capital (SSOC). The opposite of this is Economic Overhead Capital (EOC) that is the development of for example roads and bridges. Although EOC does not immediately effect economic growth it will be more beneficial for a region in the long run and will help the people to better their own conditions. Investing in EOC will therefore mean a natural investment in SSOC over time.

As already stated, investing in social infrastructure will have an effect; however, investing in economic infrastructure will yield greater benefits faster. Investing in economic infrastructure will eventually lead to a better standard of living by increasing the per capita income. People will therefore be able to pay for better health care and level of services off their own esteem, lightening the burden of the country. South Africa is spending millions of Rands on the poor, but unfortunately this does not help to better the economic backwardness taking over in South Africa. Providing everyone with a house and free services does not ensure that there will be food on their tables every day. It is not beneficial to build schools when no one can afford school fees and children have to walk kilometres to get to school. Sustainable areas must be created and this can be done by ensuring that work opportunities are easily accessible to all. By decreasing travelling time you will be creating more productive communities, therefore give people the chance to increase their income. The effects of infrastructure investment can be summarised as follow:

- *It reduces transportation costs:*
 - o This will happen through the improvement of transport infrastructure. When transportation means are in a good condition and facilities are in place to ensure that there are no delays in transportation, transportation speed can increase. When the transport infrastructure is in a general bad condition, the transport costs increases because of more damages to the vehicles and slower transportation times.
- *It creates comparative advantage:*
 - o When a region possesses the needed infrastructure such as roads, electricity, water, it will entice industries to choose that area, rather than an area where the infrastructure must still be developed. Quality infrastructure will therefore make one region more favourable than others, creating comparative advantage.
- *It leads to a rise in work opportunities:*
 - o Infrastructure development will create work opportunities during the development stage where people will be needed to do the work and afterwards through increased aggregate demand.
- *It lowers production costs:*
 - o This is because better infrastructure will increase production levels, resulting in a larger output for the same period, and therefore decreasing the cost of products.
- *It increases connection and access:*
 - o The development of social infrastructure such as schools and hospitals will have no affect if it is not in conjunction with economic infrastructure such as roads, which will enable people to access these facilities.
 - o It will also provide faster access to work, decreasing wasted time, resulting in more productive time during the day.
- *It helps achieve the MDGs:*
 - o Infrastructure helps poorer individuals and underdeveloped areas to get connected to core economic activities, therefore allowing them to access additional productive activities.
 - o It will also increase human capital of the poor and reduce child mortality and overall health through better access to medical facilities.
- *It has social benefits – increases living standards:*
 - o All of the above will result in people having more time, better access and better overall living conditions, even more money, achieved through obtaining a better work

as a result of better access to opportunities. This will enable people to better their own living standards, making the need for grants less.

The Western Cape Province has shown constant economic growth from 2000 to 2010 and is still moving forward. It is quickly becoming a developed province in a developing country. When investigating the budgets for the Western Cape Province from 2000 up to 2010 it became clear that there was a definite change in the allocation of funds between different departments of expenditure. As explained in Chapter 5, the SSOC increased at a steady rate while EOC increased rapidly. The percentage of the total budget spent on SSOC decreased over the years, while the percentage of the budget spent on EOC increased over the years. Correspondingly the GDP per capita increased. Chapter 6 gave a thorough explanation of what the relationship between the GDP and EOC, and more specifically the relationship between the GDP and transportation, was. This study has evidently proven what theoreticians have been saying all along – to uplift a nation, region or city it is necessary to invest in infrastructure. Already in 1929 Weber said that the most important factors influencing location are labour and transportation costs. This was years before everyone made use of road transportation. If the effect of transport costs was that great then, imagine what it must be now.

The North West Province on the other hand is a province that is struggling to stay on pace with economic growth and is beginning to lag behind. When investigating the province's infrastructure and its approach to infrastructure development it was seen that this might be the reason for the slow growth. The next section will therefore expand on the proposals and recommendations that can be taken from a fast growing province such as the Western Cape Province and be implemented in a developing province such as the North West Province to ensure faster, more effective economic growth.

7.3. Proposals and recommendations

7.3.1. Introduction

South Africa, and every province, region, in South Africa must stay competitive in the World economy. To ensure this it is important to keep up with globalisation. The only way this will happen is through constant investment. The ultimate goal of a region must be to reach the fully developed stage that was discussed in the theoretical framework. This section will explain how spatial planning must be adjusted in order to ensure more effective economic growth. If correctly

applied, spatial planning is the core around which all development takes place, therefore spatial planning principles must be correct to ensure growth and development.

7.3.2. Administrative level

Although implementation is important, it cannot take place if the planning was not done beforehand. There are certain key aspects that came out of this study that will be explained in short. If applying these proposals and recommendations at administrative level, spatial planning will lead to economic growth.

- Although these recommendations can be applied at national level it will be more effective if applied at provincial level as this will be easier to monitor.
- Local level on the other hand will be too small as infrastructure, especially transport infrastructure, expands over large areas and the administration is dealt with at provincial level.
- The ultimate goal is for all regions to become fully developed and to create areas where everyone has an employment opportunity and access to liveable conditions.
- This may sound like balanced growth and although this is what needs to be achieved, balanced growth does not mean you have to invest equally in all regions, it implies that every region has equal opportunity to redress demographic, economic, social and environmental weaknesses to achieve its full potential and therefore reach the fully developed stage.
- Agglomeration economies must be created which will be achieved when a place has comparative advantage. To obtain comparative advantage interdependency between the public sector and private investment is necessary for growth to take place.
- The greatest factors influencing comparative advantage are:
 - .1. Transport costs
 - .2. Labour costs
- By decreasing transport costs, labour costs will automatically decrease because it is cheaper and faster to get to work. Transport costs (part of EOC) can be decreased through investment in infrastructure as found during this study.

At provincial level, municipalities are forced to develop Spatial Development Frameworks and Integrated Development Plans. If the goals of the SDF and IDP are to achieve development, they must focus on creating comparative advantage through putting more focus on

infrastructure development. Since these policies and strategies are developed at a provincial level, it is even more reason why this changes must be incorporated at a provincial level. It will automatically have a trickle-down effect on local municipalities. The next section will elaborate further on this.

7.3.3. Implementation model

Now that the broad guidelines were explained, it is necessary to place more focus on how these strategies must be implemented in order to ensure its success. It was seen that although SSOC investment must take place, the importance of SSOC for economic growth is limited. Greater results will be seen when putting more emphasis on EOC. By implementing the following basic principles, great results can be seen in any spatial region.

- Although any investment in infrastructure will likely have an impact on development of the spatial economy.
- Investing in SSOC, for example supplying free medical care, will only result in helping the people now and will have no effect on the future generations. It is therefore important that investment be targeted at EOC.
- Investment in EOC constitutes building roads, bridges, and more, as well as maintaining this infrastructure.
- Of the different components of EOC, transport has the best chances of ensuring economic growth.
- At provincial level the percentage of the total budget allocated for EOC expenditure must be between 15% and 20% to ensure optimal utilisation of funds.
- It is important that this is together with a decrease in SSOC expenditure. SSOC expenditure must not exceed 50%, but if possible be below 40% of the total budget.
- The stage of development that a region is currently at will also influence the necessary steps.
- For a region at the starting phases of development and the preamble stage, it is necessary to spend as many resources as possible on EOC.
- As a region becomes more developed the importance of EOC investment remains important, but when a stage is reached where the infrastructure is adequate and enough control measures are in place to ensure maintenance, the people's needs would change and SSOC expenditure will now be of more value than it was at the developing stages.

The Western Cape Province is moving from a developing province towards a fully developed province. It would therefore be wise for the Western Cape Province to remain spending nearly 20% of their budget on EOC. Until the Western Cape Province is fully developed it would not be wise to decrease this percentage. However, when the fully developed stage is reached and maintenance is up to standard, ensuring that infrastructure will remain in a good condition, focus can be shifted towards SSOC.

The North West Province, however, is still developing and must therefore increase their spending on EOC. This will allow economic growth to fasten which will ultimately result in the province moving to the next stage of development. It was seen that the North West Province will have to align their spatial policies better. It is of important that these policies, such as the SDF and IDP, have implementation steps to ensure that the policies come to their right. Although the North West Province has all the policies and strategies in place, infrastructure investment is still not taking place at the necessary speed. If guidelines for implementation are included in these policies and strategies, this is bound to change. Infrastructure investment is important, as can be seen by the following points:

- Investing in transportation will result in an increase in GDP per capita in approximately two years' time. This is why the relationship is sometimes missed. Although development is needed now, it is more important that the development is sustainable. Investing in transportation will result in more sustainable development since:
- Investing in transportation infrastructure has a 95% chance of increasing the GDP per capita. An increase in the GDP per capita will naturally cause the economy to grow.
- Investment in transportation stimulates economic activity by:
 - .1. Augmenting the productivity of private inputs.
 - .2. Through its direct contribution to output.
 - .3. Creating work opportunities.
 - .4. Attracting industries that will in turn attract more people and further investment.
 - .5. Shortening travelling distances.
 - .6. Enhancing access to schools, hospitals, shopping centres, friends and family.
- Because the economy grows, the people will be able to better their own living conditions, health, schooling, and so forth.
- Investment in EOC will therefore eventually result in a better quality of life and a higher HDI.

This is why investing in infrastructure results in more sustainable development for the whole spatial region. It is however important that it be realised that not any transport development will yield positive outcomes.

- Detailed research must be done to determine the needs and priorities of the community at stake.
- It must be ensured that roads and other relevant transport infrastructure are built in conjunction with adequate transport facilities, for example rapid bus transport.
- Transport facilities must be readily available to all individuals at a reasonable price, since it is not transportation which is the problem, but rather access and availability of transport to all economic groups.
- The ultimate goal is to decrease travelling time and costs that will result in a place with comparative advantage as people and industries will be able to be more efficient.
- When a region has an adequate transportation network functioning at its optimum level, it will not only ensure that people currently living there will stay there, but also attract new industries, firms and people; ensuring a region's growth.
- It is important that the current transport facilities and networks be maintained because it is more expensive to build everything from beginning than just upgrading existing structures.
- It all comes down to the fact that investment in EOC must increase and investment in SSOC in order to ensure sustainable growth and development.

In order to ensure the effective implementation of above mentioned recommendations, these recommendations must form part of the spatial planning of provinces. The percentage of the budget allocated towards EOC and SSOC was already established. To ensure that these recommendations are adhered to, these principles must form part of the SDF and IDP set out by municipalities, since the IDP largely determines the budget. Different policies guiding development in provincial municipalities must be aligned in order to avoid discrepancies. An infrastructure backlog will therefore not be eradicated by creating more strategies and policies. This would rather have the effect of hampering growth even further, since even more discrepancies will be formed. It is far more important to adjust current spatial planning policies, such as the SDF and IDP in order to ensure that the abovementioned recommendations form part of overall planning in the province and that the strategies for infrastructure development are aligned. If the spatial planning policies are aligned correctly, the budget will be compiled more

sufficiently. To conclude, in order to get EOC and SSOC spending right, the basic principles must be in place.

7.3.4. Conclusion

Investment in infrastructure is a prerequisite for economic growth. Without this a region's growth will not only be slow but will be nearly impossible. A detailed study must be done on a region to ascertain the needs before investment takes place. Infrastructure investment forms part of the EOC expenditure of a budget and the amount allocated for EOC expenditure must therefore increase to ensure that there is enough money available for infrastructure investment. Investing in EOC will result in a natural investment in SSOC over time. Investing in EOC will therefore help people in the long run to better their own circumstances and living conditions. It was shown in this research document that theoreticians are of the opinion that investment in infrastructure is a must and it was proven by the empirical study done on the Western Cape Province and the North West Province that this is indeed the case. By implementing the above recommendations in every provincial spatial planning policy, guiding the budget, the whole of South Africa will eventually become developed and will be of greater importance to the world economy.

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Addendum A

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.959332
R Square	0.920317
Adjusted R Square	-1.28571
Standard Error	3831.263
Observations	1

ANOVA					
	df	SS	MS	F	Significance F
Regression	9	1.19E+09	1.32E+08	80.84832	#NUM!
Residual	7	1.03E+08	14678579		
Total	16	1.29E+09			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept							2.5E-268	2.5E-268
X Variable 1							-9E-308	8.9E-308
X Variable 2							3831.263	3831.263
X Variable 3	0.920317	2.4E-268	3.9E+267	#NUM!	0.920317	0.920317	0.920317	0.920317
X Variable 4							-2.5E-64	2.45E-64
X Variable 5							-3.9E-64	3.91E-64
X Variable 6							1.3E-279	1.3E-279
X Variable 7							4.1E-298	4.1E-298
X Variable 8	22049.3	3682.079	5.988276	0.000549	13342.57	30756.04	13342.57	30756.04
X Variable 9	0.018697	0.002079	8.99157	4.29E-05	0.01378	0.023614	0.01378	0.023614

Addendum B

Transport and public works		GDP per capita		Ratio
Year	Amount	Year	Amount	
2000	946692	2002	35599	3,760
2001	1060589	2003	38869	3,665
2002	1327326	2004	43763	3,297
2003	1216208	2005	47177	3,879
2004	1258628	2006	52186	4,146
2005	1773251	2007	58784	3,315
2006	2254031	2008	64205	2,848
2007	2344477	2009	65724	2,803
2008	2766228	2010	71609	2,589
2009	3872191			Average = 3,365
2010	3897827			

Ratio = GDP per capita / transport and public works x 100

From this the future GDP per capita can be estimated by using the following calculation:

GDP per capita = Ratio / 100 x transport and public works

GDP per capita for 2011 = 3,365/100 x 3872191

= 130 299

GDP per capita for 2012 = 3,365/100 x 3897827

= 131 161

It was seen in the graphs that the expenditure on transport and public works takes roughly two years to affect the GDP per capita and therefore the GDP per capita of two years later was used in these calculations.