



**The impact of road maintenance on socio-economic development the case of Dr. Ruth Segomotsi Mompoti District, North West Province**

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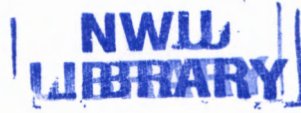
## **Declaration**

I hereby declare that this mini-dissertation submitted in fulfilment of the requirements for the degree Master's in Business Administration at North-West University, Mafikeng Campus, is my own work and has not been submitted at any other institution. I further declare that all sources cited or quoted are indicated and acknowledged in a comprehensive list of references.

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**Mosimaneotsile Josiah Madienyane**

## Abstract



The purpose of the study was to better comprehend the connection between road transportation infrastructure maintenance investment and the socio-economic development in the Dr. Ruth Segomotsi Mompati (DRSM) district. The hypothetical background included Frischmann's transportation infrastructure theory and Solow's economic growth theory. Data were gathered by means of personal interviews and observation. A purposeful sample of 15 individuals who are directly and indirectly involved in road maintenance investment, administration and its management were selected. The responses were categorised and patterns documented from the data. Findings show that good road infrastructure is a key to the growth and development of the South African economy, labour movement and job creation. A well maintained road network reduces poverty by humanising access among rural communities and cities. Bribery and corruption in project tender awarding processes were identified as significant contributors to the parlous state of most roads in the district. This research identified a clear lack of road maintenance, adding the recognition that constructive societal transformation driven by policy makers could be directed at financing road maintenance that stimulates economic growth and social change, and consequently, improves the standard of living for the inhabitants in the DRSM District.

**KEYWORDS:** Road infrastructure investment, maintenance, setup, district, socioeconomic

## **Dedication**

This project is dedicated to my loving wife for her unconditional support and constant encouragement throughout this study. I sincerely appreciate my colleagues and friends for the encouragement and support during the time of conducting this research.

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## List of Acronyms

DORA.....	Division of Revenue Act
DOT.....	Department of Transport
DRSM.....	Dr. Ruth Segomotsi Mompati District
ERR.....	Economic Rate of Return
FAO.....	Food and Agriculture Organisation
GDP.....	Gross Domestic Product
GSP.....	Gross State Product
IRF.....	International Roads Federation
SADC.....	Southern Africa Development Community
SASI.....	Spatial and Socio-Economic Impacts
VECM.....	Vector Error Correction Model
WHO.....	World Health Organisation

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## **CHAPTER 1**

### **INTRODUCTION**

#### **1.1 Introduction and Background**

Road transport systems and the maintenance of these have been presented and documented by numerous researchers of late as significant contributors to the growth of the economy. Similarly, road systems have been shown to be the pillar for development activities in the economy for several developed nations (Bagchi & Pradhan, 2013:140). Scholars have highlighted the connection between transport setup funding, social growth and the development of the economy (Akhmetzhanoy & Lustoy, 2013:47). Road setup and maintenance finance create significant governmental, social and economic developments that grow the assets and the country's supremacy, market expansion and the reduction of barriers in trade. This is a prime factor that steers production outputs and enhances the movement and wellbeing of the populace (Njoh, 2012:6).

Road transport systems and maintenance funding are measured as an element of investment, thus signifying the importance of these components in all functions of production. Traditionally, the bulk of raw material shipment to industries and finished merchandise to the marketplace in a suitable means rest on the accessibility and maintenance of the rural transport setup networks, mostly with regards roads that accommodate lorries and other haulage vehicles (Tukker & Dietzenbacher, 2013:18). In the past, road transport setup and maintenance funding were the least acknowledged part of developing economies. This component of economic growth was fundamentally ignored as a critical element in the initial conceptualisation of development economics where investment is homogeneously and generally symbolised by industries (Tukker & Dietzenbacher, 2013:12).

According to Sole-Olle, Stephan and Valila, (2012:482), transport networks and its maintenance financing was neglected and emphasis shifted to other means of funding in the primary models of the economy. Na, Han, and Yoon, (2013:265) state that the

effects of productivity are expected to differ considerably given the kind of setup, and can vary as the infrastructure level changes over time. Recent studies have added new knowledge to the experimental works regarding transport setup and maintenance as enablers and significant catalysts to any country's economic growth (Gwilliam, 2013:11). The motive why road transport setup and its maintenance were downplayed in the initial economic outlook is that old-fashioned economic prototypes regarded capital as homogeneous; which means, roads and further production mechanisms have been taken together as capital, and consequently the precise infrastructure type stood untapped (Sole-Olle et al., 2012:483). According to Na, Han, and Yoon (2013:269), among the key challenges of the econometrics is the productivity effects in the identification of road transport setup. The road transport setup and its maintenance lie beneath the additional noticeable kind of capital, enabling inputs distribution to production places and the finished goods conveyance to the markets. Properly maintained road transport setup assists several societal facilities and services, giving access to institutions of learning, clinics, hospitals, government departments and employment places (Pradhan & Bagchi, 2013:141).

Dr. Ruth Segomotsi Mompati District (DRSM) in the North-West Province was formerly known as Bophirima District. DRSM district is among the four districts in the North West Province with poor rural areas. It is a Class C municipality (more than one municipality combined with a municipal executive and legislative authority) situated in the North West Province. DRSM district is surrounded by Ngaka Modiri Molema and Dr Kenneth Kaunda in the north, and John Taolo Gaetsewe, which is a cross-boundary inside the Northern Cape in the south (municipalities.co.za). DRSM is the province's biggest district, constituting nearly half of its geographical area. The district municipality consists of five local municipalities: Naledi, Greater Taung, Kagisano-Molopo, Mamusa and Lekwa-Teemane. The district harbours deprived rural areas, and it was previously located in the Bophuthatswana homeland (municipalities.co.za). With the population positioned and spread in more than 470 villages and towns in a 250km range, roughly 500km north to south and 200km east to west, the district has teething administration

and managerial challenges (municipalities.co.za). Most of the DRSM district roads are gravel and in a bad condition as a consequence of non-maintenance, making it difficult for businesses, investors and the community to move freely. In fact, the road network makes travelling by road difficult and unattractive for investment and growth.

## **1.2 Statement of the problem**

Proper infrastructure of road transportation such as freeways and countryside roads is a critical component of goods and services transportation and an important factor to the nation's economic life. Recently, the challenge of well-maintained road infrastructure has been considered by numerous researchers as the utmost key instrument for the development of any economy (Akhmetzhanoy & Lustoy, 2013:45; Njoh, 2012:8). Developed nations including Britain and the United States of America have invested heavily in the constructed transport setups over years of preparation and efficient funding that replicate the development of the economies anticipated in the future. These countries have invested in transport setup development which has ultimately contributed to the progressively advanced innovations that lower the expenses of road creation, repairs and supervision (Rostow, 1974).

An emerging country like South Africa and a district such as DRSM in the North West Province could gain significant insights from these countries' road systems, specifically by linking its road transportation structure development, maintenance and execution to the development initiatives of the economic undertakings that culminate in a workable economic improvement. DRSM district in the North West Province has a deprived road transport infrastructure system and the pace of economic development pace is at its lowest as compared to the other districts. In an effort to quantify the economic benefits of well-maintained road networks, various studies have been conducted by researchers in other countries, including South Africa, but these studies are inadequate in scope. One of the challenges for such studies has been in the accessibility of significant data. Another hurdle is that these studies do not include the economic impact of well-maintained roads networks in DRSM District. An impact of well-maintained road

systems on DRSM District socioeconomic development therefore remains speculative rather than empirical. The problem that this qualitative case study seeks to address is to establish the impact of road networks maintenance on the socioeconomic development of DRSM District.

### **1.3 Purpose of the study**

This study is important for emerging nations such as South Africa. The impact of properly maintained road systems is evident in the easy accessibility to industries, suburban settlements and the agricultural services, as well as education facilities it provides. According to Beyzatlarand Kustepeli (2011:41), a well maintained road infrastructure funding symbolises key economic, governmental, and social developments that ultimately add value to the resources and country's supremacy, and in so doing growing production outputs, improved movement and standards of living for the populace (Iyanova & Masarova, 2013: 268). Therefore, the purpose of this case study is to better comprehend the impact of road maintenance on socio-economic development in the Dr. Ruth Segomotsi Mompati District, North West Province. Moreover, this case study highlights the connection between properly maintained road networks and its influence on the development of the economy, economic undertakings, quality of life and movement of people, poverty reduction and population relocation.

### **1.4 Objectives of the study**

Constructing a suitable road networks helps the experts and the decision-making departments to recognise the importance of road transport setup in terms of investment and maintenance on the socio-economic development of the North West Province. Therefore, the objectives of this study are set to:

1. Ascertain what impact investment in road maintenance has on socio-economic development.
2. Assess how investing in road maintenance contributes to change in the society.

3. Identify the essential preparation, execution and maintenance measures needed before and after road construction.

### **1.5 Research questions**

The purpose of this case study, which appropriates a qualitative approach, is to explore the impact of road maintenance on socio-economic development in the DRSM District, North West Province. Therefore, this study seeks to respond to the following research questions:

1. What impact does investment in road maintenance have on socio-economic development in DRSM district?
2. How does investing in road maintenance contribute to change in the society?
3. What are the essential preparation, execution and maintenance measures needed before and after road construction?

### **1.6 Contribution of the study**

This study provides significant insight into the impact of roads maintenance on development of the economy and offers valuable and up-to-date data for DRSM District legislators and officials who are stakeholders in decision-making regarding road infrastructure investment. This study addresses the gaps around the links between investment in road infrastructure maintenance and economic development in the DRSM District. The study provides a stage for the perfection of practices for funders and legislators in terms of road infrastructure. This study further generates valuable information that could help the North West Province to benefit from the practices of technologically advanced countries in improving the economic advancement and transformation of the province through a well maintained road infrastructure funding framework.

### **1.7 Research Design and Methodology**

This study is a qualitative case study assessing the impact of road maintenance on the socio-economic development in the DRSM District. A qualitative study entails a logical procedure in which research techniques are cautiously planned. According to McMillan (2015), a case study assists in preparation, improvement in practices, and illustration of an appropriate concept. The researcher is convinced that the qualitative technique is suitable for the study as it permits looking at different data that subsequently informs the primary investigation (Denscombe, 2014). According to Patton (2015), qualitative techniques assist in identifying the study participants' perceptions on the research problem. A case study technique is the paramount research approach that matches the nature of the research problem identified in this study (Mason, 2010).

### **1.8 Limitations of the Study**

The main purpose of this study is to identify the impact of road maintenance on the socio-economic development in DRSM District in the North West Province. Since this study is a qualitative case study, data is generated and collected through interviews. This data collection approach has its own inherent limits and constraints. These are largely related to the preparedness and willingness of participants to offer truthful views concerning their feelings on the impact of road network maintenance on the socio-economic development in DRSM District. In order to surmount this hurdle in the research process, suitable protocols were adopted to clarify to the participants of the privileges of submitting truthful recommendations as part of the data. Assurance was provided that they were anonymous participants and their identities were not divulged in the final report of this study.

### **1.9 Delimitations of the Study**

This qualitative case study was planned to identify the impact that road maintenance has on the socio-economic development in the DRSM District in the North West Province. This approach improved the understanding of the foundation of the road setup maintenance and its impact on the socio-economic development undertakings in

the district. Therefore, the scope of this study is limited to the DRSM District in the North West Province.

### 1.10 Definition of Key Terms

**Road networks:** Networks refer to the country and rural roads, freeways and gravel roads that join metropolises, townships and state capital city (collinsdictionary.com).

**Infrastructure:** This entails investment by the public or government in community amenities such as networks of roads and physical resources; e.g. buildings, power supplies.

**Transport setup:** According to Trimbath (2011), this is the fundamental erections that assist economic undertakings in goods and people movement, as well as the distribution of materials to production places, merchandises and services to consumers, and consumers to marketplaces.

**District:** In this study, the term refers to a region or area of settlement or state which has been given official borders for the purpose of supervision and administration (collinsdictionary.com).

**Socio-economic development:** The contribution to the expansion and performance of local economy.

**Economic development:** These are the combined engagements between the public and legislators to advance the living standard of population and the country's economic well-being.

### 1.11 Chapter Outline

The structure of this research study is divided into five chapters.

#### Chapter 1

This chapter provides the introduction and background to the study, statement of the problem, purpose of the study, objectives of the study, research questions, contribution of the study, definition of key terms, limitations of the study, delimitation of the study and the structure of the study. It also highlights the research design and methodology and the conclusion to this initial chapter.

## **Chapter 2**

This chapter looks into the vital literature reviews and diverse observations that are relevant to road transport setup and its maintenance funding.

## **Chapter 3**

This chapter focuses on the methodology of the study as well as research design, approach, data collection techniques, sampling, and data analysis connected to the objectives and purpose of the research.

## **Chapter 4**

This chapter presents the results, analysis and interpretation of the study and terminates in the chapter conclusion.

## **Chapter 5**

This chapter provides and amplifies on the findings, conclusions and recommendations of the study as well as identifying areas for future research.

### **1.12 Conclusion**

The purpose of this study is to gain a deeper understanding of the impact of road maintenance on socio-economic development in the Dr. Ruth Segomotsi Mompati District, North West Province. This study provides an insight into the relevant benefits associated with road maintenance. The qualitative case study approach was important for the researcher to better comprehend the impact of road transport setup maintenance on the socio-economic development. This study addresses the relevant departments and policy makers on road infrastructure by providing fresh understandings regarding road transport infrastructure maintenance and its funding in the DRSM District and the province as a whole.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1. INTRODUCTION**

This segment is the central body of this study and gives an analysis of related journal articles, books, case studies and extracts concerning the study topic. Important elements affecting road infrastructure have been examined amongst the construction development studies (Bagchi & Pradhan, 2013). It should be noted that roads are key infrastructural elements for a country's development and growth. Specifically in the developing countries, well maintained roads reduce levels of poverty by humanising access among rural communities and cities, eventually improving the growth of the socio-economic and communication possibilities (Adling, & Gupta, 2009:11). Road setups are part of a key connection matrix between centres of production and marketplaces. Besides, road linkages serve several purposes of permitting connection to social amenities, employment, health facilities, schools, colleges and university services vital in combating poverty by linking up further regions and encouraging social and economic growth (Njoh, 2012).

The South Africa Road setup maintenance is a specific area of worry, especially in the rural areas. As the improvement of such road setup in some parts of the country has been abandoned to a mammoth magnitude, the anticipated growth and development in some communities has been hampered. Socio-economic improvement and the consequent growth of the economy in the African region are hindered by numerous restrictive elements, as well as the non-existence of suitable roads setup. An investment in road setup and its maintenance in Africa in general contribute a major part in encouraging development (Lombaard & Coetzer, 2007). A possible greater importance in road network investment has recently developed, owing to the economic growth together with the progressive effect that the investment in proper road networks could benefit the rural populations. The rural communities should have an acceptable

and well-maintained road network that should be maintained over the long term period. Nevertheless, it is a colossal undertaking to establish the effect of road maintenance investment on socio-economic growth, mainly when the value obtained from this infrastructure is linked to other facets that are not directly linked to the network itself (Lombaard & Coetzer, 2007).

## **2.2 THEORETICAL FRAMEWORK**

According to Lucia and Lepsinger (2009), a theoretical framework is a set of philosophies developed to clarify phenomena and occurrences particularly, and generally recognised for forecasts on trends and patterns. The theoretical framework for this study has its origins in the transportation infrastructure theory, growth theories and economic theory of infrastructure and commons management (Frischmann, 2005; Solow, 1956). An investigation was conducted by Bagchi and Pradhan (2013) on the effect of investment in the transportation setup on economic growth in India using the vector error correction model yielded interesting connections (VECM). The researchers examined a set of data from road and rail between 1970 and 2010. Bagchi and Pradhan (2013) established that investment in a well maintained road transportation setup had a two way directional connection between economic growth and gross domestic capital formation, and road transportation and capital formation. Lakshmanan (2011) presented a diverse theoretical basis, specifically arguing that any investment in the transportation sector decreases costs and raises accessibility. In fact, transport enhancements change the minimal costs of producers on transport, the movement of the households and goods and services demand. In the short run, such modifications flow over the market instruments, thereby indigenising productivity, employment and income (Lakshmanan, 2011).

Growth theories have been utilised to assess national economic theories regarding investment in the transportation infrastructure, its maintenance and impact on the economic growth and general population change (Carlsson, Otto & Hall, 2013:270).

The three theories which have played significant roles in this area are: neoclassical growth theory, growth pole theory and the location growth theory (Frischmann, 2005).

The central idea of Solow's model, which is one of the growth theories, relates total production function to productivity. According to Solow (1956), there is the marginal utility derived from output, capital, labour and investment. Solow claims progress in the technological environment in the advanced countries will grow at a particular period and finally drops. Solow contended that the average cost of output will increase in an advanced state. The theorist observed that transportation setup investment, preparation, and execution are separate from the economic improvement planning process, whereas the contrary happens in the emerging countries owing to the sustained upsurge in marginal utility of capital investments and labour (Solow, 1956). The Solow model considers that a continued increase in capital investment such as road networks raises the rate of growth.

Solow's theory model supports the idea of road transportation infrastructure investment. Therefore, relating to Solow's theory to this study, it is estimated that investment in road transportation networks and its maintenance would have an economic influence on the socio-economic growth of emerging countries such as South Africa (Solow, 1956). Another theory which is the growth pole theory focuses on the idea that economic development is typically not even, but is focussed regularly at a precise pole. The pole signifies a focus of economic undertaking in a region where progress is the extended to further regions (Gavrila-Paven & Bele, 2017). Growth pole models were widely used in the sixties and early seventies by several nations, as well as emerging countries that incorporated it as guidance for the national development policies to soften local differences in employment, incomes, and accessibility to educational institutions. Growth pole models were utilised to encourage rapid economic growth and promote development. The theories were also significant for evaluating change in population, since the theories could uncover the usage of inadequate local resources to be spent or distributed for utmost outcome on economic growth (Gavrila-

Paven & Bele, 2017). Examining the developed counties around the spheres, we have to reflect on the growth pole theory as one of the significant components that backed this regional development.



The Location growth is one of the growth theories that seeks to understand the circulation of economic gains as it is disseminated to the efficient distribution of undertakings to locations, the individual location activities, the separation of spatial market places between the manufacturers, and the circulations of dissimilar sorts of production through terrain quotas (Alonso, 1960). The objective is to eliminate any geographical structures from the examination that induce focus on local undertakings, parting from the location selections to be enlightened by the factors of economic activities that explain the processes of location. These include the agglomerations of economies that promote economic undertakings into focus, so that the costs of transport that allocate undertakings in an area can be determined. The matching of these dual occurrences clarifies within a uniform space assumption the presence of agglomerations of economic undertakings (Alonso, 1960). Location selections are normally indicated by particular standards of group activity: specifically accessibility to a marketplace. For businesses, high accessibility indicates that they have access to extensive and different markets for absolute goods and factors of production, including access to data. For the society, it means accessibility to essential business areas and consequently employment, as their cost of travelling will be marginal. This means that well maintained roads are ingredients in the location choice regarding accessibility (Alonso, 1960).

The theory of economic infrastructure and commons management was promoted by Frischmann (2005), an economist. This theory of infrastructure and commons management offers a hypothetical basis for examining the impact of a nation's network of roads to economic development and growth and its subsequent implications on social development of the developing economies. Frischmann (2005) claimed that permitting open access to public infrastructure like road networks could generate an economic return to the society and lead to change in the societal growth patterns.

Frischmann's (2005) economic theory of infrastructure is dedicated to the economy demand section and examines the means a network of roads can generate worth for the public in general. The dominant principle in this theory is the formation of value. However, several scholars have theorised an analysis that would need to incorporate several aspects comprising the size of the population, Gross Domestic Product, the degree of urbanization, volume of traffic, and economic development levels. Consequently, in relating Frischmann's economic theory of infrastructure and commons management to this research study, it is logical that letting the public unrestricted right of entry to a well maintained road network could considerably influence economic development by humanising the living standards for the population and that would ultimately result in social change.

To substantiate this connection, while huge sums of public monies are spent on road networks and its maintenance projects, elements such as the quality of safety measures, reduction of traffic overcrowding, and enhanced movement refer to a combination of urban, regional, and economic benefits. For instance, in the United States, road infrastructure and its maintenance were mainly funded through the long-term bonds; a small percentage of its roads were financed by private investments (Khasnabis, Dhingra, & Safi, 2010:95). The private sector participation in US road infrastructure suggests how important road networks are in every economy. Though the US road network has been utilised as a reference in this study, it is important to stress the role that road infrastructure investment plays in the social, economic, and viable development in emerging nations, predominantly in South Africa. Several researchers have come to an agreement that there are huge economic paybacks that could be obtained from investment in transportation infrastructure (Bagchi & Pradhan, 2013).

### **2.2.1 Roads Infrastructure and Its Maintenance Policy for South Africa: Policy Framework**

The Department of Transport (DOT) is authorised to lead in the development of well-organized transportation networks by making an outline of workable policies and regulations to assist government plans for social, economic and worldwide development as summarised in the Strategic Plan of the DOT<sup>1</sup>(Roads Infrastructure Policy for South Africa, 2014). It recognised different encounters that the road network division is dealing with such as finance bottlenecks, suitable management of asset, development of skills and synchronised management strategies for traffic. Additionally the development of a nationwide road policy for transport should commence to answer subsequent matters experienced in the road transport segment (SANRAL, 2014) which include:

- Bringing up-to-date the framework of the present road policy and legislative protocols;
- Providing workable finance for road maintenance and its improvement;
- Coming up with fresh initiatives for road safety; and
- Creation of jobs

The economic infrastructure in South Africa, such as its roads network, has been acknowledged as contributing to economic development (Roads Infrastructure Policy for South Africa, 2014). Chains of policies and strategies have been developed and existed ever since the middle of the nineties when the impending management of transportation in South Africa was summarised in the transportation blue-print. The road environment management remained inadequately addressed inside the predominant state roads infrastructure policy for South Africa. Consequently, a series of ideas have been established to give rise to significant investment in transportation that entirely depends on a comprehensive road network inside South Africa (Roads Infrastructure Policy for South Africa, 2014, SANRAL, 2014). A significant amount of funds has been disbursed in fixing the legacies of the apartheid system and the

challenges facing South Africa socially. In this background, roads remained and have played a significant social role (SANRAL, 2014). The current development of the National Development Plan (NDP) in 2013 additionally recognised the formation of feasible metropolitan transportation resolutions, the consolidation and improvement of the passage of goods, the establishment of passenger transport solutions for the long distance and access to rural movement of people has been made a priority in official policy and planning. Consequently, the creation of a Roads Policy sought to reflect on the following (SANRAL, 2014):

- The part that roads play in providing access to social amenities and facilities.
- The role of roads in the creation of jobs and in providing connections between economic prospects.
- The impact of roads on the environment and the prerequisites for the improvement of such roads.

The transportation segment specifically is among the sections that have a substantial investment and could assist in rectifying this past inequality (Roads Infrastructure Policy for South Africa, 2014). This aims to meet the needs of the South African's movement desires as well as connecting people efficiently marketplaces and properties. The transportation segment entirely provides several present and possible assistance to the South Africa population as a whole. The list of policies in this respect pursues the condition to build an affordable, efficient and effective road transportation system (Roads Infrastructure Policy for South Africa, 2014). There are still constraints that persist in several parts of the road transportation segment that obstruct economic improvement and achievements of wellbeing. The present road transport network encompasses equally adverse and optimistic components. The adverse side consists of difficulties demonstrating some challenges that originate from institutional, monetary and social weaknesses. Optimistically, South Africa remains a nation with a comparatively healthy, far-reaching and efficient road setup system that is beyond the infrastructural network in its bordering nations. The road transportation system provides

considerably concerning economic goals on the societal improvement (Roads Infrastructure Policy for South Africa, 2014).

From the above contribution of the road infrastructure network, it is important to make sure that road maintenance must be planned and controlled entirely on all parts of government spheres as suggested in the Back to Basics Strategy. It states that a minimum 7% of operative budgets should be disbursed for the maintenance of the road infrastructure network (Roads Infrastructure Policy for South Africa, 2014). A devoted fund for road infrastructure is regarded as the one providing assistance in easing investment and working budgets for road infrastructure networks. Others believe that a finance model for roads managed by the DoT is perhaps the best means in dealing with challenges facing South Africa's roads. A committed funding for road maintenance for all provinces is in place already (Roads Infrastructure Policy for South Africa, 2014). Preferably a fund of that nature has to be created for municipalities to help alleviate the road maintenance backlog. The Division of Revenue Act (DORA) offers the monetary and legal outline for the budget distribution, together with the essential framework for financial management. An efficient policy on road infrastructure management provides a platform for budget allocations that influence the nature of road made and the anticipated quantifiable effects on the socio-economic welfare of the community and the nation as whole (Roads Infrastructure Policy for South Africa, 2014).

## **2.3 CONCEPTUAL FRAMEWORK**

### **2.3.1 Elements of Constructing Maintainable Roads**

Preparation in respect of construction of roads takes into account the current and projected usages of the transport system to guarantee concentrated service with the lowest of monetary and environmental cost (Asphalt Industry Alliance, 2011). The management and the construction of a maintainable road consequently necessitate reflection over elements connected to statutory requirements and decent workable management practices (Asphalt Industry Alliance, 2011). The development and planning procedure outlines the structures of the road improvement, and similarly

stipulates the structure limitations (Asphalt Industry Alliance, 2011). Viable preparation and design might reduce the cost of maintenance (Sinclair Knight Merz, 2009). The design of roads is similarly influenced by items such as selection of material, for instance, a water sensitive area could be managed by inventions such as permeable concrete roadways (Thorpe & Zhuge, 2010).

A significant reflection on the social features of maintainable roads is safety in design. A case study in Queensland, Australia, revealed that a designer has the responsibility to reduce dangers in the structural design so that the design does not badly interrupt the health and safety of persons utilising it both during and after creation (Queensland Government, 2007). This obligation has repercussions for the entire road lifespan. Lastly, a significant concern in design and construction is safeguarding superiority of the resources and the processes of construction. A regulation of the variability of the materials should provide a better quality and extra foreseeable results for the road over its lifetime (Thorpe, 1998: 119). The central aim of the preliminary stage of development of a road is to create precise objectives and recommendations for the development of the road system alongside broad setting requirements. These aims call for synchronised work between the engineer of the road, the manager of the land, soil scientist, geologist, hydrologist, biologist and those who possess understanding concerning choices and answers to precise glitches (Thorpe, 1998). The design of road setup should manage the entire space distressed by the construction of the road. The design of the road that will provide the minimum solidity every component in the area but preserving the smallest moving space is the perfect requirement. Ensuring the solidity of roads relative to a cost-effective protocol takes the preliminary price tag compensations and possible returns in road maintenance costs.

According to Sattary and Thorp, (2011), it is important to reduce the energy spent in the construction of roads and the maintenance resources. For instance, attention must be directed at the assortment of material correctness and local materials combinations so as to decrease energy embodied in the transport activities of bringing in material

from outside the area to the construction location. Reducing such energy is improved by the usage of salvaged resources and the reprocessing of concrete and external supplies in the rehabilitation of the road. According to Fisher (2010), the usage of reprocessed materials is relatively cheaper as salvaged glass has been successfully used for road repair and maintenance in Australia.

If the recycling materials are carefully chosen with caution and awareness of its benefits and drawbacks, such materials could provide a substantial energy savings and contribute towards the reduction of waste (Wilmot & Wilmot, 2003). As construction undertakings considerably influence waste, the use of greenhouse emissions (Wallace, 2005) has progressively developed to become a significant factor in any project. Therefore, pressure is on the construction companies to be further responsible for their environmental and social influences. The organisations of road development have similarly acknowledged the significance of viability, with associations such as the International Roads Federation (IRF) backing the procurement of green resources that focus on goods and services that are environmentally friendly through their lifespan (IRoads Australia, 2012). The significance of ecological practices in construction industries is fully acknowledged by the supervisory institutions.

### **2.3.2 The Deterioration of Roads**

Road construction undertakings create an important economic development, providing district interconnections. Roads provide an important dimension in the terrestrial delivery of economic resources set for the development of the state and its rural outposts. Road deterioration may affect and increase transportation costs, and once more affect transporters negatively (Ibrahim & Gani, 2014:415). These transporters may then charge their customers the extra cost that would then affect the economy of the whole country (Zofio, Condeco-Melhorado, Maroto-Sanchez, & Gutierrez, 2014:142). As the network of roads worsens, the entire nation may lose key resources created through huge sums of money. With suitable preparation and priorities, insignificant funds for maintenance are bound to provide transformation. According to

Ahmad (2006), maintenance is a necessity for any constructed asset to preserve its intended functionality and to avoid deterioration that might reduce its life span. The funds should be kept in the maintenance budget. This implies that if maintenance of the roads is not carried out according to budgetary allocations, then eventually the society and users of the road are bound to become the funders. In many nations it is alleged that it is a benefit politically to invest cash in constructing new roads. It is however the duty of experts in the road construction to assist with the provision and advice to appropriate stakeholders on the importance of maintaining roads (Ibrahim & Gani, 2014:419).

It is important for legislators and other stakeholders to provide appropriate clauses on the importance of road maintenance. Similarly, it is imperative to include local societies and transporters who are the first to be affected when roads deteriorate. Conditions of road deterioration invariably add to a rise in the costs of operating motor vehicles such as potholes damaging tyres, and therefore higher fuel intake. These are the most significant costs acknowledged in the Scotland study (Parkman, Abell, Bradbury, & Peeling, 2012). The scheduled maintenance of roads reduces the operating costs of a motor vehicle.

Similarly, the quality of journey is reduced as roads surface becomes uneven, and transporters displeasure increases. To preserve rural areas as portals for trade, it is critical to have good roads. Roads link a nation together and facilitate trade and manufacturing. Decent roads, similarly, make a nation reduce trade costs countrywide and globally create an effective road system. It is therefore significant to establish a precise equilibrium between spending on building, maintenance and operation costs of the roads. Of these undertakings, maintenance of roads is important. According to the Asphalt Industry Alliance (2011) in Germany, the state of roads setup is slowly deteriorating because of the non-existence of road maintenance that could result in entire macroeconomic expenditure rising to 4% of her GDP.

### **2.3.3 Effect of Social Undertakings on Maintenance of Roads**

Maintenance of roads must be perceived as an inevitable requirement for people in rural regions. These roads are planned and preserved such that they have fewer environmental effects on the surroundings (Susan, Jared, Richard, & Harris, 2007). Badly planned, preserved and situated roads have a greater threat of deteriorating through rain storms than soundly built and maintained roads. Social undertakings stretching from road sideways driving and channels obstructing may reduce the road lifetime (Susan, *et al.*, 2007). While transporters and the societies decide to farm nearer to roads and deliver water networks straight in the road path, this activity may result in inevitable destruction and soil depletion that would worsen the road lifetime.

### **2.3.4 Obstruction to Rural Road Maintenance Finance**

The cost of rural road maintenance is lesser compared to the value of the asset, and it is vital to carry out maintenance at appropriate times and consistent pace. Therefore, road maintenance must be an uninterrupted undertaking that should be adequately financed; and the monies allotted for it must be directed to the maintenance strategy to ensure that these roads are in a usable state (Shrestha, 2007). Often, the moneys normally billed for rural road maintenance are re-routed to inter-metropolitan roads, leaving the rural roads in a parlous state (Shrestha, 2007). This absence of maintenance worsens the conditions of the roads thereby necessitating rebuilding and re-construction. Roads in the rural areas are normally seen as insignificant and do not get the consistent maintenance that they deserve.

### **2.3.5 Political meddling in road maintenance**

Politicians can use the state of road infrastructure as an extremely useful campaign tool for their own backing or support. The circulation of funds towards rural roads in some areas is politically significant as a game in the allocation of state resources. Some of the regions that are normally marginalised by politicians are left out at the expense of others (Wilson, 2004:530). Apparently the most powerful group in

government and in the district obtain more surfaced and well-maintained roads. The majority of resident officials or politicians in the areas occasionally get favours with respect to the maintenance of rural roads. The construction and maintenance of rural roads is often associated with prospects of financing of rural infrastructures (Wilson, 2004). Some rural roads that lead to areas where politicians do not gain from are typically left out because they are outside of politically favoured borders. This indicates that politicians take road construction as some direct machinery for allocating selective investment (Burgess, Jedwab, Miguel & Morjaria, 2009; Walle & Mu, 2007).

### **2.3.6 Maintenance Procurement practice**

The central tendency in road maintenance procurement for improvement is to increase the present range of maintenance deals. Some roads maintenance work should remain under new and different agreements; however, maintenance procurement should be similarly improved. Implementation of performance based agreements could decrease the rural road maintenance cost (Thorpe, 2012). Maintenance procurement practices for the maintenance of roads are typically done within a short period and little priced particularly for the maintenance of rural roads. Logically, local service providers have to be used. The availability of local resources and local contracting has a number of benefits, ranging from techniques of work custom-made to the conditions of the local terrain and value-added output to better responsibility, accountability and less cost (Thorpe, 2012).

## **2.4 THE EMPIRICAL REVIEW**

### **2.4.1 Investment in Road Maintenance in Relation to Poverty Alleviation**

The alleviation of poverty is supposed to be a priority area in Africa. The World Bank has indicated in several studies that there is evidence that roads in rural areas are used to play political game such that there is a serious disconnect between the roads and the desire to alleviate poverty, signifying good road setup is an indispensable factor in the mitigation of poverty (World Bank, 2001). A well-maintained road

infrastructure offers ease of access and movement, leading to an increase in transportation activities, economic undertaking, growth in the economy and eventually an efficient economy. A well-maintained road infrastructure network also offers benefits to a nation in terms of enhanced local, regional and provincial integration that promotes local and national trade (Adling & Gupta, 2009:12).

Lack of well-maintained road infrastructure, particularly in the rural areas, significantly results in trade and travel restrictions for the peoples. These restrictions happen in relations to the socio-economic activities and accessibility to institutions such as universities, hospitals, marketplaces and businesses. Restricted accessibility to schools obstructs access to educational institutions for students; restricted of access to hospitals obstructs health improvement and restricted mobility and access to the marketplaces and businesses confines opportunities for trade. All these cumulatively reduce the prospect of making earnings and development in everyday standard of living (Duranton, Morrow & Turner, 2014:688). The result is a poor socio-economic development standard.

Siemiatycki (2013:1257) studied the impact of varied methods of public investments on development and poverty in rural areas in several provinces in China. The researcher established that a well-maintained road infrastructure reduces poverty as much as education in the rural areas, communications, agricultural exploration and improvement, generation of power, and the poverty alleviation target. A study conducted by Bryceson (2006) examined the ways in which effective road investment assists movement and accessibility to social services in the rural areas by means of comparative data from Ethiopia, Vietnam and Zambia. Similarly, the researcher examined if a well-maintained road could close the territorial segregation, economic and social side-lining for poorer societies.

The outcomes of the study showed that road investments in the rural areas provide the possible facilitation to poverty relief, identifying key elements linked to the recognition

of the benefits. The prevailing rural road network density, the magnitude of social and economic establishment, the scale of possession and motor transport accessibility among the rural inhabitants and the degree of buying capacity of the households in the rural areas are all factors linked to accessibility to public transport. The findings of the study further point out that when roads improve movement as happens with motor transport, it also becomes easier for the community's movement. This may possibly impact positively on poverty alleviation once the travel time savings are realised and the reduced distances offer extra economic prospects and enhanced accessibility to social services.

Jerome (2011:141) established the connection between infrastructure setup improvements and poverty alleviation when studying information on macro and micro economic factors. Eliasson and Lundberg (2012:33) resolved that privatisation of infrastructure improvement is likely to decrease poverty when the poor may possibly have accessibility to jobs. Other studies on the alleviation of poverty have been dedicated to seeking consensus from a number of poor people in the participation processes of decision-making through access to infrastructure comprising of transportation (Asphalt Industry Alliance, 2011). Strategies and policies for investment in road transport setup should reflect the safety, in addition to the alleviation of poverty.

According to the United Nations Development Programme (2011), annually, above 1.2 million people are killed on roads, as well as a further 20-50 million who suffer non-fatal injuries. The highest 10 reasons of deaths in this world are linked to road accidents, and may possibly increase by 2020 (United Nations Development Programme, 2011). Road traffic calamities are likely to be over looked in small and medium revenue nations, where 97% of road deaths happen (Osayomi, 2013:89). Road accidents contribute the highest in the mortality rates in developing countries than some of the communicable illnesses, and South Africa is an excluded hazardous site (Agbonkhese, 2013). The World Health Organization (WHO) lately categorised South Africa among the highest in the prevalence of road traffic accidents in the world (WHO, 2013), due to

the potholes in some parts of the country's roads that make it unsafe to travel on. In South Africa, little if any experimental data exists to estimate the connection between a well-maintained road transport infrastructure investment and poverty alleviation.

There is also a gap in the literature as to whether legislators practice the combined method predominant in European countries for evaluating investment in road transport setup for socio-economic effects (Parkman *et al.*, 2012). This gap is made difficult by rampant fraud and corruption that takes funds meant for the public amenities such as roads infrastructure improvement for personal use, leaving little for the maintenance of South African roads. For South Africa to meet the Millennium goals of the United Nations and its directives for poverty alleviation, systems should be in place for researchers to tackle simple queries on whether investment in well-maintained road transportation infrastructure decreases poverty, the trends of local poverty, and in what way improved rural road infrastructure development impacts the rural poor. This could be extended to investigating the manner in which road transportation investment relates to other poverty alleviation components such as social welfare programmes. According to Remy (2008), the road restoration and sporadic maintenance reduces the cost of rural people getting to metropolises, marketplaces and polling stations for voting. The participation of the rural populations in the governmental process in road maintenance should be encouraged.

#### **2.4.2 Investment in Road Maintenance in Relation to Local Economic Growth**

The rural transport network rests on suitable infrastructure, as the rural infrastructure entails mostly rural roads. These may possibly differ in value, depending on the construction and the subsequent maintenance of the infrastructure (Hiep, 2009). In the rural households specifically, a lot of time is spent by women transporting basic needs from other places and this is often harshly hindered by the lack of a suitable rural roads network. As a result of non-maintained roads in the rural areas, considerable limitations scupper the development and growth of these communities (Ubaka, 2011). Poverty is a

feature more prominent in rural areas than urban counterparts, and the integration of the two areas could result in the transfer of skills and resources for development in the rural areas. The lack of integration with urban areas due to non-existence of suitable roads hinders accessibility and movement of those resources (Highways Agency, 2009). Local roads and footpaths are regularly inaccessible, making it very challenging and in some circumstances virtually difficult for the rural households to access the local rural economy. Since the rural societies play a substantial role in the economic development and growth of a nation, and similarly its own socio-economic development and growth, it is imperative that rural roads investment must be maintained to offer a viable rural roads infrastructure network over the long run.

Aschauer (1989:180) is one of the earlier researchers who recognised the relationship between transportation infrastructure and economic development. Their study clarified that there was a positive influence on private sector output when investment by the public was made in transportation infrastructure. The researcher surveyed selected roads to examine the per capita income influence, and for a second time confirmed that there is a connection among the two. Mofidi and Stone (1990:687) also observed the impact of transportation infrastructure on economic development using an output lens and established an optimistic linkage among the spending on roads, the investments in manufacturing and job creation. Akhmetzhanov and Lustoy (2013) validated the relations between transportation infrastructure and local development with reference to population mobility. Jones (1990:220) similarly assessed income, employment, and investment as a significant component for evaluating the impact of economic activities on the transportation infrastructure. Munnell (1992:99) similarly established positive connections between road infrastructure and the gross state product (GSP). Moonmaw, Mullen and Martin, (1995:831) also recognised the positive relations between transportation infrastructure and per capita income.

### **2.4.3 Investment in Road Maintenance in Relation to Regional Development**

Road networks are the major means of transportation in Africa for both goods and commuters. According to Pinard and Greening (2004), it is estimated that the Southern Africa Development Community (SADC) road transport network carries over 80% of the area's imports and exports. Nevertheless, Africa's road system is confronted by numerous limitations that hinder economic development and growth inside the continent. According to Food & Agriculture Organization (FAO) of the United Nations (2002), aside from North Africa, Africa's rural infrastructure is insufficient and less advanced, with the bottom magnitude of surfaced and maintained roads. Some of the key restrictions to the accessibility are directly linked to inadequate funds. The outcome of this is nonexistence of investment cash to develop the road network and for regular maintenance for the present roads. The problem is the estimation of funds for road maintenance requirements, by means of a precise valuation and the degree of a country's road setup, as well as the recognition of sources of funds and consequently drawing a comprehensive and maintainable road investment. The outcome of insufficient investment in roads is that the road networks are not expanded and the current roads are not maintained.

The result of worsening road setup is not only restricting ease of access, movement and region linking between countries, but the rise in production and the costs of transportation. The worsening road network consequently influences undulation effects, eventually generating an adverse effect on the whole macro-economy, and then hamper, socio-economic improvement, poverty alleviation and a complete macro-economic development and growth (Kustepeli, Gulcan & Akgungor. 2012). To circumvent this situation, it is necessary to make road investment part of the foundation of the country's undertakings in focusing on the road setup, improvement and maintenance. As a suitable road transportation infrastructure system is an indispensable element for economic development and growth, constant road investment is crucial for the development and maintenance of the road network of a country (Xueliang, 2013:32).

In Europe, elements that play significant part in shaping transportation investment decisions comprise the suitability of the transportation strategy, accessibility of finance, price efficiency of developments, and the organisational capability to accomplish and captivate resources (Audit Commission, 2011). These investment main concerns now form performance benchmark for assessing the built roads. The main benchmarks are availability, regional interrelation, economic rivalry, and environmental viability. The effects of this benchmark are measured by means of the Spatial and Socio-Economic impacts (SASI) model that is shared among 130 states in Europe (Burinskienė & Griškevičiūtė-Gečienė, 2012). This type of outline has captured the regional economic development policies and models ever since the 1940s while Rosenstein-Rodan, Rostow, and other academics commenced the generalisation of relationship between infrastructure, as well as transportation setup, and economic development (Crescenzi & Rodriguez-Pose, 2012).

#### **2.4.4 Investment in Road Maintenance in Relation to Developing Countries**

Yu, De Jong, Storm and Mi (2012:30) studied the connection between economic growth in China, at equally magnitude of the state and region, and investment in the transportation infrastructure, by means of a Granger causality framework and a panel co-integration on time series data between 1978 and 2008. The researchers resolved that the data revealed a unidirectional Granger causality from transportation infrastructure to economic growth at the state level. However, the data from the regional level revealed bidirectional causality for the further wealthy region and a unidirectional causality for the small earnings western and central regions at the local level. Yu *et al.* (2012:28) further established that transportation infrastructure improvement is insufficient to fuel economic growth in the less advanced parts of China. Iyanova and Masarova (2013: 265) also scrutinised economic development and the investments in the road infrastructure in the regions of Slovak Republic, and established that wealthy regions are likely to observe further optimistic impacts of investment in the transportation infrastructure on economic growth than low wealthy

regions. The researchers opined that economic development rests on political, socio-economic and normal terrestrial elements as well as demography and the past experience.

Many studies support the connection between investments in transportation infrastructure and political, society, social, and economic development (Akhmetzhanov & Lustoy, 2013; Bagchi & Pradhan, 2013). Precisely, investments in road transport setup and its maintenance signify significant economic, political, and societal developments that in the long run upsurge the assets and authority of a nation, expanding of marketplaces and dropping barriers of trade, consequently growth in the output whereas humanising movement and the living standard of the common people (Adler & Polsky, 2010; Bagchi & Pradhan, 2013; Njoh, 2012). Well maintained rural roads assist in enabling and permitting the right to use of socio-economic centres in rural parts and eventually assist in attaining fairness in a nation. Numerous studies also have assessed the influence of investments in rural roads on socio-economic development; though several studies previously concentrated on the straight forward influence by means of relevant software application tools (Prud'homme, 2005). The assessments of the unintended influence on socio-economic development have been predominant. As determining the benefits of the community is challenging, that could be done if the cost of transport savings and time savings method does not offer sufficient explanation in relation to the Economic Rate of Return (ERR) approximations (World Bank, 2000).

The ERR in most cases assess small rural roads capacities and will not be capable to validating investments. An impact assessment of socio-economic influence of feeder road improvements was carried out in the Copper belt of Zambia (Africon 2004). The valuation concentrated on the present condition in the Copper belt Province and the undertakings in the area, and examined the influence feeder road network improvements could have on the socio-economics. The socio-economic impact valuation similarly concentrated on workforce production and maintenance of the

feeder road developments, with the observation of hiring individuals around areas. Regions lacking feeder roads maintenance make it challenging for agriculturalists to move their agricultural harvest to the urban areas. Lack of ability to transport produce to the market place frequently makes it hard for the locals to get income thereby improving their household wealth. The study analysis showed that transport has a substantial role in the day-to-day lives of the societies that could benefit from the improvement of the feeder road network. A Similar study by World Bank (2001) specified that a substantial enhancement in socio-economic living situations was projected with rural roads investment improvement.

## **2.5 Chapter Conclusion**

Road maintenance provides a critical support for the growth and development of the economy, as well as providing vital social assistance. A consistent and well-maintained road system provides right to use to businesses, health, work and educational institutions. All of these encourage the economic and social improvement in an area (Ubaka, 2011). Notwithstanding the preliminary investment in roads and its maintenance, over a certain period, this setup tends to deteriorate, necessitating continuing maintenance services to the prevailing roads. There is also the need for new investments to expand and improve the structure. Lacking the preservation and development, roads will carry on worsening, necessitating substantial maintenance costs after a few years. The literature analysis on road transportation and its maintenance investment has steered this study to determine that four elementary theoretical phases contributing to accomplishing before-and-after-construction achievement: Road infrastructure administration policy and approach, he allocations of budget, he type of constructed and the anticipated road and Quantifiable effects of the road on the socio-economic welfare of a community, and the whole country.

## **CHAPTER 3**

### **RESEARCH METHOD**

#### **3.1 INTRODUCTION**

This qualitative case study was to better comprehend the connection between road transportation infrastructure maintenance investment and the socio-economic development in DRSM District. According to Patton (2015), features of a study using qualitative method consist of steering the study in its natural location, labelling the subject matter of the study, defining a specific occurrence after scrutinising the study detailed, describing the study procedure and in what ways that the collected data would be analysed. This chapter outlines the methodology of the study as well as research design, approach, data collection techniques, sampling, and data analysis connected to the objective and purpose of the research, and the chapter conclusion.

#### **3.2 The Research Design**

The study of roads setup maintenance investments and its impact on the socioeconomic development was suitable for qualitative case study method (Bogdan & Biklen, 2011). The upsurge in the economic undertakings and the growth of the population necessitates the improvement of a country's road transportation infrastructure. Infrastructure improvement is a significant backer for a healthier business atmosphere. Investments in the road transportation infrastructure maintenance is essential in moving forward farming output that is a backbone in the rural areas and its local economy and social improvement occurring by means of supplying health and education services to the rural population. The undertakings on infrastructure segment improvements could induce development and fruitful work. Researches revealed that GDP grow by a percentage point by the infrastructure investments (AfDB, 2011) can be achieved if roads are well maintained. The choice to conduct a research is motivated by the research questions. This research was planned to respond to the questions:

1. What impact does the investment in road maintenance have on socio-economic development?
2. How does investing in road maintenance impact change in the society?
3. What are the essential preparation, executing, and maintenance measures needed before and after road construction undertakings?

A qualitative case study method was utilised to explore the Impact of road maintenance on Socio-Economic Development in the DRSM District, North West Province. A qualitative case study, which is a detailed narrative and examination of a confined system (Merriam, 2014), was appropriate for this study, since it delivered a precise means to discover the study background from a complete viewpoint limited by time, undertakings, and procedures, and also permissible for drawing information from several sources (Patton, 2015). According to Yin (2013), case studies should contain “*what*” and “*who*” to be studied, interviews application for collection of data, subjects and outlines development, data analysis, and findings suggestion. According to Marshall and Rossman (2014), a case study offers a suitable setting when numerous data sources could be applied to have a complete conclusion. The views of these researchers offer a case study as the finest choice for Impact of road maintenance on Socio-Economic Development in the DRSM District, North West Province.

### **3.3 The Researchers Role**

The role of the researcher was an observer-participant. The researcher conducted one-on-one face-to-face and telephonic interviews with participants in the data gathering. Furthermore, peer-reviewed applicable journals, books, case studies and extracts that are relevant to road transportation infrastructure maintenance were consulted by the researcher. In conducting this study, the gathered information for this case study made the researchers role very important (Yin, 2013). In collecting data for this study, a knowledgeable panel of three experts with a comprehensive information and understanding of road transportation infrastructure and its maintenance were requested

to evaluate the interview questions to guarantee its quality, validity, reliability and applicability. According to McMillan (2015), collecting data by means of interviews on case studies is always centred on subjective information. Therefore, the researcher was mindful of personal feelings and beliefs regarding the study problem. The researcher guaranteed that his subjective sentiments and earlier familiarities about road infrastructure in DRSM District were not personally incorporated into the study path. As an alternative, the judgements were determined by the collected data.

### **3.4 Population Sampling**

According to Yin (2013), suitable elements of an investigation are from the study questions employed to decide the range of the data collection. Purposeful sampling was applied in selecting stakeholders who are decision makers and those who are affected by road infrastructure. Creswell (2012) and Donnelly and Trochim (2007) maintained that a purposeful sampling is suitable when specimen percentage is uncritical. Purposeful sampling is suitable for the study since there were considerable number of District stakeholders who have interest and aware of roads infrastructure knowledge in DRSM District. The researcher purposeful hand-picked DRSM District stakeholders who have an interest in the preparation, finance, creation, and checking of roads infrastructure development in the district.

### **3.5 Data collection instruments**

Interview and observation were the main instruments for data collection in this study. The interviews questions were semi-structured open-ended questions. According to May (2011:103), this type of questions permit a great variety of judgemental constructed reactions; that means that there are no wrong or right responses as this type of questions requests a motivation for the participants' response. The researcher obtained the services of those who have an in-depth knowledge in road construction sector, to help construct the interview questionnaire. On the other hand, to create the perception of validity and reliability, Yin (2013) recommended the usage of several

sources known as the data triangulation. Observation was also carried out for the period of the interviews to keep comprehensive records of preconceptions, subjective opinions, and impressions of the study participants' understanding and feelings for the study subject as they answered the study questions. By means of data triangulation, information from the study investigation surges the study validity when different sources of data are combined as one. Reliability of the data from the interview was achieved by equating it to the objectives of study and the observation (Saldana, 2012).

### **3.6 Data collection technique**

#### **3.6.1 Interview**

In collecting data from the participants using interview, the initial phase is to check the participants' contact data and their preparedness to contribute to the study (Bogdan & Biklen, 2011; Seidman 2013). Preceding the interview process and the collection of data, the researcher acquired authorisation from the North-West University's research board. After the receiving an approval from the board, steps were taken to authenticate the study questions as specified in the interview procedure. An arrangement regarding the interview times were discussed in advance with the participants. Data collection through this method was through face-to-face, telephone, and mails, which are methods that necessitated the respondents to contribute enthusiastically to the study. Fifteen study participants were selected to generate a rich data on the study topic. The researcher shepherded the face-to-face and telephonic interviews by communicating to the study participants and offering them the choice to pull out from the study at any time in the study progression. Before the commencement of the interview processes, the study participants were given a permission form to sign the consent form individually. They were updated about their privileges and rights and guaranteed privacy of the data gathered from the interviews. The data collected were disguised through password protected to avoid the participants' identification, and all the data that were physically collected were secured in a lockable cabinet.

During the actual interview process, questions were posed to the relevant participants for their response. Seidman (2013) stated that a researcher ought to pay attention

cautiously on each word the participants say. Paying attention provides the researcher a chance to request supplementary questions for clarity. Supplementary questionings that are asked by the researcher during the interview show that the/she is vigorously paying attention. According to Singleton and Straits (2010), the researcher needs to preserve the conversation with the study participant throughout the interview process to achieve a complete knowledge of the research aim. All face-to-face interview responses from the participants were recorded using a tape recorder on the permission of the interviewee, where necessary. The researcher also took some notes to serve as backup. Each interview lasted 25 to 30 minutes, and a recorded data was offered to the participants individually after the interview completion on request.



### **3.6.2 Observation**

Direct observation was done for the period of the interviews. As mentioned by Creswell (2012), the practice of observation should also be used throughout the process of the interview. During this period the researcher preserved comprehensive records of any preconceptions and subjective emotion of the study participants' understanding and desire on the study subject as they answered to the research questions. The researcher also took a field trip to observe the state of the roads in the district so as to back up what the study participants said during the interview.

### **3.7 Data Analysis**

According to Merriam (2014), data analysis is the process of building logic out of the collected data and includes combining, decreasing, and deducing information from the interviews and observations. The most widely used data analysis techniques are content and inductive techniques. Content analysis includes participant's interviews' content responses, observations, and transcripts taken throughout interviews, while inductive analysis encompasses participant's responses assemblage into groups and themes. It is advisable not to start an analysis of data till all consultations and interviews are done that would assist the researcher to entirely examine texts prior to

the analysis (Seidman, 2013). However, Merriam (2014) suggests a concurrent analysis with collection of data since without constant analysis, the data could be out-of-focus and dreary. This may result in vast data magnitudes to develop. The researcher adopted the continuous relative technique of the analysis of data suggested by Glaser and Strauss (2012). There are sections of data identified from the observations and interviews with a similarity and receptive to the study research questions.

### **3.7.1 Analysis of Interview responses**

The researcher wrote down word for word of the recorded audio of the interview response. Some of the data that perhaps revealed the respondent's details were excluded from the analysis. The researcher made sure that the respondents' personalities were concealed, and gazed on responses to a precise question on all the respondents simultaneously concentrating on a questions that might assist to identify related and dissimilarity sentiments of the similar concerns in the informations suggested by McMillan (2015). Explanations of the collected data through interviews were dispersed among the participant via a member check to make clear of vague replies. The researcher read the interview texts, records and jotted in the borders of the transcripts some words and remarks that displayed resemblances. Separately, the recoded interviews with the participants were transcribed to exclude any inaccuracies.

### **3.7.2 Observation analysis**

Creswell (2012) comments that in analysing data collected during field observation, the researcher should start with the common evaluation of the collected data to acquire the sense of it by means of minutes and reflective transcripts. The researcher took the actual data from the field trip into account to get the understandings of what is really happening on the grounds. All the subjective thoughts deduced from the notes taking during the ground direct observation weremanually categorised in order to examine the patterns of the data.

### **3.8 TRUSTWORTHINESS**

Accuracy and reliability are the main elements of trustworthiness in the data collected for any research and its associated evidence (McMillan, 2015). Although this study was planned on qualitative case study technique, and this indicates that the researcher was openly and directly tangled in the data collection, there was a need that bias should be avoided (McMillan, 2015; Merriam, 2009). A double tactic that the researcher employed in the research were member check and triangulation to improve the trustworthiness in the research results. Merriam (2009:215) indicated that triangulation is the procedure to check developing outcomes, demonstrating that the diversity of the data collected is guaranteed, since the researcher used interview as one of the data collection methods in this study. On the other hand, member check was applied to acquire key answers on developing responses from the respondents. This was done as Merriam (2009:217) stated that this is the "single most important way of ruling out the possibility of misinterpreting the meaning of what participants say and do". These two methods would improve the trustworthiness and credibility of the research data.

### **3.9 ETHICAL CONSIDERATION**

Matters regarding Ethics of the study were dealt with in stages. In complying with the guidelines of the Research Board, 36 authorization to carry on the study was acquired from the North-West University Institutional Research Board. Although the study was done in a regular societal setting, the concentration part of the study is not emotional, and the targeted populace the study would be of adults of 18 years of age and above. Nevertheless, every single researcher has the obligation to safeguard the study participants (McMillan, 2015). The utmost moral issues that were mirrored in this study were consent and confidentiality. Participation by any individual in this study was voluntary. They were well-versed with what was expected from them and were guaranteed of their supreme safeguard against any injury that may affect them. On the other hand, in certain circumstances a written agreement could frighten the participants of the study, and in such case the researcher could employ a verbal consent the

researcher and the participants. Confidentiality was a priority in the study. Therefore, it was essential for the researcher to safeguard the individual persona where data was collected from. Participants of the study were guaranteed of the destruction and protection, including their identity of the collected information.

### **3.10 Chapter conclusion**

This qualitative case study method was selected for this study to increase the knowledge base of the Impact of road maintenance on Socio-Economic Development. The objective of this qualitative case research was to establish the Impact of road maintenance on Socio-Economic Development in the DRSM District, North West Province. The range of this study was limited to the DRSM District. It was of the believe that the study findings and the conclusions could contribute and help legislators, financiers, and all stakeholders who are concerned with road transportation infrastructure to comprehend the connection between road transportation infrastructure maintenance investment and Socio-Economic Development activities. The next chapter which is Chapter four analyses data and findings from the studies.

## CHAPTER 4

### RESULTS, ANALYSIS AND INTERPRETATION

#### 4.1 INTRODUCTION

This Chapter offers the analysis of the collected data for the study. The purpose of this study was to better comprehend the impact of road maintenance on socio-economic development in the Dr. Ruth Segomotsi Mompati District, North West Province. The subsequent research questions that steered the study are:

1. What impact does the investment in road maintenance have on socio-economic development?
2. How does investing in road maintenance impact change in the society?
3. What are the essential preparation, executing, and maintenance measures needed before and after road construction undertakings?

The researcher involved two professional who had a detailed understanding and knowledge in road infrastructure maintenance investment and socio-economic development, to validate the interview questions before the data collection. These professionals revised, amended and authenticated questions for the interview and aided in making the questions clear and applicable to the study purpose. A total of 15 Participants were picked and were divided into five groups.

**Table 1: interview participants, types and numbers**

<i>Group Classification</i>	<i>Key participants</i>	<i>Number of selected participants</i>
<i>C1</i>	<i>Road Managers</i>	<i>3</i>
<i>C2</i>	<i>Road Engineers</i>	<i>3</i>
<i>C3</i>	<i>Local Taxi Association</i>	<i>3</i>
<i>C4</i>	<i>Local Opinion Leaders</i>	<i>3</i>
<i>C5</i>	<i>Ordinary Road Users</i>	<i>3</i>
<b>Total</b>		<b>15</b>

## **4.2 Setting of the Study**

The process of data collection commenced when the authorisation from North-West University ethics committee was granted. All study participants were communicated with through either telephone or email. To make sure if participants have the interest of partaking in the study, the researcher also made a follow-up call to establish their willingness. In resolving some of the challenges, any person who uses the roads in the DRSM district has experienced to offer important perceptions on the conditions of the roads. Those who have travelled on the different roads outside the district have the understanding and know the importance of well-maintained roads setup, and also know the difference between the present roads network in the district and the others.

## **4.3 The Demographics of the study participants**

An overall number of 15 participants who were indirectly or directly impacted by the presence of maintainable road setup were selected and assigned a special code for identification purposes for this study. The participants for the study comprise Road Managers who are employed in different managerial roles inside the maintenance division (C1), Road Engineers (C2), Local Taxi Association (C3), Local Opinion Leaders (C4) and Ordinary Road Users (C5). These study participants were grouped into five and classified as shown in Table 1.

## **4.4 The Actual interview Data Collection and analysis**

In aggregate, 15 interviews were shepherded by the researcher for the study. The interviews were conducted for the time frame of four weeks, between August and September 2018. The face-to-face interviews were conducted in the participant's place of convenience, and each interview session persisted roughly for 25 to 30 minutes. At the beginning of the actual interview process, the study participants were updated of the study nature individually, and they were given a consent form to acquaint themselves with and sign. Individually, participants were asked about their understanding and any queries concerning the consent form, and a signed copy of the

consent form was handed over to the study participants and the researcher retained a copy of each. Separately, participants were additionally educated about the study purpose, its processes, and any risks involved and their privileges to carry on with the study or pull out from it at any stage. When the researcher received the consent of the study participants, the interview process started.

The researcher also requested an approval from all the study participants to record interviews digitally. All the study interviews with the participants were recorded by means of voice audio digital recorder. Same Interview questions were utilised to ensure that individual participants answered same questions which were planned to discover experiences of the participants with roads in the DRSM district. Ample time was granted to the participants to answer the questions, while the researcher took comprehensive field notes during the interviews. The researcher distributed to the participants the written down data to certify that the transcribed responses precisely reflect their views, while chances were given to amend any information regarded as incorrect. A special code was allocated to each participant to avoid recognising them with their names.

The recorded audio interview was listened to by the researcher and was written down by means of Microsoft Word. By means of Boeije's (2002) adapted constant comparative method, the data from the interview was structured as: classifying, coding, outlining classifications, and resemblances classification. Study themes were recognised by observing the resemblances in the participant's interview questions responses.

**Table 2: participants' types and their specially assigned code**

<i>Participants</i>	<i>Number of each participants</i>	<i>specially assigned code</i>
C1	3	C1:1, C1:2, and C1:3
C2	3	C2:1, C2:2, and C2:3
C3	3	C3:1, C3:2, and C3:3
C4	3	C4:1, C4:2, and C4:3
C5	3	C5:1, C5:2, and C5:3
Total	15	

#### **4.5 Trustworthiness Evidence**

##### **Transferability**

Road network preparation, development, finance, construction and maintenance, as well as the preparation, implementation, and checking and the development of the local economy is connected to each other. A number of emerging nations, such as South Africa, have public works departments and transport departments accountable for the construction and maintenance of roads needed for socio-economic and economic growth. The value of the Transferability was accomplished since the researcher supplied comprehensive features that are autonomous of the researcher's subjective inferences and offered additional outside evaluators employing comparable approach to arrive at the comparable inferences.

##### **Confirmability**

This research confirmability was attained for the reason that the researcher followed a methodical process for the collection of data, examination, and writings. The researcher noted the manuscript processes employed imperatively to ease subjectivity and replicability improvement of the study results as suggested by Trochim and Donnelly (2008). The uniformity strategies utilised by the researcher comprised the usage of data originated from several sources including possession of transcripts and notes; participants observation' and behaviour; and the researcher predisposition

reduction. The researcher employed several sources to validate the findings of the study aimed at deducing the collected data from the study participants. The researcher distributed the initial study results to limited study participants to confirm that the recorded data represented their viewpoints properly. The researcher offered opportunity to those who want to modify or alter any incorrect facts. The researcher furthermore offered a comprehensive explanations of the research hence other scholars may possibly effectively imitate the study.

### **Credibility**

The credibility for the study was established through triangulation and lengthy interaction (Silverman, 2013). Triangulation permitted the researcher to lessen the influence of prejudice, since each source of data collection, like notes taking on the fields, responses of the study participants and observations, permitted the researcher to achieve an all-inclusive opinion of the issue. The study outcomes were in line with the studied documents contents and together with understandings, the opinions, and the viewpoints of the participants around the topic. This provided the researcher the controllability to raise his comprehension of the entire characteristics of the research. Talking to fifteen individuals who originated from different backgrounds and had knowledge about the conditions of DRSM district roads structure and in what way to develop them offered saturation to the study. Credibility was attained through this technique.

### **Dependability**

Once the situations of the study is altered, the researcher recorded the variations in a review track and deliberated in what way they might impact other comparable research work; in that method dependability was documented. Dependability guarantees that the approaches employed in this study to attain the outcomes can be repeated in a comparable location or environment and situation, therefore acquiescent same outcomes.

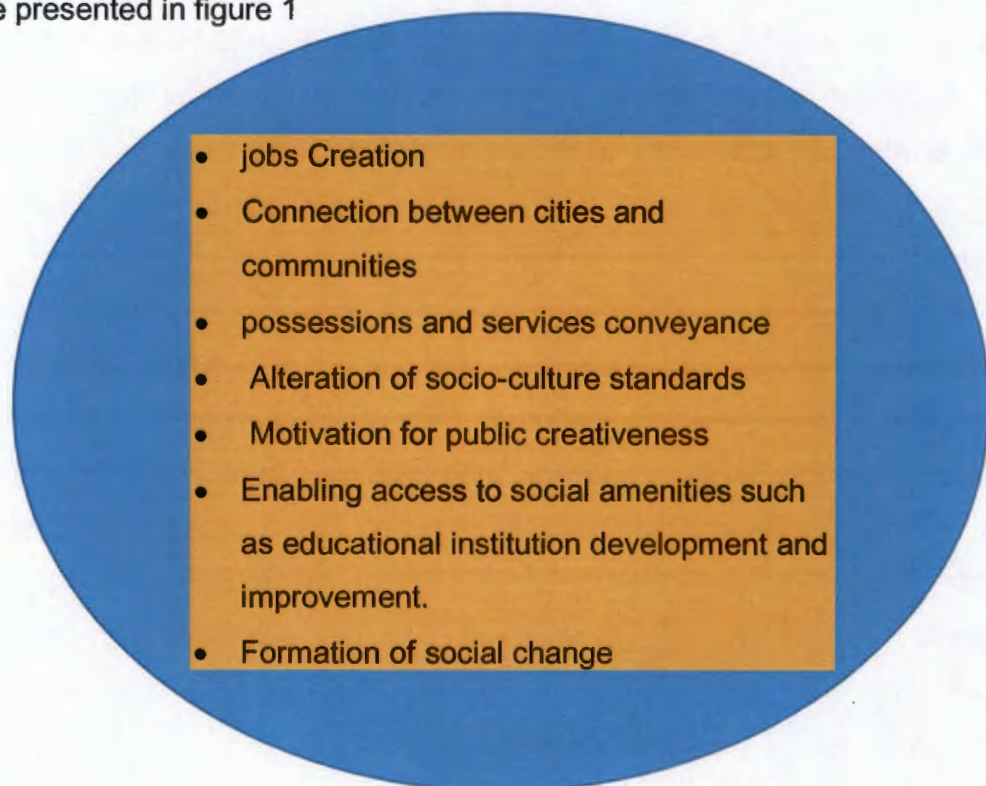
## 4.6 The Results of the Study

The findings and the participant's responses to interview questions are discussed in this section.

### *The Study Question 1*

What impact does the investment in road maintenance have on socio-economic development in the Dr. Ruth Segomotsi Mompati District, North West Province?

The collected data for this study exposed three main classifications of themes that back the connection between good road infrastructures, socio-economic growth and change in the society. There is also a positive connection between good road infrastructure investment and economic improvement (Bagchi and Pradhan, 2013). This researcher claimed that a well-maintained road offers accessibility to employment, clinics, educational institutions, community get-together and also surges society per capita income. Common participants responses emerged from the interviews that connect to RQ1 are presented in figure 1



**Figure 1:** Common participant's responses emerged from the interviews that connect to RQ1

Figure 1 made known responses from the study participants that connect good road infrastructure to socio-economic development in the DRSM District. These substantial participants' responses give the idea that backed the economic theory of infrastructure and the commons management that a good road setup in a nation eases socio-economic development and growth for developing economies (Frischmann, 2005). Table 3 shows how many times the study participants in each class and overall stated the connection between good road infrastructure investment and socio-economic improvement, development and change in the society.

- Jobs Creation (11 times) representing (73.3%).
- Connection between cities and communities (15 times) representing (100%).
- Possessions and services conveyance (15 times) representing (100%).
- Alteration of socio-culture standards (8 times) representing (53.3%).
- Motivation for public creativeness (7 times) representing (46.6%).
- Enabling access to social amenities such as educational institution development and improvement. (15 times) representing (100%).
- Formation of social change (9 times) representing (60%).

**Table 3 Participant's Connection of Road Infrastructure maintenance to socio-economic growth**

Participants	key responses and number of times mentioned						
	jobs Creation	Connection between cities and communities	possessions and services conveyance	Alteration of socio-culture standards	Motivation for public creativeness	Enabling access to social amenities such as educational institution development and improvement	Formation of social change
C1.1	x	x	x	x	X	X	x
C1.2	x	x	x			X	x
C1.3		x	x	x	X	X	
C2.1	x	x	x			X	x
C2.2	x	x	x		X	X	x
C2.3		x	x			X	
C3.1	x	x	x		X	X	x
C3.2	x	x	x	x	X	X	x
C3.3		x	x	x	X	X	
C4.1	x	x	x	x		X	x
C4.2		x	x		X	X	x
C4.3	x	x	x	x		X	
C5.1	x	x	x			X	
C5.2	x	x	x	x		X	x
C5.3	x	x	x			X	
TOATAL	11	15	15	8	7	15	9

Classification 1(C1) participants are the district road managers and part of road policy-makers representing the department of transport who are stationed in the district and also include provisional government hired officials. These participants provided the maximum ranking of three out of three on connection between cities and communities, possessions and services conveyance, Enabling access to social amenities such as

educational institution development and improvement as a key tie to the socio-economic development in the DRSM District.

Classification 2(C2) participants are the district Road engineers who are stationed at the head office and hired government officials. These participants also provided the maximum ranking of three out of three representing (100%) on connection between cities and communities, possessions and services conveyance, enabling access to social amenities such as educational institution development and improvement as a key tie to the socio-economic development in the DRSM District.

Classification 3(C3) participants represent local taxi drivers association who transport passengers from one location to their end point safely. These participants also provided the maximum ranking of three out of three representing (100%) on connection between cities and communities, possessions and services conveyance, motivation for public creativeness and enabling access to social amenities such as educational institution development and improvement.



Classification 4(C4), represents well esteemed opinion leaders. These are people with a prodigious amount of power and influence. Opinion leaders, when equated with their followers are well-known for having characteristics of greater societal position, respect, and more diverse. These participants too provided the all-out ranking of three out of three representing (100%) on connection between cities and communities, possessions and services conveyance, and enabling access to social amenities such as educational institution development and improvement.

Classification 5(C5) represents pedestrians, cyclists, and private motor vehicle owners represent the ordinary road users. This group also scored 100% on job creation, connection between cities and communities, possessions and services conveyance, and enabling access to social amenities such as educational institution development and improvement.

The Entire five classification (C1-C5) of the study participants connected road infrastructure maintenance in one way or the other to the socioeconomic improvement through seven common responses which are:

- Jobs Creation;
- Connection between cities and communities;
- Possessions and services conveyance;
- Incentive for individual creativeness;
- Motivation for public creativeness;
- Enabling access to social amenities such as educational institution development and improvement; and
- Encouragement for investment.

The data above confirm that road infrastructure maintenance investment functions as a significant facilitator of a socio-economic improvement in emerging nations as it has been shown by Echui and Keho (2011). Additionally, the data confirms that road maintenance investment is connected indirectly or directly to many undertakings including poverty reducing by enabling easy movement of the locals population to job centres, the local economic stimulation, and standards of living improvement (Bagchi& Pradhan, 2013).

### *The Study Question 2*

How does investing in road maintenance impact change in the society?

This segment deliberates the study participants' interpretations on how investing in road maintenance impacts change in the society. The review of the literature exposed some studies that backed the connection between road infrastructure maintenance investments and change in the society (Akhmetzhanoy & Lustoy, 2013; Bagchi& Pradhan, 2013). According to Njoh (2012), well-maintained road infrastructure represents important social improvements that ultimately raise the possessions and nations power, expanding of marketplaces, growth in production outputs whereas humanising the mobility and living standard of the grassroots. The collected data from

the study participants reinforced the important role of well-maintained road infrastructure played in uplifting the society. Table 4 shows how many times the study participants in each class and overall stated the connection between good road infrastructure investment and change in the society.

Common participants responses emerged from the interviews that connect to RQ2 are presented in figure 2



**Figure 2:** responses from the study participants that connect good road infrastructure to change

Figure 2 shows the responses from the study participants that connect good road infrastructure to change in the society in the DRSM District. These considerable participants' responses give the idea that backed economic theory of infrastructure and the commons management that a good road setup in a nation eases socioeconomic development and growth for developing economies (Frischmann, 2005). Table 4

shows how many times the study participants in each class and overall stated the connection between good road infrastructure investment and change in the society as indicated below:

- Jobs Creation (09 times) representing (60%);
- Connection between cities and communities (15 times) representing (100%);
- Possessions and services conveyance (15 times) representing (100%);
- Alteration of socio-culture standards (13 times) representing (86.7%);
- Motivation for public creativeness (10 times) representing (66.7%);
- Enabling access to social amenities such as educational institution development and improvement. (11 times) representing (73.3%); and
- Formation of social change (13 times) representing (86.7%).

**Table 4 Participant's Connection of Road Infrastructure maintenance to change in the society**

Participants	key responses and number of times mentioned						
	Jobs Creation	Connection between cities and communities	possessions and services conveyance	Alteration of socio-culture standards	Motivation for public creativeness	Enabling access to social amenities such as educational institution development and improvement	Formation of social change
C1.1	x	x	x	x	X	x	x
C1.2	x	x	x	x	X	x	x
C1.3		x	x	x			x
C2.1	x	x	x				x
C2.2		x	x		X		
C2.3	x	x	x	x			
C3.1	x	x	x	x	X	x	x
C3.2	x	x	x	x	X	x	x
C3.3		x	x	x	X	x	x
C4.1	x	x	x	x	X	x	x
C4.2		x	x	x		x	x
C4.3	x	x	x	x	X	x	x
C5.1	x	x	x	x	X	x	x
C5.2		x	x	x	X	x	x
C5.3		x	x	x		x	x
TOATAL	09	15	15	13	10	11	13

Classification 1(C1) provided the maximum ranking of 100% from all the three participants on connection between cities and communities, possessions and services conveyance, alteration of socio cultural standards and formation of social change as the important matters that brings change into the society.

Classification 2(C2) participants also provided the maximum ranking of three out of three representing (100%) on connection between cities and communities, possessions and services conveyance, as a key tie to social change. It was not surprising that among these participants who are all district road engineers that only one response each under alteration of socio-cultural standards and formation of social change as the key tie to social change and the reason been that they are all technical. They execute engineering responsibilities in designing preparation, and managing the creation and maintenance of road constructions.

In Classification 3(C3), three out of three participants representing (100%) mentioned that on connection between cities and communities, possessions and services conveyance, motivation for public creativeness and enabling access to social amenities such as educational institution, alteration of socio-cultural standards and formation of social change as the significant items that conveys change into the society.

Classification 4(C4) which is made up of opinion leaders too provided the all-out ranking of three out of three representing (100%) on connection between cities and communities, possessions and services conveyance, and enabling access to social amenities such as educational institution, alteration of socio-cultural standards and formation of social change as the substantial things that transfers change into the society.

Classification 5(C5) representing the ordinary road users also stated that connection between cities and communities, possessions and services conveyance, and enabling access to social amenities such as educational institution, alteration of socio-cultural standards and formation of social change as the substantial items that bring change into the society.

One of the studies Participant (C1.2) indicated that: *“Construction of good maintainable road in the rural community will inspire people to migrate to the rural community in pursuance of work and in addition inter matrimonies will surface, in that way may affect societal change. This is as a result of that individual who moved to the rural community in search of work will take along with new culture. A proportion of economic*

*undertakings may begin to take place, such as educational institutions and other social amenities will be constructed to accommodate the people that migrated to the rural community in that case various category of economic undertakings will begin to happen in the community. Clinics and shops that will be constructed in the community may generate job. Absolutely, good road building drives economic growth and development in a specified region. This means that good road system is an important component of every economic undertaking.”*

Another study Participant (C4.3) also stated that *“perception of good rural road development improve intercity movement is not alone. This participant further stated that there are numerous ethnic groups within the northwest province, good road networks would help better to comprehend one another, by means of easy movement to socialise. Lacking good road setup link means it would be difficult to know the people leaving inside the district.”*

Relating to the above responses to the prevailing writings means that maintainable road setup remains an indispensable component in the reduction of poverty and social change in the rural communities and emerging nations as such (Adler & Polsky, 2010). Good roads accessibility enables job and trade by offering passage of farming harvests for farmers in the rural areas to the urban marketplaces and also decreasing the times of travel. Availability of good roads also decreases the cost of transportation. It similarly increases shipping possibilities for equipment and other materials, and decreases the figures of motor tragedies and connected transport overheads. Altogether, the above benefits impact change in the society through standard of living growth, decreasing the hours of commuting, and expanses on transport. Connection between cities and communities; Possessions and services conveyance; Alteration of socio-culture standards; enabling access to social amenities such as educational institution development and improvement and Formation of social change as significant responses relating to maintainable road infrastructure investments to change in the society.

Rights to good road networks setup will improve both socio-economic development of and ease effective distribution of merchandises and farming harvest to the marketplace. The inferences for change in the society in this research work consist of offering researchers with a better comprehension of the impact of good road setup investment on socio-economic growth, particularly in stressed municipalities such as DRSM District. The research work could theoretically offer an optimistic change in the society by proposing enhancements in the road maintenance setups that can consequently contribute to the better-quality living standards of the local community.

### *The Study Question 3*

What are the essential preparation, executing, and maintenance measures needed before and after road construction undertakings?

The study participants' remarks were considered about preparation, executing, and maintenance measures needed before and after road construction undertakings stages in this subdivision. The literature analysis on road transportation and its maintenance investment has steered to determine that four elementary theoretical phases stood indispensable for accomplishing before-and after-construction achievement: Road infrastructure administration policy and approach; The allocations of budget; The type of constructed and the anticipated road; and quantifiable effects of the road on the socioeconomic welfare of a community, and the whole country.

All the participants, except road managers and road engineers, sanctioned that they believe there is no essential preparation, executing, and maintenance measures that existed before and after road construction undertakings. Though, they agreed that there is a working body in place that should inspect the road construction infrastructure and its maintenance, but they think the working body is not doing its work. However, minority of the study participants had the understanding in the manner the provincial government in the North West Province functions in relation to road infrastructure.

Nevertheless, an ordinary resident does not have a clue on which body or entity to approach on grievances or complaints on the state of the rural road conditions.

In order for the researcher to comprehend the background on the essential preparation, executing, and maintenance measures needed before and after road construction undertakings, the responses from the study participants were categorised into three subjects; that is governance, preparation, and bribery and corruption. Amongst the categorised subjects, bribery and corruption in project tender awarding process is a significant backer why most of the roads in the district lacked proper maintenance. The study participants revealed bribery and corruption 30 times, followed by governance 21 times and lastly lack of proper preparation 19 times. All the study participants except road managers and engineers mostly settled that though road constructions monitoring actions are in place and applied, they do not see the benefit of it to guarantee best work done due to bribery and corruption. Participants also revealed deficiency in the preparation and inefficient governance as part of the reasons why most roads in the district are in deprived state.

Table 5 below shows the significant themes acknowledged by the study participants.

*Table 5: Significant themes acknowledged by Participant's except road managers and engineers as an obstruction to proper essential preparation, executing, and maintenance of road infrastructure*

Participants	significant themes and number of times mentioned			
	Governance	Preparation	Bribery and corruption	Total
C3.1	xx	x	Xxx	
C3.2	xxxx	xxx	Xx	
C3.3	x	xx	Xxxx	
Sub total	07	06	09	
Total				22
% total	31.8%	27.2%	40.9%	
C4.1	xxx	xx	Xxxx	
C4.2	x	x	Xxxxx	
C4.3	x	xx	X	
Sub total	05	06	10	
Total				21
% total	23.8%	28.5%	47.6%	
C5.1	xxx	xxx	Xxxxx	
C5.2	xx	xx	Xxxx	
C5.3	xxxx	xx	Xx	
Sub total	09	07	11	
Total				27
% total	33.3%	25.9%	40.7%	

Contained in the three classifications of the study participants is diverse data in terms of responses. Classification 3 (C3) study participants indicated bribery and corruption 09 times representing (40.9%) of the (C3) overall 22 responses. The study participants from this Classification also revealed preparation 06 times representing (27.2%) and 07times on governance representing (31.8%) of the entire classification.

The Study Participant (C3).3 alleged that: *“I have witnessed a proportion of road maintenance and instead of doing the repairs work in the time where there is no rains, they rather do the repairs work in the rainy period. My question is that what take place when the bitumen is emptied in the potholes and eroded as a result of the rain waters? This suggests that people who are in charge of monitoring are just monitoring. In the next couple of months, the same monitors will ask the department for funds for road maintenance contract. That attitude is clearly characterised by bribery and corruption.”*

The Participant (C3.2) also indicated that: *“Speaking frankly on the road maintenance preparation there is more to organisation needed in the implementation of maintenance, how is proper maintenance rules and procedures will be applied? I don't think so, because the same individual drafting and monitoring the maintenance contract of the road is the same individual awarding the tender. For example, an individual who is responsible for effecting the maintenance implementation strategy himself is a political figure and as you know politicians all the time award themselves tenders. If this happens who will effect and inspect this strategy correctly?”*

Classification 4(C4) study participants stated bribery and corruption 10 times representing (47.6%) of the entire class of 21, preparation 6 times representing (28.5%), and 5 times on governance representing (23.8%). Table 5 above shows how many times Classification 4(C4) study participant's revealed significant themes.

Classification 4(C4) study participant (C4.2) specified: *“bribery and corruption is considered one of the major issues that hinders properly maintained roads in the district. This political figure are not doing justice to the community, they block the free flow of economic activity. These politicians are provided with state resources to perform their duty, but decide to incapacitate the provision of social amenities for the reason of get rich fast.”*

Classification 4(C4) study participant (C4.3) also pronounced that: *“the apartheid administration constructed these roads not to transport large possessions from the inner country to the coastline hence their initial main concern was to build railway lines to transport gold and other minerals consequently they started constructing railway lines before roads in the country. Normally it is anticipated that roads must be constructed first before railways rather vice versa. The best manner to have a good road is to carry large material by means of trains.”*

According to Classification 4(C4) study participant (C4.1): *“in my own judgement the transport department lacked proper preparation when it comes to the road maintenance plan and implementation.”*

Classification 5(C5) study participants cited bribery and corruption 11 times that represent (40.7%), 7 times for preparation representing (25.9%), and 9 times for governance denoting (33.3%) of the class of sub-class aggregate of 27 responses. Table 5 also offers how many times separately Classification 5(C5) participants revealed significant subjects.

Preparation and implementation becomes the central point for all the study participants interviewed. They acknowledged that deficiency in sticking to proper road maintenance stipulations, and non-existence of continuing maintenance as an issue of concern. Regarding governance, the study participants frequently quoted routine observation, and the incompetence of transport department to conclude if roads infrastructure were constructed to the approved specifications.

**Table 6: Significant themes acknowledged by road managers and engineers as an obstruction to proper essential preparation, executing, and maintenance of road infrastructure.**

Participants	significant themes and number of times mentioned			
	Roads design	Budget constrains	Limited staff capacity	Total
C1.1	xx	xxx	Xxxxx	
C1.2	x	xxxxx	Xxx	
C1.3	xx	xxxx	Xxx	
Sub total	4	12	11	
Total				27
% total	14.8%	44.4%	40.7%	
C2.1	xxxx	xxx	Xx	
C2.2	xxxxx	x	Xxx	
C2.3	xxxx	x	X	
Sub total	13	5	6	
Total				24
% total	54.1%	20.8%	25%	

Classification 1(C1) study participants named roads design 4 times that represent (14.8%), Budget constrains 12 times representing (44.4%), and Limited staff capacity 11 times denoting (40.7%) of the category aggregate 27 responses . Table 6 above presents how many times independently the Classification 1(C1) participants mentioned the significant themes. Classification 2(C2) study participants stated roads design 13 times that represent (54.1%), Budget constrains 5 times representing (20.8%), and Limited staff capacity 6 times signifying (25%) of the category aggregate 24 responses. Table 6 above also presents how many times independently the Classification 2(C2) participants mentioned the significant themes.

As indicated in table 6, budget constrains hinder proper essential preparation, executing, and maintenance of road infrastructure. Proper road maintenance necessitates a stable and consistent movement of cash. The elementary structure or

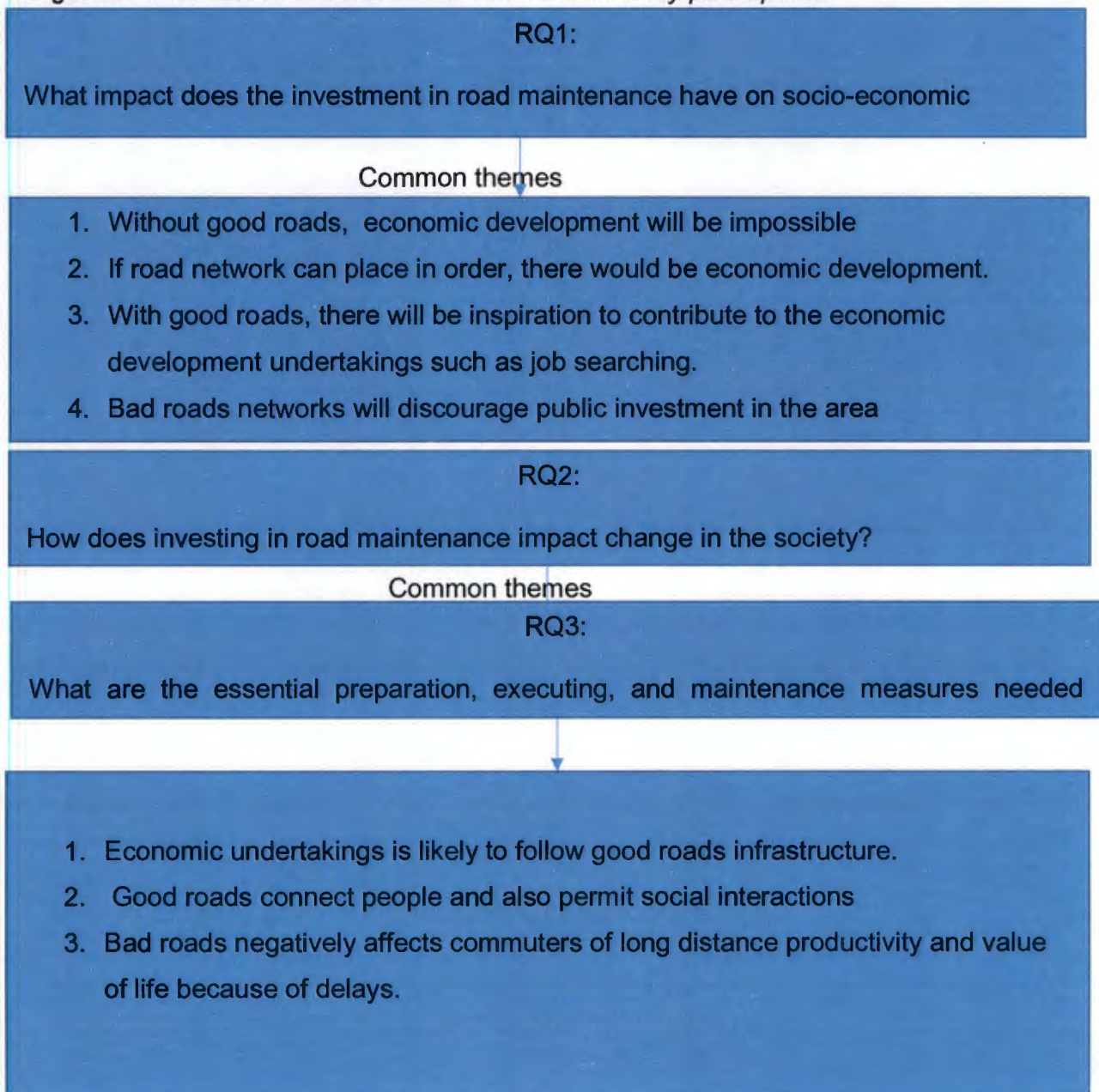
base for any road or construction activity and its maintenance is based on funding. The building, maintenance and compilation of records of all roads in the district require financial resources. Up-to-date the records of all the conditions of the district roads similarly become unreliable sometimes due to the limited staff capacity to cover the whole district. All these are due to Budget constraints as mentioned 12 times representing (44.4%), by Classification 1(C1) of the study participants. The complexity of some road data collection procedures should match the existing skills within the departments, as indicated by Classification 1(C1) participants in the ranking of 11 times representing (40.7%) that lack of staff capacity is also hindrance to effective road maintenance plan and implementation.

On the issue of road design, Classification 2(C2) study participants stated roads design 13 times representing (54.1%), as an obstruction to proper essential preparation, executing, and maintenance of road infrastructure; as shown on table 6 above. The preparation of road comprises reviewing the situations significant in determine whether to construct a new roads or refining the existing ones concerning demand for transportation, temperature, landscape, and the provided materials. According to Gaffeny and Gane (1970), road design is the choosing of road measurements and its mechanisms, traffic lane width, and the type of tools for the road. The road planning and design procedures are complex in nature due to the many mechanisms involves in the road construction and the diverse features to be reflected for optimum result. These activities are significant to think through when it comes to the likelihoods of executing imminent maintenance undertakings (Gaffeny & Gane, 1970). Time and again a precise maintenance measure requirement is triggered by glitches in one particular road location due to non-suitable road design. The road designers and engineers ought to include the maintainability concepts and undertakings into consideration when designing the roads.

#### 4.7 Common themes from all the participants linking to study questions

Common themes from the participant's responses in this study were recognised by observing their resemblances in the responses to the questions of the interview. Relating to the structural statements to the written statements permitted the researcher to categorise the predominant themes associated to the study questions. Figure 3 below offers the three key themes taken from the study participant's responses connecting road and infrastructure maintenance to socioeconomic development.

**Figure 3:** Classification of Common themes from all study participants



1. The finished work is examined but do not guarantee compliance.
2. Pot holes are regarded as one of the possible cause of road accident. There appears to be no weight restriction of goods carrying vehicles are factored into the rural road preparation, execution and monitoring.
3. No regular road maintenance plan in place, instead new roads are just constructed. The road is not tough sufficient to withstand heavyweight trucks.
4. Not enough budget allocation for regular maintenance.

#### **4.8 Field observation**

An observation relating to the study topic was carried on by the researcher on nine different locations within the district to find out the real condition on the ground. Several roads were established to be in poor state as a result of lack of maintenance culture. The findings from the field observation by the researcher are all connected to the issues of preparation, maintenance activities, as well as inadequate maintenance activities, and poor planning of roads. These issues in question were all highlighted by some of the study participants. The capabilities in the road maintenance practice and lack of proper monitoring as well as issues surrounding preparation, executing, and maintenance measures have contributed to the current state of the roads in the district. Some of the road conditions could be also attributed to the outdated road design criteria and overloaded truck weights as well as fast rising consignment and commuter movement. The following figures show the actual conditions of some of the roads in the district:



Figure 4: Kagisano Molopo road

source: field observation

NWU  
LIBRARY



Figure 5: Matsheng road

source: field observation



*Figure 6: Tlapeng road*

*source: field observation*



*Figure 7: Kagisano Molopo road*

*source: field observation*



*Figure 8: Kagisano Molopo road*

*source: field observation*



*Figure 9: Mamusa road*

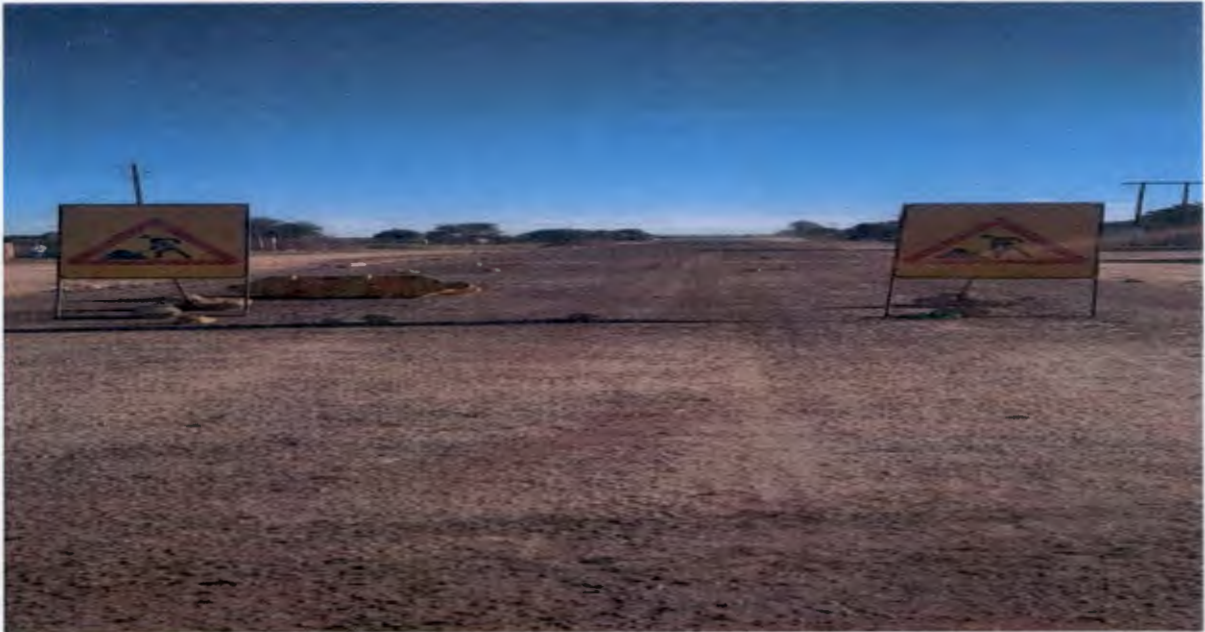
*source: field observation*



*Figure 10: lekwaTeemane road source: field observation*



*Figure 11: Greater Taung road source: field observation*



*Figure 12: new road construction in Greater Taung source: field observation*

#### **4.9 Chapter Conclusion**

The purpose of this case study in the qualitative method is to better comprehend the impact of road maintenance on the Socio-Economic Development in the Dr. Ruth Segomotsi Mompati District, North West Province. An overall of 15 participants were interviewed, comprising road engineers, road managers, local taxi association, opinion leaders and ordinary road users were selected as the study participants. The study participants were interviewed separately, recorded and the data from the interviews were triangulated to remove the researcher's prejudice. The next subdivision, which is chapter five will deduce the connotations to the study results, conclusion, and the recommendation for future study in the area of road maintenance to close the current literature and application gaps.

## **CHAPTER 5**

### **FINDINGS, CONCLUSION AND RECOMMENDATIONS**

#### **5.1 INTRODUCTION**

This final segment of the study makes deductions from the findings, offers a conclusion and submits recommendations for future researchers in the field of roads, the maintenance of such infrastructure and its implications for the society and the economy as a whole. The final remarks in this study also close the gap in the current literature. According to Bagchi and Pradhan (2013), Njoh (2012) and Adler and Polsky (2010), many researchers concur that road transport setup and its maintenance investments signify indispensable economic and societal developments. These scholars confirm that investments of this nature could increase the country's wealth and influence, raising production outputs, and the movement and the living standard enhancement of the citizens at the grassroots. Some historians believe that some requirements are urgent for emerging countries, including South Africa, to efficiently gain economic payback from the internal road setup investments (Siemiatycki, 2013). These requirements comprise changes in technology, quality labour force and skills availability, together with the total inclusion of the society and the resolute engagements with national politicians.

#### **5.2 THE STUDY FINDINGS**

The data from this study offered an understanding into the impact of road maintenance investments on the socio-economic development in DRSM district. According to Frischmann's (2005) economic theory of infrastructure and commons management, an abstract basis for examining the impact of a nation's road system as an enabler for socioeconomic and economic development and growth and ensuing societal effects in the emerging nations rest on good infrastructure. The theories of regional economic growth with regard to investment in transport, its consequences on the mass

transformation and the growth of the country's economy have been examined by researchers. The neoclassical growth theory boosted growth theories such as location growth theories and growth pole theory. This study was guided by Solow's (1956) neoclassical model in the analysis of the influence of road transport setup and its maintenance investment on the socioeconomic development in the DRSM district. The central idea in Solow's (1956) neoclassical model is connected to the total input to output. In relating this theory to this study, the researcher demonstrated that road setup and its maintenance investment drive growth in the South African economy and that of the locals in DRSM.

The growth pole theory is pertinent in measuring changes among the population since it could be employed to recommend paramount usage of local assets distributed for utmost economic benefit. The overall study participants agreed that there are some administrative requirements that hamper successful recovery of viable economic paybacks on road setup maintenance. The study participants also acknowledged significant factors impacting the growth of a viable roads setup in the district. They also connected seven common responses to road setup maintenance investment and socio-economic development and change in the society.

***Participants' common responses connecting of road infrastructure maintenance to socioeconomic growth and change in the society***

- Jobs creation
- Connection between cities and communities
- Possessions and services conveyance
- Alteration of socio-cultural standards
- Motivation for public creativeness
- Enabling access to social amenities such as educational institution development and improvement.
- Formation of social change

***Significant themes acknowledged by participants except road managers and engineers as an obstruction to proper essential preparation, executing, and maintenance of road infrastructure***

- Governance
- Preparation
- Bribery and corruption

***Significant themes acknowledged by road managers and engineers as an obstruction to proper essential preparation, executing, and maintenance of road infrastructure.***

- Roads design
- Budget constraints
- Limited staff capacity

*Figure 13: Common responses linking to study questions*

**Figure 14: Classification of common themes from all study participants**

**RQ1:**

What impact does the investment in road maintenance have on socio-economic activities?

Common themes

1. Without good roads, economic development will be impossible
2. If road network can be placed in order, there would be economic development.
3. With good roads, there will be inspiration to contribute to the economic development undertakings such as job searching.
4. Bad roads networks will discourage public investment in the area

**RQ2:**

How does investing in road maintenance impact change in the society?

Common themes

1. An economic undertaking is likely to follow good roads infrastructure.
2. Good roads connect people and also permit social interaction
3. Bad roads negatively affect commuters of long distance productivity and value of life because of delays.

**RQ3:**

What are the essential preparation, executing, and maintenance measures needed before and after road construction undertakings?

Common themes

1. The finished work is examined but does not guarantee compliance.
2. Pot holes are regarded as one of the possible causes of road accidents. There appears to be no weight restriction of goods carrying vehicles factored into the rural road preparation, execution and monitoring.
3. No regular road maintenance plan in place, instead new roads are just constructed. The road is not tough sufficient to withstand heavyweight trucks.
4. Not enough budget allocation for regular maintenance.

Infrastructure setup is a broad concept as explained in the literature reviewed. For the purposes of this study, the researcher described infrastructure setup as investment in the community amenities and tangible properties by the public. To comprehend the huge bulk of data on various studies on a good transport setup and its contribution to economic change in the community in emerging nations, and to deduce from the study findings and from the collected data and scrutinised, the researcher linked the study questions to the common responses and various reviews that relate to the study topic.

### *The Study Question 1*

5.2.1 What impact does the investment in road maintenance have on socio-economic development in the Dr. Ruth Segomotsi Mompati District, North West Province?

The study established that the entire five classifications(C1-C5) of the study participants connected road infrastructure maintenance in one way or the other to the socio-economic development through the seven common responses which are: Jobs Creation, Connection between cities and communities, Possessions and services conveyance, Incentives for individual creativeness, Motivation for public creativeness, Enabling access to social amenities such as educational institutions development and improvement, Encouragement for investment.

These findings confirm those of Adamkovičová (2013: 23) who recognises that the key influence of social and economic social improvement and development is good infrastructure. The value of social life in a particular district or area is informed by the advancement of facilities and social infrastructure. Good road infrastructure is a key to the growth and development of every economy, labour movement and job creation in any country. The magnitude of the road infrastructure improvement has a demonstrable impact on further zones, for instance, the growth in the tourism sector, external trade, foreign capital flow and local development (Adamkovičová, 2013: 23). A well-maintained road infrastructure network also offers a benefit to a nation in relation

to enhanced local, regional and provincial integration that assists in promoting local and national trade (Adling, & Gupta, 2009:12). Furthermore, a well-maintained road infrastructure considerably improves the economic growth of the country and its development and subsequently lessens poverty. Mofidi and Stone (1990:687) also observed the impact of good transportation infrastructure on economic development using an output lens and established an optimistic linkage among the spending on roads, the investments in the manufacturing and subsequent job creation.

Akhmetzhanov and Lustoy (2013) validated the relations among transportation infrastructure and local development with reference to population mobility. Jones (1990:220) similarly viewed income, employment, and investment as a significant component for evaluating the impact of economic activities on the transportation infrastructure. Munnell (1992:99) similarly established positive connections between road infrastructure and the gross state product (GSP). Moonmaw, Mullen and Martin, (1995:831) also recognised the positive relations between transportation infrastructure and per capita income. Investments in road transport setup and its maintenance all constitute significant economic, political, and societal developments that in the long run upsurge the assets and authority of a nation, expanding of marketplaces and dropping barriers to trade, consequently growth in the output whereas humanising movement and the living standard of the common people (Adler & Polsky, 2010; Bagchi & Pradhan, 2013; Njoh, 2012). As a suitable road transportation infrastructure system is an indispensable element for economic development and growth, constant road investment is crucial for the development and maintenance of the road network of a country (Xueliang, 2013:32).

### *The Study Question 2*

#### 5.2.2 How does investing in road maintenance impact change in the society?

This segment reflects the study participants' interpretations on how investing in road maintenance impact change in the society. The findings revealed that the entire five

classifications (C1-C5) of the study participants connected road infrastructure maintenance to change in the society through seven common responses which are: Jobs Creation, Connection between cities and communities, Possessions and services conveyance, Incentive for individual creativeness. Motivation for public creativeness, enabling access to social amenities such as educational institution development and improvement, Encouragement for investment.

The current research studies propose that a good road setup is an indispensable measure of decrease in poverty in emerging nations such as South Africa. Poverty is frequently entrenched in the rural areas than their urban counterparts, and the integration among the two areas could result in the transfer of skills and resources for the development of the rural areas. The lack of integration with urban areas due to non-existence of suitable roads hinders accessibility and movement of those resources (Highways Agency, 2009). It should be noted that roads are key infrastructural elements for a country's development and growth. The right to good roads provides carriage for farming yields for farmers and enables employment for the grassroots, and real time reduction in travel time. A well maintained roads network decreases the costs of transport, a decrease in the number of motor accidents, and a noticeable decrease in related transport overheads. Entirely, these paybacks from well-maintained roads have a positive impact on the society by driving up the living standards of the community. Wholly the participants connected investment in road setup to dramatic changes in the community.

Specifically in the developing countries, a well maintained roads system is bound to improve a reduction in poverty by humanising access among rural communities and cities, eventually improving the growth of the socio-economic status of such communities (Adling, & Gupta, 2009:11). Road setups are part of a key connection between centres of production and marketplaces. Besides, road linkages serve several purposes of permitting connection to social amenities, employment, health facilities,

schools, colleges and universities vital in combating poverty by linking up further regions and encouraging social and economic growth (Njoh, 2012).

Transport enhancements change the minimal costs of producers of transport, the movement of the households and goods and services demand. In the short run, such modifications flow over the market instruments through indigenising productivity, employment, and income (Lakshmanan, 2011). This theory of infrastructure and commons management offers a hypothetical basis for examining the impact of a nation's road network to economic development and growth and its subsequent implications for social development of the developing economies. Frischmann (2005) claims that permitting open access to public infrastructure like road networks could generate an economic return to the society and lead to change in the societal fundamentals of growth and development.

### *Study Question 3*

5.2.3 What are the essential preparation, execution and maintenance measures needed before and after road construction undertakings?

From the road maintenance investment and socio-economic development literature, it steered the researcher to determine that four elementary theoretical phases stood indispensable for accomplishing before-and after-construction rewards. These are road infrastructure administration policy and approach, the allocations of budget, the type of constructed and the anticipated road and quantifiable effects of the road on the socioeconomic welfare of a community and the whole country.

The researcher explored if road setup developments and maintenance in DRSM district possess these four basics for accomplishing before-and after-construction achievement. What was discovered in the literature review indicated that some of the emerging nation's investment decisions on road setup typically focused on the movement of people in the metropolitan regions, a place where the employment

opportunities and educational institutions are frequently positioned, lacking a formal strategy to quantify the benefits of economic improvement of that investment. In the developing communities such as DRSM district, it is hard to determine the connection amongst well maintained road setup expenditure and its related assistances (Ogun, 2010).

The responses from the study participants (C3-C5), apart from road managers and engineers, were categorised into three subjects: Governance, preparation, and bribery and corruption. Amongst the categorised subjects, bribery and corruption in project tender awarding processes was a significant indicator why most of the roads in the district lacked proper maintenance. Classification (C1-C2) study participants who are road managers and road engineers named roads design, budget constraints and limited staff capacity, amongst the reason most of the roads in the district lacked proper maintenance. Though proper maintenance plans are in place, the maintenance funding of roads is basically inaccessible, according to the data collected that from the Classification (C1-C2) study participants. The data pointed out the local government is unable to do maintenance as a result of inadequate funds for maintaining the roads setup, consequently the rural roads maintenance is evidently a problematic if at all there is any maintenance.

### **5.3 CONCLUSION**

Investments in road infrastructure maintenance have a central role to play in enabling economic growth. A reliable and inexpensive infrastructure helps in poverty reduction and contributes in achieving social change. Good road connections decrease the costs of transport and promote business growth within a specific area. This suggests that an improved infrastructure leads to progressive growth of the economy and development. This empirical study supports the important impact of road infrastructure on socio-economic growth.

A well maintained road infrastructure service is part of the ultimate consumption of things for the households and businesses. Lack of attention on this sector by the authorities impedes development and growth of both micro and macroeconomic proportions. The road infrastructure quality impacts directly on the output of business and development. The quality of road infrastructure impacts positively on the development of socio-economic activities and is an important tool for the development of the country as a whole. A well-maintained road infrastructure attracts businesses, offers easy entrance to marketplaces, clinics and hospitals, institutions of learning and other services believed to be indispensable to the social well-being of spatial communities.

## **5.4 RECOMMENDATIONS AND AREAS OF FURTHER STUDIES**

### **5.4.1 Recommendations**

Road infrastructural improvement and socio-economic growth are among the utmost general themes for discussion in the current literature and studies. The role of quality roads is significant to the socio-economic growth because the accessibility and superiority of the road infrastructure influence investment choices, workforce movement, and industry formation site. The advantage of good road infrastructure and its investment is endless. Therefore the following submissions are the recommendations regarding this study:

- The prevailing roads in the district should be adequately maintained, predominantly, roads from economic activity places such as farms and businesses centres as they are the backbone to socio-economic development and also bring change into the society.
- Road transport finance in areas such as improvement, repairs, maintenance and restoration are essential in boosting socio-economic development and growth.

Therefore, the local municipality should set up a special budget for routine road maintenance within the district.

- The road transport setup maintenance should be expanded to all areas in the district to meet economic development and social change.
- The sponsorship from the private sector in the development and improvement of road setup in conjunction with the public sector should be encouraged.
- As a matter of importance, the road transport management authority in the district should craft a constructive formal strategy and monitoring outline on road monitoring.

#### **5.4.2 Areas for further studies**

The researcher is convinced that it would be of value to have additional qualitative research on the influence of road maintenance laws on contract awards in relation to roads maintenance, its execution, and monitoring. This is because bribery and corruption in the awarding, creation, and monitoring of road were sore concerns in this case study. The researcher considers that a comprehensive research that studies the collective process of governance, in which the inhabitants as the interested party have a voice and power to contribute more meaningfully in the affairs of road construction and its maintenance would be necessary.

#### **5.5 CONCLUSION**

The common agreement between the study participants shows that properly maintained roads lead to socio-economic improvement and social changes. Some participants also highlighted that bribery and corruption in roads contracts tenders, lack of monitoring, and roads governance were the key obstructions to the proper road infrastructure maintenance in DRSM. This study confirms the findings in earlier

research that comment that road networks investment and transport setup advances the economic growth of the whole country. Investments in the road networks in an emerging country such as South Africa are likely to accelerate and boost economic growth and positive social change.

## REFERENCES

- Adamkovičová, B. 2013. *Regionálna analýza a plánovanie*. Trenčín: TnUAD. ISBN 978-80-8075-575-1. (Regional analyses and planning)
- Adling, S. & Gupta, A. 2009. Pavement deterioration and its causes. *Mechanical and political Science Quarterly*, 125(1), 87-110.
- Adler, W. D., & Polsky, A. J. 2010. Building the new American nation: Economic development, public goods, and the early U.S. army. *Political Science Quarterly*, 125(1), 87-110.
- African Development Bank AfDB, 2015. Transport & ICT infrastructure. *Annual report presented to the Board of Directors of the African Development Bank*, Abidjan, Côte d'Ivoire.
- African Development Bank AfDB, 2011. An infrastructure action plan for Nigeria: Closing the infrastructure gap and accelerating transformation. *A report on the state of infrastructure in Nigeria presented to Nigeria President by AfDB*.
- Africon, 2006. Socio-Economic Stakeholder Consultation Report for the Feasibility Study for the Thaba Tseka-Taung-Mokhotlong-Sani Pass Road Project. March 2006.
- Agbonkhese. O. 2013. "Road Traffic Accidents in Nigeria: Causes and Preventive Measures." <http://www.iiste.org/journals/index.php/CER/article/download/9369/95090>
- Ahmad R. 2006. *Maintenance Management and Services* (Case Study: Perkeso Buildings in Peninsular Malaysia), Master, Universiti Teknologi Malaysia.
- Akhmetzhanoy, B. A., & Lustoy, N. S. 2013. High-speed mainlines and their contribution to regional development. *Problems of Economic Transition*, 56(3), 44-48.
- Alonso W. 1960. Location theory in Friedman J. and Alonso W. (eds.). *Regional Development And Planning: A Reader*. MIT Press, Cambridge, Mass. 78-106.
- Audit Commission, 2011. Going the distance: Achieving better value for money

in road maintenance. Local Government Report, May 2011. Audit Commission, London.

Aschauer, D. A. 1989. Is Public Expenditure Productive? *Journal of Monetary Economics*, 23: 177-200.

Asphalt Industry Alliance. 2011. *Annual Local Authority Road Maintenance (ALARM) Survey*. London, UK: Asphalt Industry Alliance.

Bagchi, T. P. & Pradhan, R. P. 2013. Effect of transportation infrastructure on economic growth in India: The VECM Approach. *Research in Transportation Economics*, 38(1),139-148.

Beyzatlar, M. A., &Kustepeli, Y. 2011. Infrastructure economic growth and population density in Turkey. *International Journal of Economic Sciences and Applied Research*, 4(3), 39-57.

Boeije, H. 2002. "A Purposeful Approach to the Constant Comparative Method in the Analysis of Qualitative Interviews", Quality & Quantity. *International Journal of Methodology*, 36(4), 391-409.

Bogdan, R. C.&Biklen, S. K. 2011. *Qualitative Research for education: An introduction to theories and methods* (5th Ed.). Boston, MA: Pearson Education Inc.

Bryceson, D.F. 2006. Roads to Poverty Reduction? Dissecting Rural Roads' Impact on Mobility in Africa and Asia.

Burinskiene, M. &Griskeviciute-Geciene, A. 2012. Towards creating the assessment methodology for urban road transport development projects. *Technological and Economic Development of Economy*, 18(4), 651-671.

Burgess, R., Jedwab, R., Miguel, E. & Morjaria, A. 2009. 'Our Turn to Eat: The Political Economy of Roads in Kenya'. London: DFID.

Carlsson, R., Otto, A., & Hall, J. W. 2013. The role of infrastructure in macroeconomic growth theories. *Civil Engineering and Environmental Systems*, 30(3-4), 263-273.

Crescenzi, R. & Rodriguez-Pose, A. 2013. R&D, socio-economic conditions and regional innovation in the U.S. *Growth and Change*, 44(2), 287-320.

Creswell, J. W. 2012. *Educational research: Planning, conducting, and evaluating quantitative and qualitative research*.4th ed. Boston, MA: Pearson.

Donnelly, J. P. & Trochim, W. M. K., 2008. *The research methods knowledge base* (3rd Ed.). Mason, OH: Cengage.

Denscombe, M. 2014. *The good research guide: For small-scale social research projects*. 5th ed. McGraw-Hill (UK).

Duranton, G., Morrow, P. M., & Turner, M. A. 2014. Roads and trade: Evidence from the U.S. *The Review of Economic Studies*, 81(2), 681-724.

Gavrila-Paven, I. & Bele, I. 2017. Developing a growth pole: Theory and reality. 10.18515/dBEM.M2017.n01.ch22

Gillen, D.W. 1996. Transportation infrastructure and economic development: A review of recent literature. *Logistics and Transportation Review*, 32(1), 39-62.

Gwilliam, K. 2013. Cities on the move—Ten years after. *Research in Transportation Economics*, 40(1), 3-18.

Echui, D. & Keho, Y. 2011. Transportation infrastructure investment and sustainable economic growth in Cote d'Ivoire: A co-integration and causality analysis. *Journal of Sustainable Development*, 4(6), 23-35.

Eliasson, T. & Lundberg, M. 2012. Do cost-benefit analyses influence transport decisions? Experiences from the Swedish Transport Investment Plan 2010-21. *Transport Reviews*, 32(1), 29-48.

Fisher, D.C. 2010. "Recycled glass a sustainable alternative for road pavement construction" Selector, <http://blog.selector.com/au/2010/07/15/recycled-glass-asustainablealternative-For-road-and-pavement-construction>

Frischmann, B. M. 2005. An economic theory of infrastructure and commons management. *Minnesota Law Review*, 89, 917-1030.

Food & Agriculture Organization (FAO) of the United Nations, 2002. New Partnership for Africa's Development (NEPAD): Comprehensive Africa Agriculture Development Programme: Improving Infrastructure and Trade-Related Capacities for Market Access. April 2002.

Fuller, W. E. 1955. Good roads and rural free delivery of mail. *Mississippi Valley Historical*, 42(1), 67-83.

Gaffeny, J. A. & Gane, P. C. 1970. "Highway design with maintenance in mind." *Roads and Road Constr.*, 48(576), 300-308.

- Glaser, B. G. & Strauss, A. L. 2012. *The discovery of grounded theory: Strategies for qualitative research* (7 ed.). Piscataway, NJ: Transaction Publishers/Rutgers
- Hiep, D.V. 2009. Optimal Maintenance Strategies for Bituminous Pavements : A Case Study in Vietnam Using Hdm-4 with Gradient Methods. *J. East. Asia Soc. Transp. Stud.* 6, 1123–1136.
- Highways Agency 2009. *Design Manual for Roads and Bridges*. Volume 14. Economic assessment of road maintenance. London, UK: Highways Agency.
- <https://www.collinsdictionary.com/dictionary/english/district>
- <https://municipalities.co.za/overview/141/dr-ruth-segomotsi-mompati-districtmunicipality>
- Ibrahim, A. & Gani, S. 2014. Evaluation of Common Maintenance methods for Flexible pavements. *American Journal of Engineering and Applied Sciences*, (4)3,413-424
- Iyanova, F. & Masarova, J. 2013. Importance of road infrastructure in the economic development and competitiveness. *Economics and Management*, 18(2), 263-274.
- Jerome, A. 2011. Infrastructure, economic growth and poverty reduction in Africa. *Journal of Infrastructure Development*, 3(2), 127-151.
- Jones, B. D. 1990. Public policies and economic growth in the American states. *Journal of Politics*, 52, 219-233
- Khasnabis, S., Dhingra, S. L., & Safi, C. 2010. Mechanisms for transportation infrastructure investment in developing countries. *Journal of Urban Planning and Development*, 136(1), 94-103.
- Kustepeli, Y., Gulcan, Y., & Akgungor, S. 2012. Transportation infrastructure investment growth and international trade in Turkey. *Applied Economics*, 44(20), 2619-2629.
- Lakshmanan, T. R. 2011. The broader economic consequences of transport infrastructure investments. *Journal of Transport Geography*, 19(1), 1-12.
- Lombard, P. & Coetzer, L. 2007. The estimation of the impact of rural road investment on socio-economic development.
- Marshall, C. & Rossman, G. B. 2014. *Designing qualitative research*. (6th Ed.). Thousand Oaks, CA: Sage.

- Mason, M. 2010. Sample size and saturation in PhD studies using qualitative interviews. In *Forum: Qualitative Social Research*, 11(3), Freie Universität Berlin.
- May, T. 2011. *Social Research: Issues, Methods and Research*. McGraw-Hill International.
- McMillan, J. H. 2015. *Fundamentals of educational research*. 7th ed. Boston, MA: Pearson Education.
- Merriam, S. 2009. *Qualitative Research: A Guide to Design and Implementation*. Francisco, CA: Jossey-Bass.
- Merriam, S. B. 2014. *Qualitative research: A guide to design and implementation*. John Wiley & Sons.
- Moonmaw, R. L., Mullen, J. K. & Martin, W. (1995). The interregional impact of infrastructure capital. *Southern Economic Journal*, 61, 830-845.
- Mofidi, A. & Stone, J. A. 1990. Do state and local taxes affect economic growth? *The Review of Economics and Statistics*, 72, 686-691.
- Munnell, A. 1992. Infrastructure investment and economic growth. *Journal of Economic Perspectives*, 6, 98-189
- Na, K. Y., Han, C. & Yoon, C. H. 2013. Network effect of transportation infrastructure: A dynamic panel evidence. *The Annals of Regional Science*, 50(1), 265-274.
- Njoh, A. J. 2012. Impact of transportation infrastructure on development in East Africa and the Indian Ocean region. *Journal of Urban Planning and Development*, 138(1), 1-9.
- Nobrega, R. A. & Stich, B. 2012. Toward long-term recovery in Mississippi: Understanding the impact of the transportation system on economic resilience. *Leadership and Management in Engineering*, 12(4), 299-308.
- Osayomi, T. 2013. Regional determinants of road traffic accidents in Nigeria identifying risk areas in need of intervention. *African Geographical Review*, 32(1), 88-99.
- Patton, M. Q. 2015. *Qualitative research and evaluation methods*. 4th ed. Thousand Oaks, CA: Sage.
- Parkman, C., Abell, R., Bradbury, T. & Peeling, D. 2012. *Economic, Environmental and Social Impact of Changes in Maintenance Spend on Roads in Scotland. Summary Report for Transport Scotland*.

- Pinard, M.I. & Greening, P.A.K., 2004. Sustainable Provision of Low-Volume Sealed Roads.
- Prud'homme, R. 2005. Annual World Bank conference on development economics: Lessons of experience. *The international Bank for Reconstruction and Development / The World Bank*, New York: Oxford University Press
- Porter, M. E. 2000. Location, competition, and economic development: Local clusters in global economy. *Economic Development Quarterly*, 14(1), 15-34.
- Queensland Government 2007. "Guide to the workplace health and safety obligations of designers of structures." Queensland Department of Employment and Industrial Relations, Brisbane, Australia.
- Remy Simatovic, M. I. 2008. *Impact of rural roads program on democracy and citizenship in rural areas of Peru*. Working Paper 45124. Washington, DC: World Bank.
- Roads Infrastructure Policy for South Africa: 2014. Policy Framework. Transport Plan
- Rostow, W. 1974. Politics and the Stages of Growth. 10.2307/3500623.
- Saldana, J. 2012. *The coding manual for qualitative researchers*. Thousand Oaks, CA: Sage.
- Sattary, S. & Thorpe, D. 2011. Reducing embodied energy in Australian building construction. In: Egbu, C. and Lou, E.C.W. (Eds.) "Proceedings of the 27th Annual ARCOM Conference", 5-7 September 2011, Bristol, UK, *Association of Researchers in Construction Management*, 1055-1064.
- Seidman, I. 2013. *Interviewing as qualitative research: A guide for researchers in education and the social sciences* (4th ed.). New York: Teachers College Press.
- Shrestha, P.M. 2007. *Corruption in Infrastructure Provision and Service Delivery at the Municipal Level in Nepal: A Case Study*. London: WEDC.
- Siemiatycki, M. 2013. The global production of transportation public-private partnerships. *International Journal of Urban and Regional Research*, 37(4), 1254-1272.
- Sinclair, K. M. 2009, "Sustainable Practices in Road Construction", <http://www.globalskm.com/Knowledge-and-Insights/AchieveArticles/2009/Sustainable-Practices-in-Road-Construction.aspx>

Singleton, R. A. & Straits, B. C. 2010. *Approaches to social research*. 5th ed. Oxford, NY: Oxford University.

Sole-Olle, A., Stephan, A. & Valila, T. 2012. Productivity and financing of regional transport infrastructure. *Papers in Regional Science*, 91(3), 481-485.

Solow, R. M. 1956. A contribution to the theory of economic growth. *Quarterly Journal of Economics*, 70(1), 65-94.

South African National Roads Agency,  
2014SANRAL\_Annual\_Report\_2014\_PRESS\_14\_9\_15.pdf



Susan, D. K., Jared, M. G., Richard, R. & Harris, M. 2007. *Rural Roads: A Construction and Maintenance guide for California Landowners*

Talley, W. 1996. Linkages between transportation infrastructure investment and production. *Logistics and Transportation Review*, 32(1), 145-154.

Thorpe, D. S. 1998. "A Process for the Management of Physical Infrastructure." Unpublished PhD. Thesis, Queensland University of Technology

Thorpe, D. & Zhuge, Y. 2010. Advantages and Disadvantages in using Permeable Concrete Pavement as a Pavement Construction Material. In: "Proceedings, 26th Annual ARCOM Conference", 6-8 September 2010, Leeds, UK, Association of Researchers in Construction Management (ARCOM)", 6-8

Thorpe, D. 2012. Evaluating factors in sustainable road construction and management a life cycle approach In: Smith, S.D (Ed) *Procs 28th Annual ARCOM Conference*, 3-5 September 2012, Edinburgh, UK, Association of Researchers in Construction Management, 1235-1244.

Thomas, D. P. 2013. The Gautrain project in South Africa: A cautionary tale. *Journal of Contemporary African Studies*, 31(1), 77-94.

Trochim, W. M. K. & Donnelly, J. P. 2008. *The research methods knowledge base*. (3rd ed.). Mason, OH: Cengage.

Tuckman, B. W. & Harper, B. E. 2012. *Conducting educational research*. Rowman & Littlefield Publishers.

Tukker, A. & Dietzenbacher, E. 2013. Global multiregional input-output frameworks: An introduction and outlook. *Economic Systems Research*, 25(1), 1-19.

Ubaka, D. 2011. Presentation at National Roads Maintenance Review – Wider economic issues, impacts, costs and benefits meeting for Work stream 7, Perth, 18th August 2011.

United Nations Development Programme. 2011. Human development report country Factsheets: Nigeria. New York: United Nations.

Usman, A. B. 2014. Analysis of conditions of rural road transportation Kwara state, Nigeria. *European Scientific Journal*, 10(5).

Van de Walle, D. & Mu, R. 2007. Fungibility and the Flypaper Effect of Project Aid: Micro-evidence for Vietnam. *Journal of Development Economics* 84(2): 667-685.

Wallace, W. 2005. *Becoming Part of the Solution- the Engineer's guide to sustainable Development*, American Council of Engineering Companies, Washington, DC, USA.

World Health Organization 2013, Global Status Report on Road Safety 2013: Supporting a Decade of Action.

Wilmot, T.D.& Wilmot S.D. 2003. Strategies for Sustainable Roads, 21<sup>st</sup> ARRB Conference.

Wilson, F. 2004 „Towards a Political Economy of Roads: Experiences from Peru". *Development and Change* 35(3): 525–546.

World Bank, 2000. Choosing Rural Road Investments to Help Reduce Poverty. October 2000.

World Bank, 2001. Roads Economic Decision Model (RED) for Economic Evaluation of Low Volume Roads. March 2001.

Xueliang, Z. 2013. Has transport infrastructure promoted regional economic growth? With an analysis of the spatial spill over effects of transport infrastructure. *Social Sciences in China*, 34(2), 24-47.

Yin, R. K. 2013. *Case study research: Design and methods*. (5th Ed.). Thousand Oaks, CA: Sage.

Yu, N., De Jong, M., Storm, S., & Mi, J. 2012. The growth impact of transport infrastructure investment: A regional analysis for China (1978–2008). *Policy and Society*, 31(1), 25-38.

Zofio, J. L., Condeco-Melhorado, A. M., Maroto-Sanchez, A., & Gutierrez, J. 2014.

Generalized transport costs and index numbers: A geographical analysis of economic and infrastructure fundamentals. *Transportation Research Part A: Policy and Practice*, 67, 141-157