



**A POST-PROJECT EVALUATION OF THE IMPACT OF A TARRED ROAD
PROJECT ON THE LIVELIHOOD OF LOCAL RESIDENTS: A CASE STUDY OF
MALAMULELE REGION IN THE VHEMBE DISTRICT**

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Mini Dissertation submitted in partial fulfilment of the
requirements for the degree

Magister Technologiae: Business Administration in Project Management

In the Faculty of Business & Management Sciences
at the Cape Peninsula University of Technology

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District Six Campus

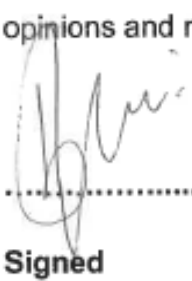
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I, Basani Olly Hlungwani, declare that the contents of this dissertation represent my own unaided work, and that the dissertation has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.



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ABSTRACT

Post-project evaluation of road infrastructure development projects in South African rural settlements has so far been insufficient. As a result, there is a scarcity of reliable information on the impact of such developments on rural communities. This serves to undermine future development policies in these communities because inter-departmental initiatives remain uninformed and uncoordinated. With a clear post-project evaluation framework, rural livelihoods are likely to improve. This study sought to investigate the impact of a tarred road on the livelihood of Malamulele residents in the Vhembe District. The research's major aim was to explore how the tarred road project affected these residents. The secondary objectives were to examine residents' livelihoods prior to the tarred road project, assess these livelihoods post-project, and make recommendations on how to maximise possible benefits stemming from the project.

The study took the form of a case study. It made use of mixed methods to collect both quantitative and qualitative data. Primary data was gathered through questionnaires consisting of both open- and closed-ended questions that were distributed to 130 local residents in the Malamulele region. The researcher ensured that the consent of the participants was obtained before collecting the data.

The study found that residents are partly satisfied with the impact of the road, as some of their initial challenges have not been addressed. The study revealed that the community still struggles with public transport and is paying high transport fares to access shops and social infrastructure. On the positive side, the community has found the road to be beneficial in terms of accessibility during the rainy season and the elimination of dust.

ACKNOWLEDGEMENTS

I wish to thank:

- Mr J. Matande, for his patient guidance, encouragement and the advice he has provided throughout my time as his student. I have been extremely lucky to have a supervisor who cared so much about my work, and who responded to my questions and queries so promptly.
- Mr S. Fore, for his advice, patience and the tools he provided me to choose the right direction and complete my dissertation.
- Dr L. E. Jowa for his support and guidance.
- My parents, for their wise counsel and sympathetic ear. You are always there for me.
- Finally, I could not have completed this dissertation without the support of my friends and partner, who provided stimulating discussions as well as happy distractions to rest my mind outside of my research.

The financial assistance of The Energy & Water Sector Education Training Authority (EWSETA) towards this research is acknowledged. Opinions expressed in this Dissertation and the conclusions arrived at, are those of the author, and are not necessarily to be attributed to the EWSETA.

DEDICATION

To my parents, Hasani James and Nkhensani Doris Hlungwani

To my siblings, Kurhula, Ntwanano and Nikiwe

To my partner and all my friends,

Without whom none of my success would be possible

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Definitions and terms

Project evaluation – a combination of a number of activities ranging from setting indicators, developing a model, defining measurable outcomes, identifying main stakeholders and their interests, selecting the methodology for evaluation, collecting information, examining information and distributing results for further learning (Kameraho, 2015:19-22).

Post-project evaluation – the type of evaluation undertaken to assess and interpret the results after a project has been completed (Altuğ, 2002:22-26).

Livelihood – the means of securing the basic requirements to sustain life; a set of activities involving securing water, food, medicine, shelter, clothing, and the capacity to satisfy these requirements working either individually or as a group, by using both human and material means for meeting the requirements of oneself and one's household on a sustainable basis, with dignity (Wikipedia, 2019).

Impact – the positive and or negative changes resulting from a development project, directly or indirectly, intended or unintended (Fujimura & Adhikari, 2010:4-6).

Project management – is the application of knowledge, skills, tools & techniques to project activities to meet the project requirements (Project Management Institute, 2013:6-8).

Acronyms and Abbreviations

IDP – Integrated Development Plan

DPME – Department of Performance of Monitoring Evaluation

IFAD – International Fund for Agricultural Development

IEO – Independent Evaluation Office

JICA – Japan International Cooperation Agency

CHAPTER 1: OVERVIEW OF THE RESEARCH STUDY

Introduction

A well-developed transportation infrastructure is a prerequisite for economic growth and poverty alleviation (Starkey & Hine, 2014:14-22). It is an essential component of national economies and plays a significant role in spatial relations, assisting in the creation of valuable links between regions and economic activities, as well as between people and the rest of the world (Andrews, Braimah & Vincent, 2018:169-171). As a result, many third-world countries have several infrastructure initiatives (projects) aimed at improving the livelihoods of their citizens (Otieno, 2000:15-17). These projects receive investments (monetary investments), and it is therefore critical to conduct post-implementation evaluations of these projects so that stakeholders can see the value of their funds (Ibid). The importance of post-project evaluation for investors is that it allows them to determine whether or not projects met pre-determined goals (Khandker, Koolwal & Samad, 2010:7-10).

The Vhembe District has a total of 1329.46 kilometers of tarred roads, with a backlog of 2243.89 kilometers (Vhembe District Municipality, 2016:95-97). Many of the villages in the district, including the one under evaluation, have only gravel roads. The movement of traffic and climatic changes over time cause gravel road loss, resulting in dust generation, safety and health hazards, discomfort and nuisance, air pollution, and road inaccessibility during the rainy season (Rajkamal, Dinesh, Rohith, Chowdary and Prasad, 2016:82-85). The effects of bad roads in South Africa's rural communities cannot be overstated (Andrews et al., 2018:169-171), and despite the topic's importance, there is some dissatisfaction with the evidence to demonstrate the impact of rural road investment. Rural road impact studies have had little influence on the planning and selection of standards for rural road investment due to a lack of a consistent analysis (Hine, Abedin, Stevens, Airey & Anderson, 2016:3-9). Despite the perceived effects of bad roads, researchers and scholars have not adequately addressed the issue, necessitating empirical research to determine its effects on the livelihood of residents.

Literature review

Introduction

This section explores existing expertise in the field of post-project evaluations. It encompasses a literature review on road infrastructure and development, the history of project evaluation, past research papers on post-project evaluations and the process of conducting this kind of evaluation.

Road infrastructure & development

In line with the Road Infrastructure Strategic Framework for South Africa (2002), road infrastructure plays a major role in a country's economy and it has been recognised internationally that roads require more attention than they have been receiving (Moleli, 2012:40-48). The government of South Africa has therefore devoted itself to addressing backlogs across the nation through various projects in the area of road construction and maintenance (Murwira & Bekker, 2017:128-121). According to Kessides, as cited by Ntjatsane (2017:3-6), road infrastructure contributes to economic growth by reducing the costs of production, by raising the quality of life by providing access to consumption goods (transport and communication services) and by contributing to macro-economic stability.

According to the Road Infrastructure Strategic Framework for South Africa (2002), road infrastructure plays an important role in growing the economy of a country; it acts as a direct provider of services and as a catalyst for economic integration, redistribution and development. Governments utilise road projects to develop poor areas, to improve the economic and social welfare of individuals and to improve access to the market, education, jobs and health facilities (Fan & Chan-Kang, 2005:16-19).

The speed at which residents' livelihoods respond to modifications in road infrastructure may vary. Van de Walle (2008:15-20) argues that early impact for the same region may vary from the medium and long-term effects. Benefits may be felt immediately but may also take a considerable time to manifest themselves.

History & Development of project evaluation

Many large, international and multilateral organisations, such as the World Bank, the European Bank for Reconstruction and Development, the Inter-American

Development Bank and the Asian Development Bank, generally perform post-project evaluations of infrastructural projects in the rail and road sectors (Nicolaisen & Driscoll, 2016:1-6)

In the United States, project evaluation became standard in the wake of the social programmes associated with the Great Society initiative launched in the 1960s during the presidencies of Kennedy and Johnson (Maurer & Smith, 2016:16-19).

Through the years, agencies such as Think Tank (a research organisation with a principal focus on the analysis of public policy, founded in 2001 in the USA) (Mark & Pfeiffer, 2011) and the International Fund for Agricultural Development (IFAD), have established independent evaluation offices. The IFAD's is called the Independent Office of Evaluation, founded in 2003 with the aim of evaluating IFAD-financed policies, strategies and operations (Navarra & Garcia, 2015: 4-10).

The South African Government stepped up its monitoring and evaluation from the year 2005 (Ntoyanto, 2016:12-17). According to Ntoyanto (2016), this was after the government had recognised the importance of evaluating and monitoring its policies, projects and programmes, if it hoped to achieve substantial results. Unfortunately, the systems that were set up for control purposes did not provide precise and reliable data for evaluation processes (Gopane, 2012:43-46). According to Van Holdt, as quoted in Goldman et al. (2015:9-12), this led to widespread discontent in the nation. The failure of progress to keep pace with people's anticipations led to extensive riots about the lack of service provision.

Types of project evaluation

Project evaluation can be used at different stages in project management and implementation. Harri Laihonen, Linzalone, & Schiuma, as quoted by Laursen et al. (2017:2-6), note that project evaluation may be used *ex-post* to log project work once a project has been completed, *interim* to correct, modify or coordinate project work during a project, and *ex-ante*, prioritising potential projects before beginning work on them.

Post-project evaluation and previous studies

The success of development projects is critical to accomplishing the agenda of governing authorities and local communities across the world. As various projects are implemented in order to improve the social, political and economic wellbeing of citizens in a country, post-project evaluation can be utilised to determine the effectiveness of these projects on the livelihood of citizens (Ntjatsane, 2017:3-6). Post-project evaluation typically occurs after implementation and focuses on the impact of a given technology (Dixon, 2016:231-234).

Examples in the literature of post-project evaluations performed on infrastructure projects include a study conducted in China by Yuan, Ye and Xiaohong (2010:601-604). They evaluated the impact of road investment projects on household welfare in rural areas. Another study conducted in Vietnam sought to evaluate the impact of the World Bank-financed Vietnam rural transport project (Van de Walle & Cratty, 2002:30-32). A similar study was conducted by Mashiri, Thevadasan and Zukulu (2005:869-870) on road rehabilitation in the Amadiba community in the O.R. Tambo District of the Eastern Cape, South Africa. The study probed the impact of the Amadiba road on the livelihood of community members and found that its rehabilitation had positive effects on the socio-economic wellbeing of the community. The study concluded that public and private investors need to ensure that their investment is backed up by other forms of development for the impact on community members' livelihoods to be sustainable.

Though these studies differed in orientation, they all aimed at assessing the impact of these projects on the targeted end-users. The studies found that road upgrading and reconstruction had a beneficial effect on community members' livelihood, although the effects can take some time to manifest themselves, depending on the community position and the road itself. Post-project evaluations are more accurate and more costly than pre-project evaluations (Khandker et al., 2010:7-10). Khandker et al. (2010:7-10) explain that this is because post-project evaluation requires the researcher to collect data on the actual outcomes for the project's internal and external stakeholder groups, as well as on the social and economic factors that would have triggered the intervention.

Purpose of post-project evaluations

According to Dudley-Evans and St John, as quoted by Dobakhti and Zohrabi (2017:75-79), post-project evaluations are conducted after the close-out of a project to establish its long-term impact and verify its relevance or effectiveness to satisfy external sponsors or senior management (Sherman, 2013:11-15). This sort of evaluation can also be used to assess the general achievement of the project, to determine whether or not particular aims and goals have been achieved, to determine whether and how respondents have gained from the programme, and finally to determine any unforeseen results (Ogle, 2002:14-17). Moreover, as Altuğ (2002:22-26) points out, post-project evaluations are useful instruments for capturing data and learning lessons from the project experience.

Post-project evaluations not only generate results indicating what works, but also provide data on what is necessary to make the project perform in distinct settings for distinct communities, which can then be used to guide decisions (Rogers, 2014:1-3). Hence Haber and Szalaj (2009:25-30) stipulate that the main responsibilities of post-project evaluation are to evaluate the extent to which the mission or planned objectives have been achieved, to assess the impact and sustainability of its accomplishments, to formulate a diagnosis of effects (intended and unintended) and, lastly, to propose directions for development and the modification of future interventions (Haber & Szalaj, 2009:25-30).

Post-project evaluation process

The process of conducting post-project evaluation varies according to the user structure (Altuğ, 2002:22-26). The literature suggests that no method is best for all circumstances because each process has its own array of advantages and precautions (Kahan, 2008:23-29). Quinones, Loy and Kirshstein remark that even though almost every evaluation is unique, certain stages are typically followed in any evaluation (quoted in Ogle, 2002:14-17), The researcher will use the method set out in the Department of Performance Monitoring Evaluation's *Evaluation guidelines* as represented in Figure 1.1, below. This design makes it possible to acquire excellent data about the project and its effect on the community and society.

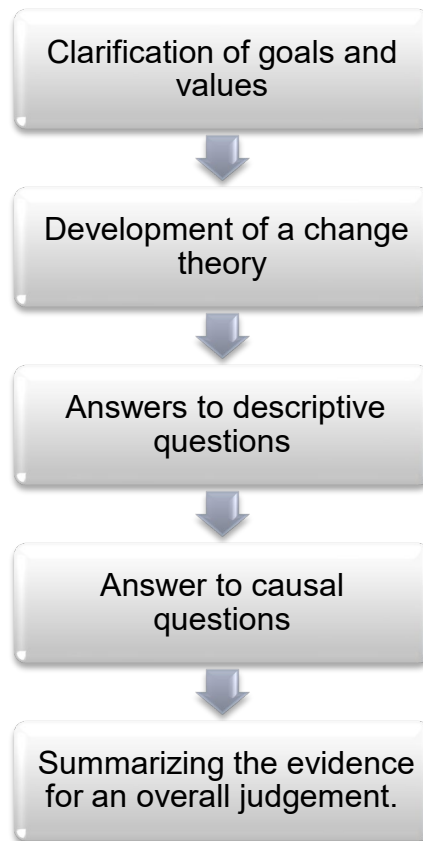


Figure 1.1: Post-project evaluation process according to the Department of Performance Monitoring Evaluation (2014:1-6)

The first step is to outline the project objectives, indicating what changes the designers hope to create (Suvedi & Morford, 2003:3-6). The second step is to assess the theoretical underpinnings of change and how this theory of change works in practice (Department of Performance of Monitoring Evaluation, 2014:1-6). The third step, according to Wall (2014:2-8), entails the determination and measurement of the changes that took place in relation to the background – the locale and circumstances – where the project was implemented. The fourth step should involve assessment of whether and to what extent the noted effects are attributable to the project. Finally, the evaluator sums up the evidence and provides a general judgment (Department of Performance of Monitoring Evaluation, 2014:1-6).

Problem statement

There has been no impact or post-project valuation conducted to determine if the tarred road in the Malamulele region is working as intended and whether it has solved

any of the problems faced by residents. Nation-wide, there seem to be few research studies focusing on the post-project impact of tarred road construction on the livelihood of members of the surrounding community.

Aim of the study

The aim of this research study is to determine the impact of the tarred road project on the livelihoods of residents in the Malamulele region of the Vhembe District.

Research objectives

Primary objectives

- To determine the impact of the new tarred road on the livelihood of local residents

Secondary objectives

- To conduct an investigation into the residents' livelihoods prior to the construction of the tarred road
- To measure and analyse the extent to which the effects of the tarred road have impacted the livelihood of the residents.
- To make recommendations on how the community can capitalise on the positive benefits and deal with the negative effects of the new tarred road construction project

Research questions

1. What were residents' livelihoods like before construction of the tarred road?
2. How and to what extent does the tarred road project impact the livelihoods of residents?
3. What advice can be given to the community to maximise the project's positive effects and offset its negative effects?

Delineation of the study



Figure 1.2: Vhembe District Map from Google Map (2019)

- A study of a region with a recent tarred road project
- The region must be in the Vhembe District in Limpopo, South Africa
- The study is limited to local village residents of 18 years of age and above. They must be residents by birth or have been residing in the village for more than 15 years

This allows the researcher to acquire relevant information, as residents who are younger than 18, and people not residing in the selected village or who have moved there recently, would not have been able to recall and describe the challenges experienced by the older residents during the time they were served by a gravel road.

Significance of the study

This research study will enable community members (as key stakeholders) to provide input on their overall satisfaction with the road improvement project. In addition, the Department of Performance Monitoring and Evaluation and the Department of Roads and Transport will be made aware of the results and impact of the intervention.

It is essential to conduct a post-project evaluation of projects in which the government has invested huge amounts of money. The researcher's objective is to provide a firm factual foundation on the basis of which the government can determine whether or not the action produced the results intended and receive guidance regarding future resource allocation decisions. Finally, this research study will contribute to the knowledge base, enabling future researchers to use its findings for comparative and reference purposes.

Research design

Trochim (2006:1) defines a research design as the overall strategy that an individual chooses in order to incorporate all the various elements of the study in an intelligible and logical way. According to Akhtar (2016:70-76), there are four types of research design: descriptive, exploratory, explanatory and experimental. This study is both exploratory and descriptive in nature. According to Dowling (2014:10-16), an exploratory design is necessary to establish perspectives in the absence of past data or only a few studies for reference. A descriptive design typically uses a survey or case study approach to gather data to answer the research questions (Adepeju, 2017:29-30). These two design elements will be used by the researcher to explore and describe the experiences of Malamulele residents regarding the upgrade of their local road.

Research paradigm

A paradigm is a way of discovering, understanding and exploring the facts of the world (Rehman & Khalid, 2016:52-56). It involves an intricate system of beliefs and a conceptual structure incorporating assumptions about ontology, epistemology and methodology.

This research study will embrace a pragmatist paradigm. Pragmatism emphasises an understanding of human existence and, in a particular situation, often attempts to recognise the different factors involved in and determining human behaviour (Duram,

2010:2-5). The model is considered ideal for this study as it encourages the researcher to use a range of approaches to address research questions that cannot be solved by a single approach. It enables the researcher to use the best available approach to the solution of a particular problem (Makombe, 2017:3371-3380).

Ontology

This study focuses on the experiences of local residents of the newly tarred road and how it has impacted their livelihood. Vermersch, as cited by De Jaegher, Pieper, Clénin and Fuchs (2017:495-500), recognises the need for intersubjectivity to make possible a full understanding of human experience. Intersubjectivity is an ontological position in which the researcher can be simultaneously subjective and objective. It believes in the existence of a single objective reality, but allows that human beings can hold widely differing interpretations of that reality Morgan cited in Maarouf (2019:6-9).

Epistemology

Knowledge was gathered from previous relevant studies and the personal views of the selected population based on their perception/judgement of the success or failure of the road upgrading project. Johnson and Onwuegbuzie (in Nowell, 2015:141-144) argue that the epistemological approach of the pragmatist integrates various sources of knowledge to discover workable solutions, to obtain a greater understanding of individuals and the world in which we live and practice, and to solve individual and social issues.

Research methodology

The researcher decided to use the case study approach to examine the impact of the newly tarred road on the livelihoods of community members. This methodology is considered appropriate for the study as it enables the researcher to study a group of community members in their natural context to gain an in-depth understanding of them (Heale & Twycross, 2018:7-8).

Walliman (2017:1-3) describes research methods as the tools and protocols used to conduct a research study. In this study, the researcher uses mixed methods of collecting data that is both quantitative and qualitative. Ihuah and Eaton (2013: 938-

940) assert that case study research allows the researcher to use different sources and methods to gather information. Mixed methods enhance the strengths and decrease the constraints of individual methods, and contribute to overall knowledge about a phenomenon (Wium & Louw, 2018:1-8). The approach affords researchers the opportunity and independence to address the research questions in ways that other discrete methodologies cannot (Ronald, 2016:46-48).

Research processes

Target population

As defined by Hair (2015:163-165), a target population is a whole group of subjects or objects of relevance to the research project because of the information that they possess. The target population of this research study is people between the ages of 18 and 65 years of age from a Xitsonga-speaking village in the Malamulele region of the Vhembe District.

The village under study has two high schools, two primary schools and a public clinic. According to Census 2011 (StatsSA, 2011), the village has a population of 4 452 Xitsonga-speaking people with a majority of women (56.1 per cent). Young children of up to 14 years of age constitute 38.8 per cent, while the working age group of 15-64 makes up the largest per centage of the population (55 per cent), only 6.1 per cent elderly people (65+) (StatsSA, 2011).

Sampling method

The researcher used purposive sampling to select a sample of residents who had lived in the village for more than 15 years and were between 18 and 65 years of age. Amin as cited by Kameraho, (2015:19-22) notes that purposive sampling is useful in selecting individuals with unique information or experiences about the problem under study.

The second sampling method used in this study is random sampling. Welman, Kruger and Mitchell (cited by Khandker et al., 2010:7-10) affirm that random sampling grants every individual in the population that is part of the research sample, regardless of their gender, race and religion. The researcher will utilise simple random sampling method to select participants from within the defined representative sample range

(participants who have lived in the village for more than 15 years and are between 18 and 65 years of age). This sample will serve to represent the entire village.

Sample size

The sample size is a significant feature in any empirical study in which the goal is to make inferences about a target population from the sample (Taherdoost, 2016:237-38). Graff (2016:53-54) maintains that the sample size for mixed methods research needs to be sufficiently large to represent the target population; generally at least 50 units. Therefore, for this study, a sample of 130 local residents meeting the requirements described above was sufficient. The researcher was also obliged to take into account the availability, responsiveness, interest and willingness of community members to participate.

Ethical considerations

This research has respected the right of every human being not to be used by other people (Locke et al., 2007:34-36). The researcher obtained the consent of the participants by presenting them with adequate information about the research study and their rights as participants so that they could make an informed, voluntary and fair decision to engage in the study. The participants were also informed that they could withdraw from the survey at any time. A letter was sent to the village officials seeking permission to conduct the research, and permission was obtained from individual participants to conduct the interviews.

Confidentiality was ensured by protecting the privacy and anonymity of the participants (Thambura, 2016:42-43). All information provided by the participants was treated as confidential and personal information about them, such as identification numbers, names and residential addresses, was revealed to no one.

Data collection methods

The researcher obtained data from two main sources, as detailed below:

Secondary data

Secondary data is the kind of information that other scholars have already gathered or generated (Ajayi, 2017:2-6). This study utilised literature from scholarly articles,

municipality documents, books, and government websites to enhance the researcher's understanding of the research field and project. Information obtained from secondary data sources determined the basic orientation of the research.

Primary data

As defined by Ajayi (2017:2-6), primary data is data collected by the researcher herself. The researcher made use of structured questionnaires (consisting of open-ended and close-ended questions). A questionnaire is a set of prepared questions aimed for completion by the research participants or by the researcher through a face-to-face interview or telephonically (Brace, 2008:45-50). This method was selected because it is usually the fastest and cheapest way of gathering information from the sample (Bhattacharrya, 2006:49-51). The survey was designed in such a manner that it allowed the researcher to assign numerical values (using a Likert scale) to measure and analyse the significance of answers given by the respondents. In this manner, the researcher obtained relevant information that enabled her to organise and analyse the data to arrive at a conclusion.

Fieldwork

Questionnaires were personally distributed to the community members (including motor vehicle owners) for the participants to complete themselves according to their experiences of the new tarred road. Questionnaires were ideal for collecting data for this research project because they have the advantages of enabling the collection of an enormous amount of data in a relatively short period of time, and of having the data analysed using appropriate software (Frechtling et al., 2010:15-20).

Data analysis

The quantitative data obtained was analysed, interpreted and presented in graphic and tabular form using a software program called Statistical Package for Social Studies (SPSS). According to Landau and Everitt (2004:2-6), SPSS is a powerful and comprehensible program for analysing and manipulating quantitative data. Prior to entering the data into the software program, the information was sorted so to remove any errors that occurred during the collection of the data. The qualitative data was analysed independently by utilising templates, categorising different responses and their frequencies, then finally coded. This latter is one of the most significant tasks in qualitative research (Cornwell, quoted in Maphosa, 2014:95-100).

Delimitations of the study

The following delimitations were set by the researcher:

- The researcher will only hand out questionnaire surveys to 130 randomly selected local residents of the Malamulele region in the Vhembe District, Limpopo.
- The researcher will design a questionnaire survey to include both closed-ended and open-ended questions.
- The Malamulele region was considered for this study because one of its villages had upgraded its access road to tar.
- This research will focus only on residents of the Malamulele region aged 18 to 65 who have resided in the village for a minimum of 15 years.

Synopsis of chapters

Chapter 1 – **Introduction**: provides an overview of South Africa’s poverty alleviation initiatives through road infrastructure projects. There is an emphasis on the nature and importance of post-project evaluation after expensive initiatives like road upgrades.

Chapter 2 – **Literature Review**: outlines the theorisation of project evaluation and offers examples of previous post-project evaluations.

Chapter 3 – **Research Methodology**: explains the research methods and approaches used in the research.

Chapter 4 – **Data Collection**: presents the empirical data collected through semi-structured interviews and questionnaires.

Chapter 5 – **Data Analysis**: discusses the data collected, making reference where appropriate to relevant literature..

Chapter 6 – **Conclusion**: provides a summary of the findings, suggests answers to the research questions, and makes recommendations for further research.

CHAPTER 2: LITERATURE REVIEW

Introduction

Roads form part of the basic services rendered by the government and it is the government's constitutional responsibility to ensure that its citizens are granted access to roads, clean water and electricity (Mamabolo, 2013:15-20). Generally, basic services are delivered to community members through local government, or municipalities, the arm of government closest to the citizens (ibid.). Roads, on the other hand, can be matters of municipal, provincial or even national responsibility. But at whatever level the investment is made, it is vital that post-implementation evaluation of these projects is conducted for investors to see that their money has been well spent (Otieno, 2000:15-17).

Many of South Africa's rural areas are characterised by poverty, with their main problems deriving from the absence of skills, poor infrastructure and low levels of private sector investment (Matshidze, Sabitu & Stephen, 2016:418-423). The lack of employment makes a huge contribution to impoverishment: according to Statistics South Africa (StatsSA 2014), the national rate of unemployment was calculated at 30.8 per cent. Just as other African governments and their development partners have done, South Africa has embarked on investing in road and rail infrastructure to help alleviate poverty in affected areas (Booth, Hanmer & Lovell, 2000:1-33).

Development is an essential element in any country's vision (Wanjiku, 2014:11-18). Wanjiku (2014:11-18) claims that road infrastructure is one of the main elements of development since its absence hampers the movement of goods and people from one place to another. As various development projects are implemented in order to transform the social, political and economic wellbeing of citizens in a country, post-project evaluation serves to determine the effectiveness of these projects and their impact on citizens' livelihood (Tsunokawa & Hoban, 1997:40-45).

Roads

The human transport network in rural areas is generally constituted by paths, trails, footpaths, earth and gravel roads. These connect the villages and towns to each other and to secondary roads, enabling community members to access products, markets, social infrastructures and shops in other areas (Escobal & San Roman, 2002:7-11).

South Africa has national roads, provincial roads and local roads in all nine provinces. According to the *South African Concise Oxford Dictionary* (2002:960-961), a road refers to an extensive way between places, especially one that is paved for use by automobiles. Roads are among the most vital public assets in most countries (Burningham & Stankevich, 2005:11-13). Since they are regarded as rendering a basic service, the government of South Africa is obliged to provide its citizen with good quality roads (Van Heerden et al., 2015:172-179).

South Africa's roads are administered by the Department of Transport, which is predominantly accountable for policy development and financing road-related projects (Mamabolo, 2013:15-20). Responsibility for the construction and maintenance of roads is divided among the three spheres of government, namely national, provincial and municipal (ibid.).

In general, roads are constructed or refurbished in some locations rather than others for various reasons (Van de Walle, 2008:15-36). According to Moleli (2012:1-3), these reasons include increased road use, inaccessibility of the road during rainy seasons, new development in an area, or because the existing road is damaged and cannot carry the necessary capacity of road users any more. Moleli provides the example of an area called Evaton, which was growing but could only be reached by inaccessible gravel roads. Policymakers such as the Department of Transport would assign a new road to such a region since it is judged to have economic potential (Van de Walle, 2008:15-36).

According to Mamabolo (2013:15-20), the Department of Public Works in the province of Limpopo has surfaced and upgraded a substantial number of roads as a provincial responsibility. As stipulated in the Final Integrated Development Plan of Vhembe District (Vhembe District Municipality, 2016:95-97), the Vhembe District has a total number of 1329.46 kilometres of tarred roads, with a backlog of 2243.89 kilometres in the district. The major challenges faced by the Vhembe district, as highlighted in the Integrated Development Plan, is the breaking down of machines, the shortage of machines and ageing personnel (ibid.). To these problems, one must add factors such as technical and managerial weaknesses in most district municipalities, as the South African Rural Transport Strategy points out (Department of Transport, 2003:11-12).

Road infrastructure and its importance in rural development

One will never understand the importance of a phenomenon until one has studied it; in this case, the researcher had no idea of the extent to which infrastructure like roads affected and benefitted her personally until she embarked on evaluating the impact of tarred roads on the livelihood of individuals.

As cited in Mamabolo (2013:15-20), Pillay and Sedat note that about 7 million workers and learners in South Africa are dependent on the public transport infrastructure. Poor quality and inadequate road networks make public transport costly, even in rural areas where community members have to walk to the nearest secondary road to access public transport.

Van de Walle (2008:15-36) maintains that rural roads are the main key to raising the standard of living in rural communities. Road infrastructure serves many purposes other than access to transport; it provides networks to the external world and access to markets and public services such as ambulances, police and social services (Moleli, 2012:1-3). Fortson et al. (2015:1-40) observe that, in developing countries, roads connect rural areas to each other and to larger cities.

According to the Road Infrastructure Strategic Framework of South Africa, as cited by Mamabolo (2013:15-20), transport has a dual role play in the economy of a country: it acts as a direct supplier of services as well as a catalyst for economic integration, redistribution and development. Chakwizira et al. (2010:5-8) argue that road infrastructure serves as a stimulus for growth and development. The availability of reasonably priced and reliable transport is critical as it enables access to basic services and resources (ibid.). Given the role of road infrastructure in the economy as adumbrated above, Mamabolo (2013:15-20) rightly insists that this sector must not delay in grappling with the challenges it faces.

The involvement of roads in driving a country's economic growth dates back to the 1960s and 1970s, when it was seen to be of great use in connecting areas of potentially profitable agriculture (Howe & Richards, 1984:10-14). A bit later, in the 1980s, road construction projects were seen as a way of providing employment and hence reducing poverty (Ferb et al., 2014:10-18). Even today, governments use road infrastructure construction projects to develop underprivileged areas and reduce poverty (Fan & Chan-Kang, 2005:16-19). These projects include constructing

buildings, roads, bridges and other forms of infrastructure. As explained by Alzahrani and Emsley (2013:313-322), the construction industry is of paramount importance in the development of any country, and the number and scale of construction projects (such as buildings, roads and bridges) is a measure of a country's economic growth (Ibid.). According to Van Heerden et al., (2015:172-179), the construction of roads in rural areas serves as a core for socio-economic rehabilitation and the stimulation of areas that are sluggish in terms of development.

Logic of road investments

According to Fortson et al. (2015:12-16), road investments projects normally follow the logic like the one described in the figure below:

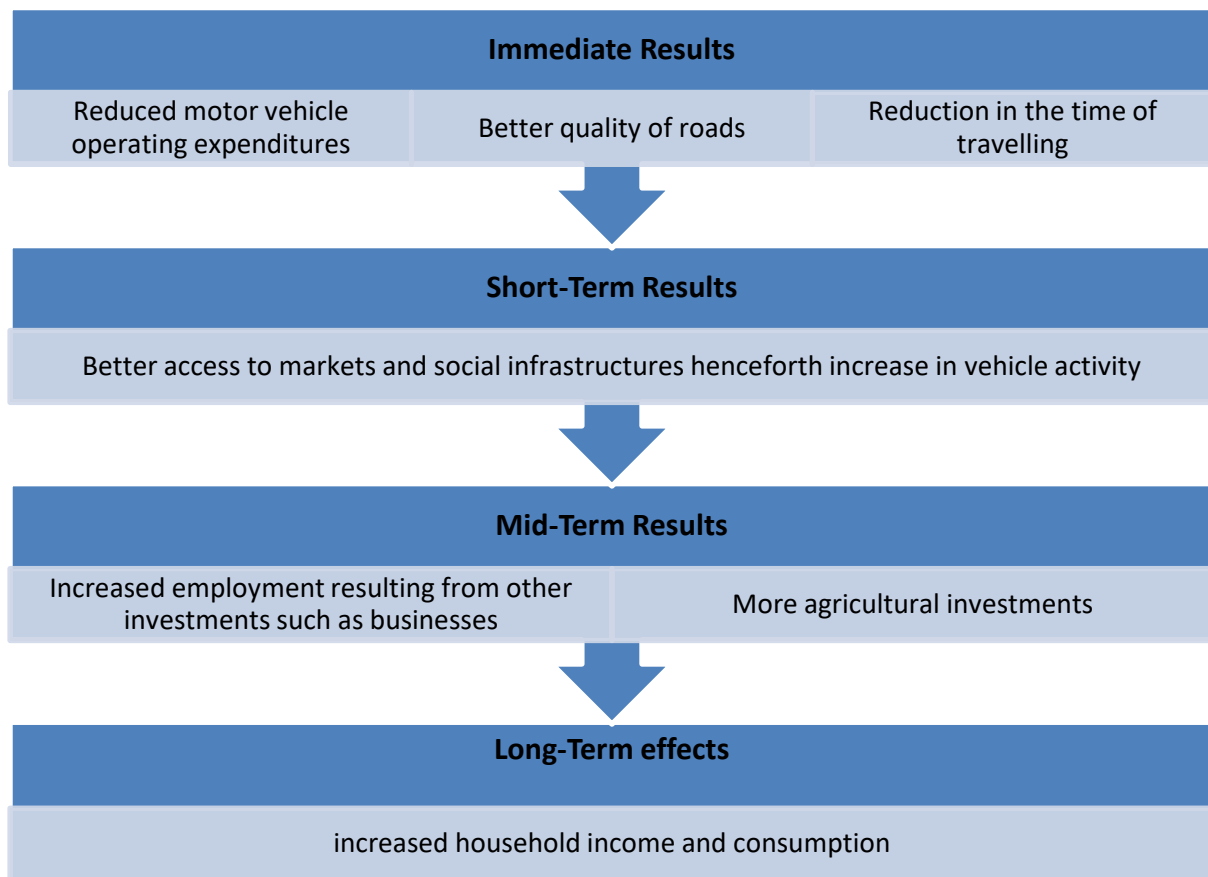


Figure 2.1: Logic Model for road investments

(Fortson et al., 2015:12-16)

The function of evaluation post the implementation of a project or a programme is to assist the investors in deciding whether or not such projects are producing the

intended effects, and to measure the effects that can be attributed to these projects. Van de Walle (2008:15-36) posits that the initial impact of projects may differ from the medium and long term impact in the same area. Short-term impact on the livelihood of residents may alter as time goes on. Businesses may sustain losses immediately after the project is completed, however, as developments are made in the community, they might well grow and become more profitable.

During the implementation of the project, unemployment may be reduced and skills may be transferred to local inhabitants. Immediately after the project closeout, there might be direct effects such as employment to maintain the road, reduced or elevated transport costs, increased traffic and shorter or longer travel times. Indirect (longer-term) effects may consist of employment that is not related to the road development, access to transport and institutions (social infrastructure, libraries, colleges, etc.), changes in the social patterns of the residents and their income (Khandker et al., 2010:7-10).

In the case of upgrading a gravel road to tar, there would be an immediate reduction in travel time and vehicle operating costs (Fortson et al., 2015:12-16). Another possible example of an immediate impact would be an increase in the attendance rate at schools in the area (Van de Walle, 2008:15-36). Such immediate results might then be followed by short-term results like improved access to social infrastructure and agricultural markets (Fortson et al., 2015: 12-16). Medium-term results contribute to the country's economy, in that the employment rate among community members increases due to the introduction of new businesses in the area (ibid.). Longer-term results include an increase in households' income and consumption (ibid.).

According to Van de Walle, (2008:15-36), the shorter- and longer-term impact of road infrastructure projects may differ among different groups. The poor may only experience some benefit after some time has elapsed, owing to the slow-burning economic effects resulting from the road investment.

Positive impact of road infrastructure

According to Blöndal (cited in Ferf et al., (2014:10-18)), governments invest in roads as they are expected to have a positive impact on the livelihoods and social and economic wellbeing of the citizens. These impact may not be felt directly from utilising the road but indirectly through the ease of access to opportunities that the road affords

(Van de Walle, 2008:15-36). There are many other factors that should be coordinated with the road intervention to ensure that its effects on its surroundings are beneficial (ibid.). For example, for a road to have significant effects on the social sector, functioning health and educational services should be present in the vicinity; for a road to enhance mobility, community members must have access to transport on the road, whether public or private (Van de Walle, 2008:15-36).

In sum, the nature and degree of the impact of road infrastructure improvement are generally dependent on co-operation with other investments in the physical, geographical and social/cultural infrastructure of the community concerned (Van de Walle, 2008:15-36). The World Bank in its Infrastructure for Development Report (World Bank, 1994:9-11) stated that road infrastructure investment alone is insufficient to generate sustainable increases in economic growth.

The possible positive impact of road construction projects are discussed in more detail below.

Access

The World Bank, as cited by Nhemachena et al. (2011:87-94), defines accessibility as the ability for individuals living in isolated rural areas to access basic social and economic services. Research studies in the Philippines have reported that there is a relationship between access to social and economic services and income level (Booth et al., 2000:1-33): enjoying greater access to social and economic services may open up opportunities for jobs that will push up income levels. In addition, easy access to a good road gives community members the advantage of being able to source income from other sectors; reductions in transport costs in remote areas can result in raising non-farm earnings and boosting household incomes by nearly half (Norman, 2013: 5-11).

Increased accessibility improves communication (the sending and receiving of information) and allows community members to participate in social activities outside their rural areas (Nhemachena et al., 2011:87-94). One of the impact studies conducted on the Amadiba road has shown evidence of a correlation between accessibility and improvement in community members' livelihoods (Mashiri et al., 2005:856-865). Musekene (2010:38-44) agrees that road infrastructure improves

access to social and economic services, enabling contact with markets outside the community and ultimately improving the overall welfare of community members.

Nhemachena et al. (2011:87-94) references Bird et al., Dercon, CPRC, and Bird and Shepherd as empirical research studies presenting evidence of accessibility as a contributing factor to poverty alleviation. The improvement of access to markets in rural communities leads to the diversification of rural economies for community members who wish to trade their labour and/or agricultural produce/products (ibid.).

Employment and economic growth

Economic development encompasses a rise in individual income, job and wealth creation, business establishment and an increase in gross regional product (Weisbrod & Weisbrod, 1997:1-2). According to the World Bank (2010:2-5), road rehabilitation requires labour and offers temporary employment to community members. Some employment continues after the implementation of a project to cover the maintenance and efficient operation of the road (Musekene, 2010:38-44).

Since employment is one of the main objectives of road investments, their construction is based on the principle of labour-intensive methods (Musekene, 2010:38-44). As defined by Musekene (2010:38-44), a labour-intensive method of construction and maintenance involves the economically efficient employment of as many labourers as is technically achievable throughout the construction process. According to Taylor and Bakabye (1999:1-2), labour-based methods in road construction create 2.5-4.0 times as much work for unskilled labourers.

Musekene's (2010:38-44) study of labour-intensive methods in the development and maintenance of transport infrastructure in Limpopo found that a total number of 6 827 jobs were generated by the programme named Gundo Lashu Programme (a labour-intensive rural roads programme launched by Roads Agency Limpopo (RAL) in 2001). Most of the beneficiaries were unskilled and jobless women and youths recruited from the community in the vicinity of the project (ibid.).

Reduced vehicle operating costs and other benefits

Mu and Van de Walle (2011:729-734) observe that tarred roads decrease the time of travelling from rural villages to markets and institutions. Supported by the findings of the World Bank (2010:2-5), they found that rehabilitated road resulted in a 59 per cent reduction in travelling time and an overall 26 per cent reduction in transportation costs. Part of this reduction can be attributed to less wear and tear on motor vehicles as a result of the smoother road.

Many studies have demonstrated that roads have positive impact on the livelihood of community members. Fortson et al. (2015:53-56) describe the usefulness of the road to community members for reasons such as shopping and visiting relatives. A Moroccan study conducted by Khandker et al. (cited by Booth et al., 2000:1-33) reports a significant change in the rate of attendance at school after a gravel road was upgraded to a paved one. According to this study, in the absence of the paved road, only 21 per cent of rural girls and 58 per cent of rural boys ever attended school (Booth et al., 2000:1-33).

Negative impact of road infrastructure development

While most of the literature furnishes extensive evidence of the benefits of upgrading and rehabilitating roads, some studies present evidence of negative impact that may result from upgrading roads. There is a probability that in addition to winners there will be losers: given that new roads result in higher land values, there may be a propensity towards land concentration and landlessness (Van de Walle, 2008:15-36). According to De Haan & Rogaly and Rigg, as referenced by Moore (2012:9-13), the poorer people in rural areas are the ones who are more likely to be prone to the negative impact of new roads, which serves to increase inequality between rich and poor in the community. Discussed below are some of the negative impact that may be experienced by community members after a road infrastructure development.

Road accidents

A study of rural road construction in Pakistan (Ohira & Takanashi, 2008:5-9) found an increase in traffic accidents after the tarring of a road. They attribute the elevated accident rate to the comfort of driving on paved roads experienced by drivers, which leads them to drive faster than before. Van de Walle (2008:15-36) notes that injury, death and disability as a result of road accidents can worsen household poverty since

they incur unaffordable costs such as medical care, funeral costs and loss of household income. A study conducted in Bangladesh cited by Norman (2013:5-11) noted that road accidents caused a decline in household income and food consumption, forcing families into poverty.

Congestion

Roads are beneficial to the development of the economy but improvement in roads can lead to congestion (Moleli, 2012:1-3). Mashiri et al. measured the flow of traffic and average speed prior and post the reconstruction of the Amadiba road, and found an increase in traffic from 30-100 vehicles per day. According to Norman (2013:5-11), congestion may result because of the decrease in vehicle operating costs. She provided the example of the Champasak Road Improvement project, where the traffic volume grew at an annual average rate of 22 per cent post-implementation.

Migration

Rural dwellers who live far from the urban centres may be encouraged by access to roads to migrate to urban areas to find non-farm employment (Moore, 2012:9-13). Asher and Novosad (2014:20-22) also found that a new road decreases the cost of mobility and facilitates migration.

Overpopulation

Wanjiku (2014:11-18) suggests that ease of access to roads together with lower transport and vehicle operating costs may lead to overpopulation. Asher and Novosad (2014:20-22) concede that more people may be persuaded to stay in rural areas if their economic opportunities are improved by the road upgrade. An increasing population may lead to over-exploitation of resources..

Post-project evaluation

This phase of evaluation is also known as summative project evaluation (Stevens et al., 1993:10-16), but Grabe (1983:12-14) prefers 'post-project evaluation'. Post-project evaluation is an assessment of a project or a programme after its completion (Zidane, Johansen & Ekambaram, 2015:410-416).

Fleischer and Christie (2009:158-165.) elaborate by referring to post-project evaluation as a systematic method of gathering information on the outputs, results or impact of a project. This information yields data on the extent of the project's success or accomplishment of its goals.

Post-project evaluation is normally conducted by comparing the initial project plan with the ultimate product, performance being measured and assessed against accepted success criteria (Altuğ, 2002: 22-25; see also Khandker et al., 2010:7-10).

According to Wideman (1992:19-25), post-project evaluation should encompass three elements of equal importance: first, the technical objectives of the project as shown by its scope and quality constraints; secondly, the business management goals, represented in terms of time and cost; and thirdly, the extent of stakeholder fulfilment, measured by their perception of the success of the project.

Post-project evaluation focuses on two evaluation criteria, impact – usually assessed some time after the completion of the project; and sustainability – to what extent the impact continues to be generated post the implementation of the project (Japan International Cooperation Agency, 2011:14-20).

As explained by Khandker et al. (2009:3-10), if post-project evaluations are accurate they should have instant benefits. Post-project evaluations are costly compared to pre-project and on-going evaluations (ibid.). Khandker et al. (2009:7-10) explain that this is because they require the researcher to collect data on the actual outcomes as well as on the supplementary social and economic factors that may have determined the course of the intervention.

Purpose of post-project evaluations

Every project evaluation has a role to play in the success of a project, and the role of post-project evaluation is unique. According to Stevens et al. (1993:10-16), post-project evaluation needs to be deep and wide, determining if the contributors' needs and expectations were met, if their initial issues were solved, if the programme/project was resourceful, and if the end-users of the product were pleased and fulfilled.

CHAPTER 3: RESEARCH METHODOLOGY

The purpose of this chapter is to outline and justify the research methodology, design, and methods used to collect, analyse and present data. According to Mamabolo (2013:15-20), the success of a research study is largely dependent on the choice of methodology. This chapter discusses and explains the research design, target population, sampling methods, data collection process and how the data was analysed.

Paradigm

A paradigm is a fundamental belief structure and a conceptual framework, a way of interpreting and studying the reality of the universe. There are four key research paradigms that are differentiated and explored in the work of many authors: the positivist, pragmatist, interpretivist and realistic paradigms (Žukauskas, Vveinhardt & Andriukaitienė, 2018:122-125). Research paradigms are driven by a set of principles relating to epistemology, methodology and ontology (Saunders et al., cited in Ihuah & Eaton, 2013:934-937).

This research study adopts a pragmatic approach. As a research paradigm, pragmatism is founded on the notion that researchers should use a conceptual and/or methodological approach best suited to the specific research problem being investigated (Tashakkori & Teddlie, cited by Kaushik & Walsh, 2019:3-5). Pragmatism ignores the controversial questions of truth and objectivity, and favours empirical investigation geared towards the solution of practical problems in the real world (Ronald, 2015:43-46). The researcher identified the advantages of this paradigm, which made possible a more nuanced, contextual view of the tarred road project and its effect on livelihoods (Shannon-Baker, 2015:321-323).

A pragmatic approach allowed the researcher to adopt various data collection and analytic methods, including the use of questionnaires (with closed-ended and open-ended questions) and observation. Additionally, the quantitative phase has enabled the researcher to attract far more respondents than she might have if only qualitative approaches were used (Nguyen, 2019: 2-6).

Epistemology

Epistemology is the branch of philosophy concerned with knowledge and the processes by which knowledge is constructed and authenticated (Rehman & Alharthi, 2016:52-56). In this research study, knowledge was gained via information gathered from previous studies in similar fields and community members with diverse views on the success or failure of the road upgrade project. This is in line with Johnson and Onwuegbuzie's characterisation of the pragmatist's epistemological approach, which incorporates a range of information sources in order to find workable solutions, to gain a deeper understanding of individuals and the environment in which we live and practice, and to address social and individual issues (Nowell, 2015:141-144).

Ontology

Ontology is the study of the nature of reality or being, so concerns consideration of the very existence or meaning of the social phenomenon under investigation (Scotland, 2012:10-12). This study focused on the perceptions of affected residents regarding the newly tarred road and how it influenced their livelihoods. Vermersch, in De Jaegher et al. (2017:495-500), insists on the need to include inter-subjectivity to better comprehend people's experience. Intersubjectivity is an ontological stance in which the researcher acknowledges both subjectivity and objectivity. According to Morgan, the intersubjective recognises both the existence of a single objective reality and the possibility that human beings have various conceptions of that reality (Maarouf, 2019:6-9). The researcher wanted to hear the subjective opinions of the community members on the tarred road project in the context of data that was objectively derived.

Methodology

Methodology is the general term used to refer to the design, processes, techniques and procedures used in an investigation (Kivunja & Kuyini, 2017:28-33). The researcher used a case study methodology to examine the effect of the newly tarred road on the livelihoods of community residents. The approach was considered appropriate for this study as it required the researcher to study and analyse a group of people in their natural context to gain an in-depth understanding of them (Heale & Twycross, 2018:7-8). The case study is explained in more detail below.

Research approach

Mixed methods (quantitative and qualitative methods) were selected for this research. Ihuah and Eaton (2013:938-940) assert that case study research allows the researcher to use different sources and methods to gather information. Mixed methods are well known for their ability to enhance strengths and decrease the constraints of individual methods, adding to an overall understanding of the phenomenon being researched (Wium & Louw, 2018:1-8). The use of mixed methods enabled the researcher to be more flexible in her approach to the research and to answer a wider variety of questions. The methods used embraced questionnaires, interviews, observation, and document analysis.

Research design

Trochim (2006:1-2) defines research design as being the overall strategy that an individual chooses to incorporate various elements into the study in an intelligible and logical way. He explains that a research design constitutes a blueprint for the gathering, measurement and evaluation of data. The research design helps to determine how the data collection will be conducted and to ensure that the various elements of the research are addressed and implemented in the right order (Macanda, 2014:55-67).

This study was both exploratory and descriptive in nature. According to Dowling (2014:10-16), an exploratory design is necessary to establish perspectives in the absence of past data or only a few studies for reference. A descriptive design typically uses a survey or case study approach to gather data to answer the research questions (Adepeju, 2017:29-30). These research orientations enabled the researcher to describe and explore how local residents have been impacted by the tarred road.

Research methods

Questionnaires

This research study made use of questionnaires consisting of both open- and closed-ended questions. According to Weinreich, a qualitative approach to research produces in-depth and rich information, while a quantitative approach is utilised to calculate numerically the findings regarding the study variables (Khandker et al., 2010:7-30).

Bhattacharjee (2012:35-40) postulates that a combination of the two methods helps produce distinctive insights into a complex social phenomenon that are unavailable when either of these methods is used alone. Frechtling et al. (2010:15-20) add that utilising mixed methods to conduct evaluation research tends to increase the validity and reliability of the findings achieved.

Target population

The target population of the study comprised the residents of village in the Malamulele region in the Vhembe District, near a recent road infrastructure development project. Residents aged between 18 and 65 who had lived there for at least 15 years were targeted for sourcing research information.

The village under study had a total population of 4 452 Xitsonga-speaking people, of whom the majority (56.1%) were women. Children up to the age of 14 comprised 38.8%, the working age spread of 15 to 64 made up the largest percentage of the population (55%), while elderly people (65+) constituted the lowest percentage of the population (6.1%) (StatsSA, 2011).

The village's road has been upgraded to tar and the researcher's aim was to investigate the impact this intervention has had on the livelihood of the residents. The target population had used the gravel road before and would be able to explain the challenges experienced and what sort of impact the new road had made on their lives.

Sampling method

Sampling involves the selection of part of a targeted population (Thompson, 2012:9-37) so as to estimate something about the population as a whole. Sampling was used in this research to save some of the time and cost that would have been incurred had the whole population been involved. Two sampling methods were utilised and are briefly described below.

The researcher employed purposive sampling to select a sample of residents between the ages of 18 and 65 with more than 15 years' residence within the village. This was because the researcher believed that this population profile held vital and relevant information that could not be obtained elsewhere. Amin notes that purposive sampling is useful in selecting individuals with unique information or experiences regarding the problem under study (Kameraho, 2015:19-22).

The second sampling method used was random sampling. According to Teddlie and Yu (2007:77-100), random sampling is a strategy in which each unit in the available population has an equal likelihood of being selected for the sample. The chance of a unit being selected is not affected by the selection of other units from the targeted population. The use of random sampling grants every individual in the population an equal opportunity to be part of the research, regardless of their gender, race or religion (Khandker et al., 2010:7-30). The researcher made use of a simple random sampling method to select participants from within the purposively selected representative sample (as described above).

Sampling sizes

Sampling also includes determining the size of the population sample to be studied (Macanda, 2014:55-67). Macanda (2014:55-67) points out that a representative sample saves time and money in a project. Further, determining a sample size should take into consideration the purpose of the study, the kind of study, the nature of the population under study, the accuracy level required and the expected rate of response. Also, the sampling size for mixed methods should be sufficiently large to represent the target population – generally at least 50 units, according to Graff (2016:53-54). The researcher randomly selected 130 residents within the targeted population in the Malamulele region to participate in the study.

Data collection methods

While there are many ways of collecting data from participants, the ones used by the researcher are described in depth below.

Primary source of data

Primary data refers to first-hand data collected by the researcher him/herself, and is usually a costly and time-consuming method of data collection (Ajayi, 2017:2-6). The researcher collected her primary data using two methods, observation and a questionnaire-led survey.

Observation

Observation is among the most significant methods of research in the social sciences, and also one of the most versatile (Ciesielska, Boström & Öhlander, 2018:33-40). As

described by Marshall and Rossman, observation is the systematic analysis of occasions, behaviours and activities in the social context of the selected sample (cited in Kawulich, 2005:6-10; see also Walshe et al., 2012:1048-1054).

The use of observation has certain benefits and disadvantages. First, data collected that pertains to the surroundings and human behaviour can be directly documented by the researcher without her having to depend on other people (Foster, 1990:38-44). Observation enables one to determine and understand how people behave in their own environment and how things are arranged and prioritised in that setting (Kawulich, 2012:150-154).

A potential limitation of observational study is the researcher's subjectivity. Ratner, as cited by Kawulich (2005:6-10), notes that one should try to recognise one's own biases and prejudices, and set them aside as much as possible, so that the data can be viewed neutrally and accurately interpreted. Another limitation is that the acquired data may not be recorded in a systematic manner and could therefore manifest inconsistencies (Foster, 1990:38-44).

The researcher used the double-entry notebook method proposed by Driscoll (2011:153-174) to avoid bias. This method makes it possible to record observations on the left-hand page and to make reflective notes on the opposite page (Buckelew & Ewing, 2019:166-168). The researcher gathered as many details as she could discover about the livelihoods of the community members, their social lives, how their daily lives were affected by the new road, and the new trends that resulted from the introduction of the tarred road on a notebook page. This enabled her to isolate her observations from her own emotions.

The researcher functioned as a participant observer which, as defined by the Atlas Website cited by Michael et al. (2017:84-89), is a form of observation in which a researcher embeds him/herself as a member of the group being researched to observe behaviour which would otherwise be inaccessible. The writer is a member of the community under study by birth and has a clear understanding of what is happening in the context of her area of study. Participant observation allowed the researcher to obtain an insider's perspective on the community concerned and gain an in-depth and rich comprehension of the participants' activities and circumstances (Michael et al., 2017:84-89).

Questionnaire surveys

Bhattacharya (2006:1) denotes that a questionnaire is a faster and cheaper way of gathering information from the sample. A standard questionnaire was used to obtain measurable data from the residents. The questionnaire constructed consisted of opened and closed-ended questions thus allowing the researcher to collect both quantitative and qualitative data.

Fieldwork

A total of 130 questionnaires were personally distributed to the residents of Malamulele by the researcher, but only 94 of them were completed and returned to the researcher. Participants were expected to complete these questionnaires themselves based on their experiences of the newly tarred road. Questionnaire surveys were chosen to be an ideal method of collecting data for this research project because they have the advantage of gathering together an enormous amount of data in a relatively short period, and can be analysed using computer software (Frechtling et al., 2010:15-20).

Case Study

The case study design has been used in a variety of fields, including education, business, social sciences, law and health, to investigate a broad range of issues (Harrison et al., 2017:10-17). Case study analysis is regarded as a valuable way of researching and analysing complex problems in real-world settings (Harrison et al., 2017:10-17). As defined by Yin (2017:3-10), a case study is a scientific inquiry into a contemporary occurrence in all its complexity and within its real-world context. It is a special way of understanding any occurrence, natural or social, that occurs within a data set.

There are several advantages to using case studies. First, analysis of the data is often carried out in the context of its origin, that is, in the setting where the activity takes place (Zainal, 2007:1-6). Secondly, case studies can lead to a researcher's professional development, as they provide practical, context-dependent knowledge that improves one's research skills (Flyvbjerg, cited in Starman, 2013:29-35). Thirdly, variations in instrumental, intrinsic and collective approaches to case studies permit information to be analysed both quantitatively and qualitatively (Zainal, 2007:1-6).

According to Yin (2017:3-10), case studies are sometimes accused of taking too long, being complicated to carry out and producing a large amount of paperwork. Finally, the case study method is that its reliance on an individual case makes it difficult to generalise to a larger population or context (Tellis, as cited in Zainal, 2007:1-6).

Secondary source of data

Research usually begins with a search for what is already established as well as what needs to be discovered about a subject, involving the examination of secondary sources and past studies in the same field of interest (Johnston, 2017:619-626).

According to Dale et al., Glaser and Smith as cited by Sherif (2018:3-4), the main benefits of secondary research are its cost-efficiency and flexibility. If somebody else has already assembled the information required, the researcher does not have to allocate financial resources towards it (Johnston, 2017:619-626). Ajayi (2017:2-6) notes that several shared data sets, particularly data sets for public use, have very large samples, measurements of many structures and systematic designs that enable researchers to respond to questions that they would otherwise lack the time or resources to investigate.

The biggest drawback of secondary data analysis is that publications offer only a summary of the original results due to the space restrictions in scholarly journals (Church, 2002:32-45). Another drawback to the use of secondary data is that it is seldom specific to the researcher's precise needs, and particular information that one would like to obtain may not have been gathered (Boslaugh, 2007:2-10).

To address the drawbacks of secondary data, the researcher began by formulating research questions and hypotheses, and then searched for accessible secondary data to answer these research questions. The researcher then gathered and examined in detail all research methods, codebooks, manuals and other documents provided to users of the research database. Such sources supplied the researcher with adequate information to determine the external and internal validity of the data and decide whether or not there were sufficient cases in the data set to make realistic assumptions about her research study (Cheng & Phillips, 2014:371-373). The researcher also minimised inconsistency in the study by repeatedly checking that the set of data collected was aligned with the research questions (Boo & Froelicher, 2013:130-135).

The researcher utilised information gleaned from scholarly articles, municipality documents, books, and government websites to frame the study and gain a greater understanding of what was at stake in the research project.

Data analysis

Questionnaires completed by the participants were first sorted to remove those that had been completed incorrectly. As many as 34 questionnaires were incomplete and had to be removed from the data analysis process, leaving 94 completed questionnaires. Frechtling et al. (2010:15-20) suggest that the first step in analysing data is to sort the collected data by checking for answers that may be out of line. The researcher thereafter arranged and used colour coding to prepare the data for entry into a computer program.

The researcher made use of the Statistical Package for Social Sciences (SPSS) program to manipulate and statistically analyse the data. According to Flynn (2003:2-6), the SPSS program is capable of creating descriptive statistics, that is, averages and frequencies as well as time series analysis. The program can also create graphs and tables of high quality (Flynn, 2003:2-6).

Ethical considerations

For this study, a letter requesting permission to conduct research at the village was requested from the village's officials. In this letter, the nature and purpose of the research were explained in detail. A similar explanation was provided to participants, together with the assurance that participation was voluntary and that they had the right to withdraw from the study at any time without any consequences. The researcher assured the participants that the information provided would remain confidential, and that they would not be asked for personal information such as identification numbers, names and residential addresses. The information obtained from the participants was not used for any purpose other than this research study.

CHAPTER 4: DATA ANALYSES

This chapter presents the results of the study and compares them with those obtained by previous studies cited in the literature review. Information is displayed in tables, pie charts and bar graphs. Data was gathered to document both the pre- and post-construction situations, to find out if there was any improvement in the villagers' socio-economic status.

1. Response rate of questionnaires

This research obtained response rate of 72.3%, as shown in the calculations below:

$$R = \frac{C}{S}$$

Where R is the response rate, S is the original sample and C is the number of completed surveys.

$$R = \frac{C}{S}$$

$$= \frac{94}{130}$$

$$= 0.723 \times 100$$

$$R = 72.3\%$$

2. Screening questions:

Screening questions were included to distinguish local people who had recently arrived from others who had witnessed the difficulties presented by the gravel road.

2.1. The number of people who had resided in the village for more than 15 years.

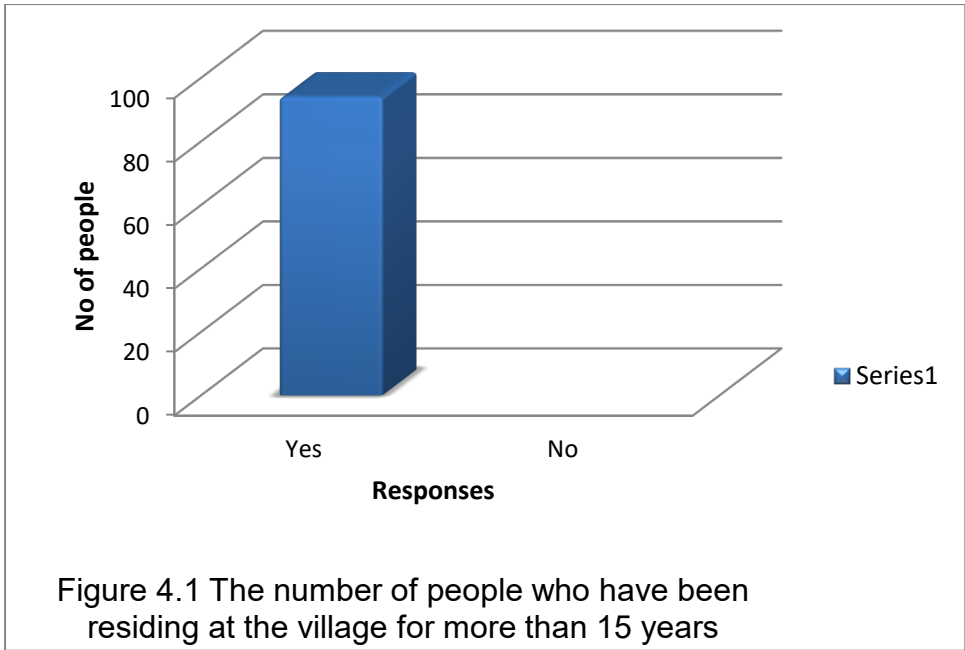


Figure 4.1 above shows that all 94 respondents had lived in the village for more than 15 years.

2.2. The number of residents with more than 18 years of age

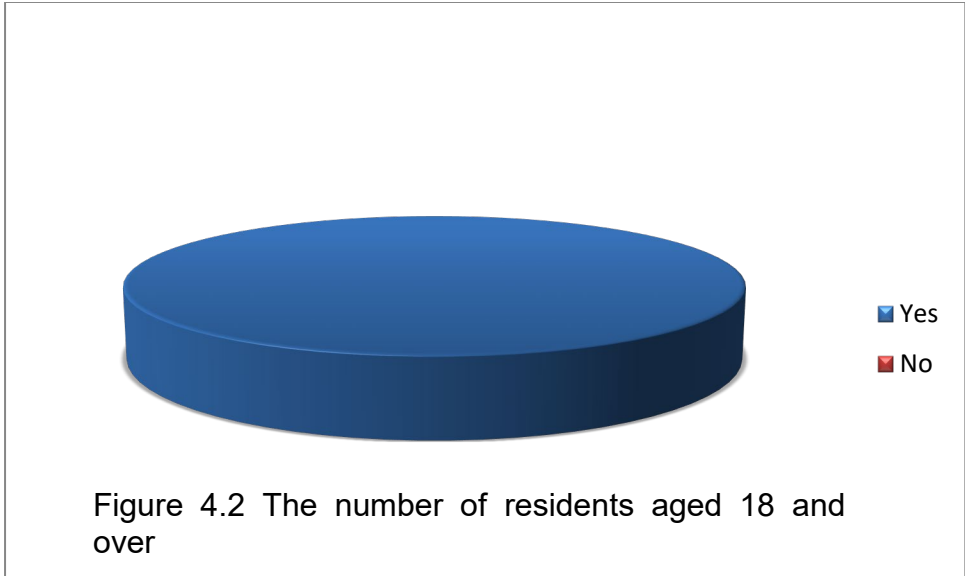


Figure 4.2 reveals that all the respondents were older than 18 years of age. The researcher included this question to ensure that all the respondents were adults who were able to provide reasoned responses without peer manipulation or other extrinsic motivations.

3. This section involves detailed questions on the livelihoods of residents before and after the tarred road project.

3.1. The total number of years residents have lived in the village

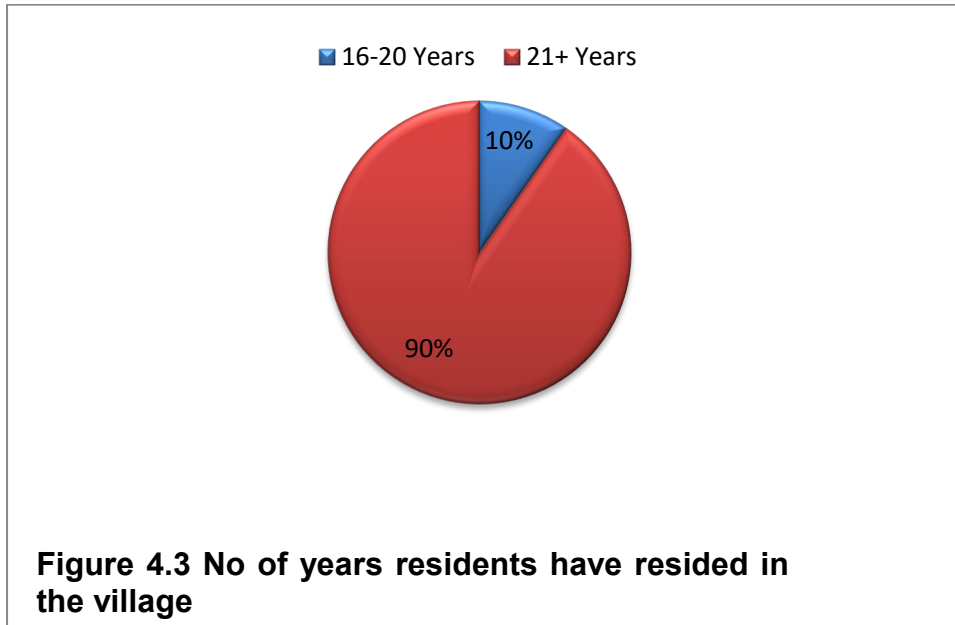


Figure 4.3 shows that the vast majority of respondents (90%) had lived in the village for over 21 years, while the remaining 10% had been living in the village for between 16 and 20 years.

3.2. Gender

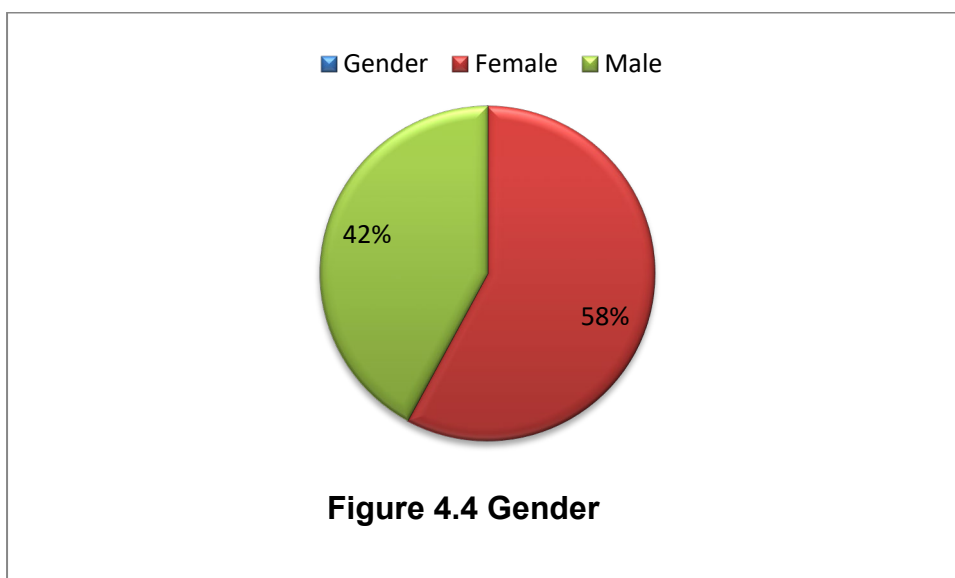


Figure 3.2 highlights that women accounted for 58% of the total respondents, the other 42% being men.

3.3. Age group

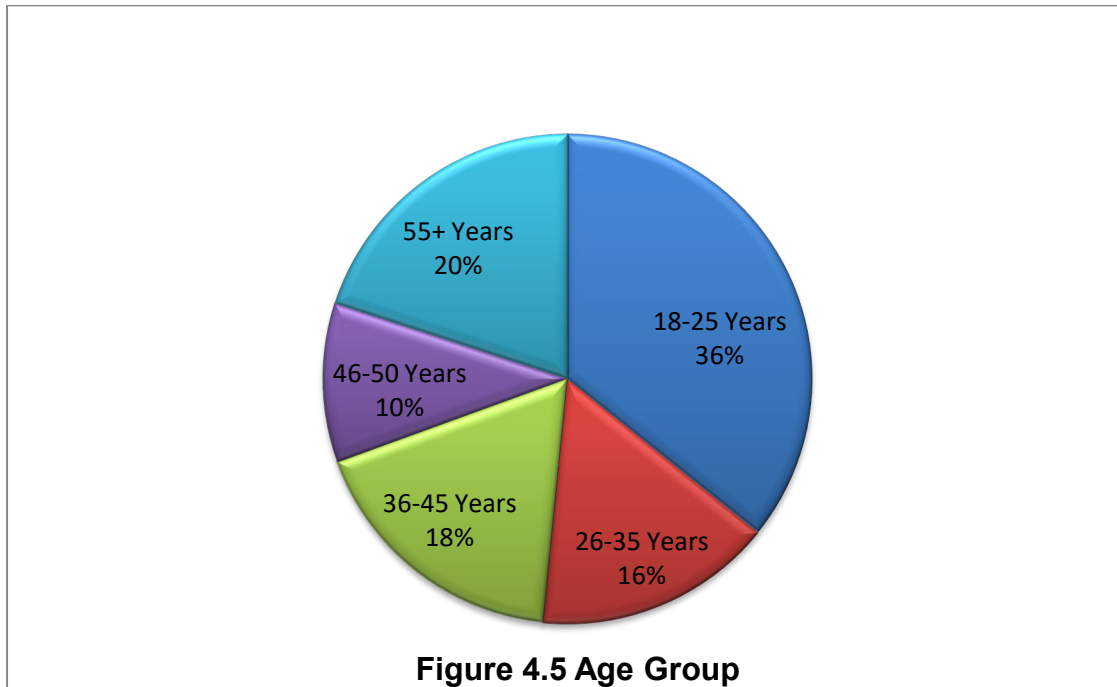


Figure 4.5 indicates that many respondents (36%) in this study were between 18 and 25 years of age. The least number of respondents were between the ages of 46 and 50 years (10%). Twenty per cent of respondents were elderly (age 55 + years), and 18% between 36 and 45. Only 16% of respondents were aged 26 to 35 years. This represents a good spread among the various age groups.

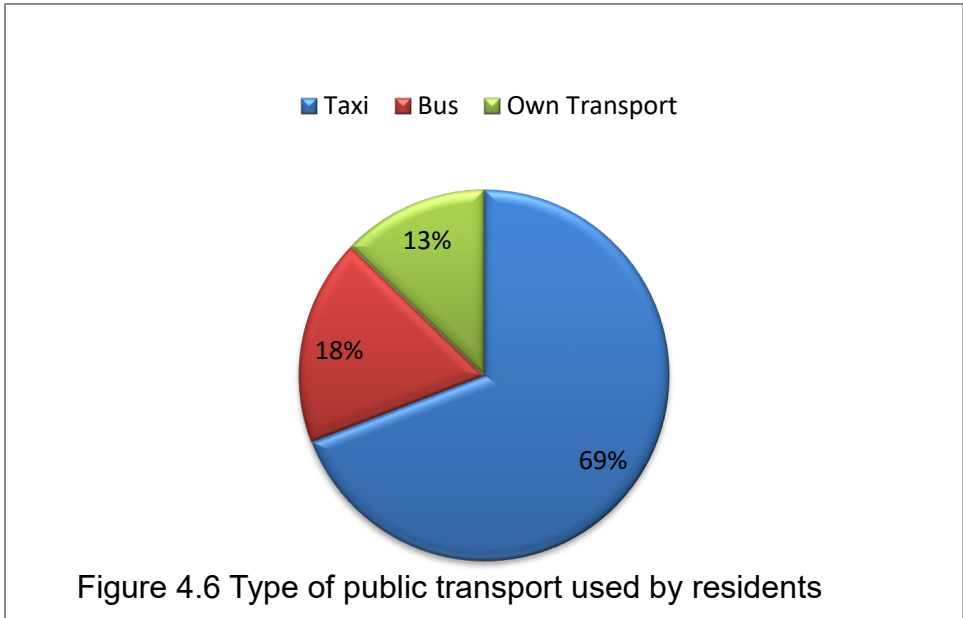
3.4. The total number of people using public transport on a daily basis (

Table 4.1: Number of people using public transport.

Options	Number	Per centage
YES	81	86%
NO	13	14%

Table 3.1, above, indicates that the highest number of respondents (86 per cent) make regular use of public transport. The other 14% apparently use their own transport.

3.5. The type of public transport used by village residents.



The diagram above (Figure 4.6) reveals that the form of public transport most commonly used in this village is the commuter omnibus, with 69% of the respondents indicating this. Some (13%) used their own transport (a light truck, motor car or bicycle). Only 18% of those surveyed used buses.

3.6. Transport waiting time before construction of tarred road

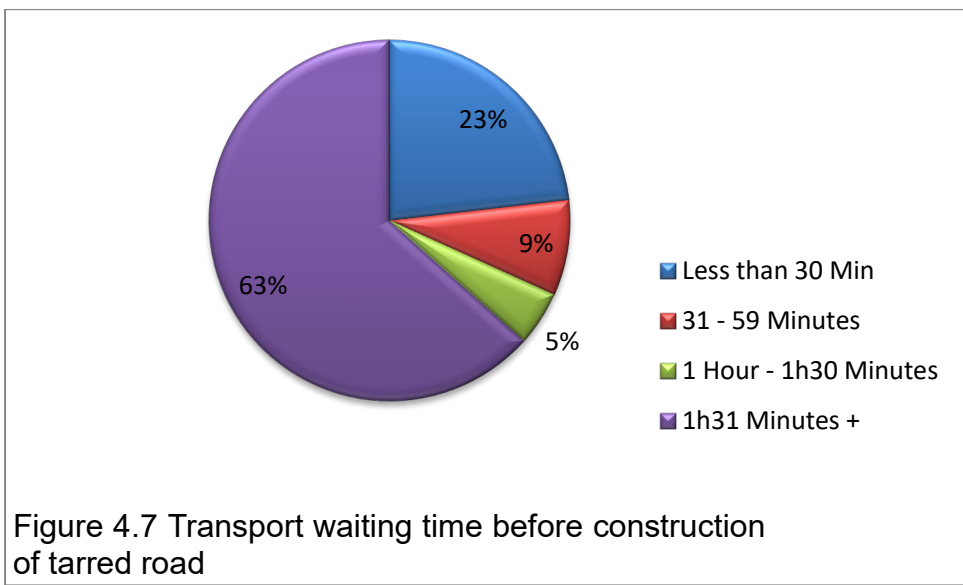
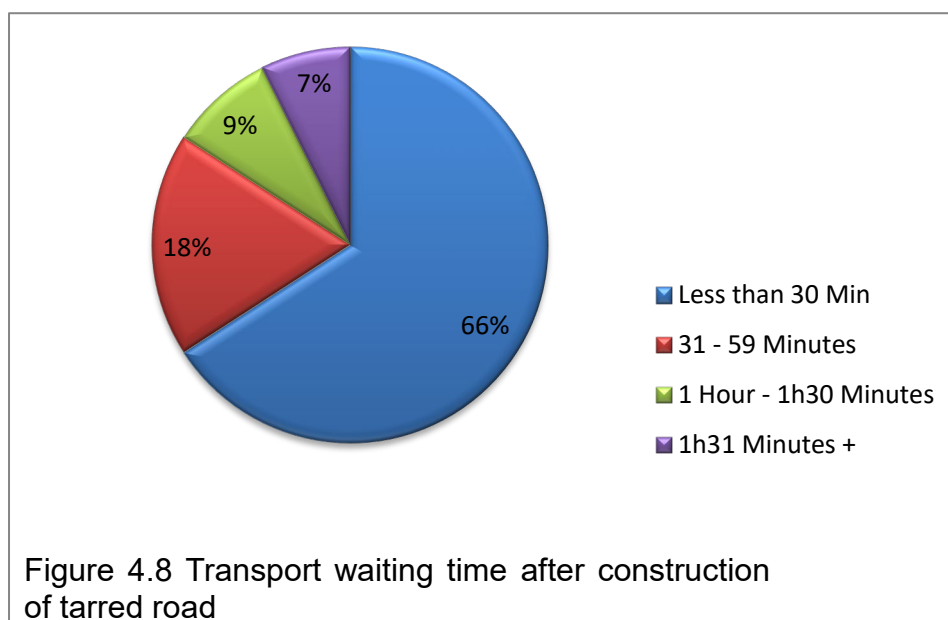


Figure 4.7 reveals that the majority of respondents (63%) would wait over 1 hour 30 minutes for public transport before the tarring of the road. The remaining 37% typically waited for anything from under 30 minutes to an hour and a half. This figure suggests that transport was a problem, possibly due to the inaccessibility of the gravel road during rainy days and because of potholes. Most of the respondents confirmed that public transport had not been reliable and they would often end up walking to the nearest town or giving up and returning home. Nemvumoni (2017:22-27) argues that transport is primarily determined by road conditions and that sometimes road conditions can be so poor as to fail to accommodate certain modes of transport.

3.7. Travelling time after the construction of tarred road



The transport waiting time for residents after the development of a tarred road is shown in Figure 4.8, above. According to the statistics, the highest proportion (66%) of residents indicated that they now waited 30 minutes or less for public transport. Of the remaining 34% of respondents, only 7% claimed that they had to wait for more than 1 hour and 30 minutes for public transport. This reveals a correlation between road conditions and accessibility by road transport. Post-intervention studies such as those conducted by Mu and Van de Walle (2011:729-734) associated improved or paved roads with a decrease in travel time from villages to markets. It is also supposed that, if good roads exist, market forces will ensure that transport operators respond to the demand for transport (Starkey & Hine, 2014:14-22). A comparison of the statistics in

Figure 3.6 with those displayed in Figure 3.5 indicates a dramatic reduction in average waiting times for transport among the villagers after the construction of the tarred road.

3.8. Employment Rate

Table 4.2: Employment rate in Malamulele.

Options	Number	Percentage
Yes	16	17%
No	78	83%

Table 4.2 above highlights that 17% of respondents are employed, while the remaining 83% are unemployed.

3.9. Relation between the employment rate and construction of tarred road

Table 4.3: Relation between unemployment and tarred road infrastructure.

Options	Number	Per centage
Yes	1	6.2%
No	15	93.8%

Table 4.3 above clearly demonstrates that only one, or 6.2% of the 16 employed residents, had secured a job as a result of the newly constructed road. The remaining 93.8 per cent said that their work was not connected to the development of the tarred road.

3.10. New activities in the area

Table 4.4: New activities in Malamulele

Options	Number	Per centage
Yes	64	68%
No	30	32%

The majority of respondents (68%) acknowledged that there had been new developments in the area since the road had been upgraded to tar, according to the

findings set out in Table 4.4, above. At the same time, 32% of the respondents did not agree that new activities had resulted from the tarred road.

3.11. Attribution of the new activities to development enabled by the road tarring project

Table 4.5: Attributes of new activities to tarred road availability

Options	Number	Per centage
Yes	53	83%
No	11	17%

According to Table 4.5, above, 83% of the 64 respondents who had agreed that there were new activities in the village believed that this recent activity was as a result of the newly developed road. The presence of infrastructure such as roads is the foundation for the advancement of other activities (Botrić, Šišinački & Škuflić, 2006:129-130). Gachassin, Najman and Raballand (2010:5-12), assert that roads generally lead to other amenities or facilities. The construction of a tarred road in this village may be associated with the construction of a village government facility. This new development makes it easier for local residents to access government infrastructure.

3.12. New activities in the village

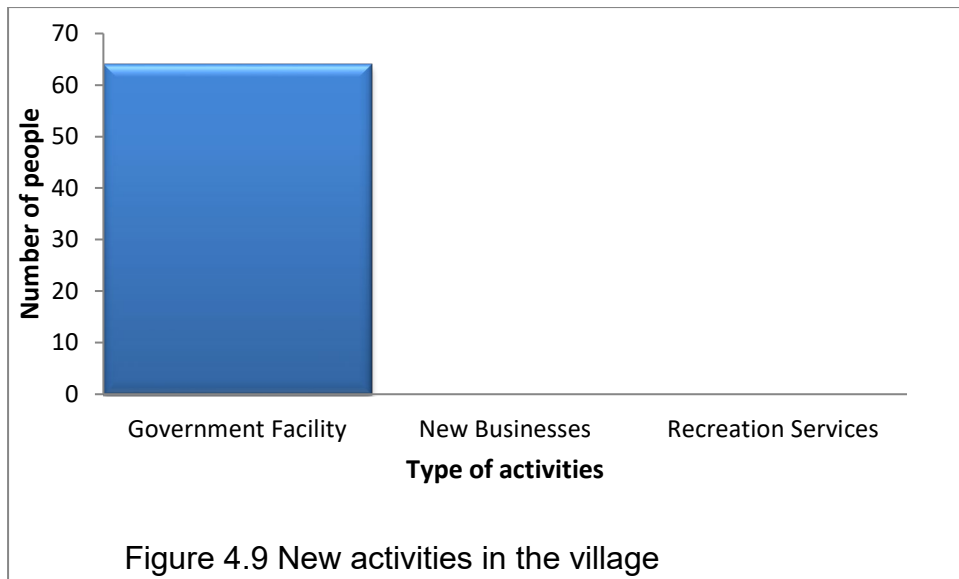


Figure 4.9 indicates that all the respondents who agreed that recent development in the village was the result of the newly constructed tarred road also agreed that this new activity in the village consisted of the establishment of a government facility.

3.13. Table 4.6. Vehicle owners in the village (motor, bicycle, motorbike, etc.)

Table: 4.6: Vehicle ownership in Malamulele

Options	Number	Per centage
Yes	19	20%
No	75	80%

The following table indicates that only 20% of the respondents owned some form of vehicle (a motor car, a motorcycle or a bicycle). The vast majority (80%) of respondents to this survey depended on public transport for the distribution of goods and access to markets and social services.

3.14. Frequency of driving on the road

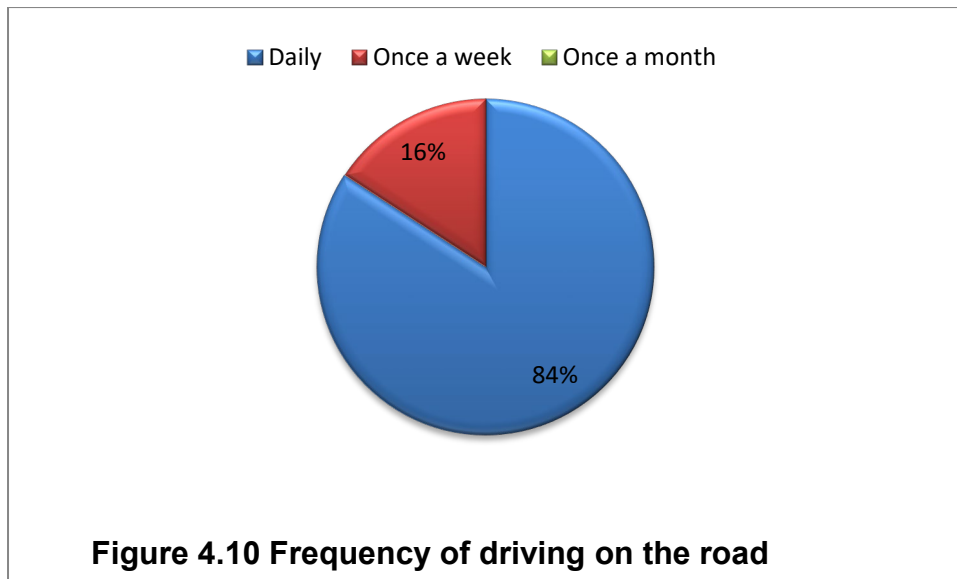
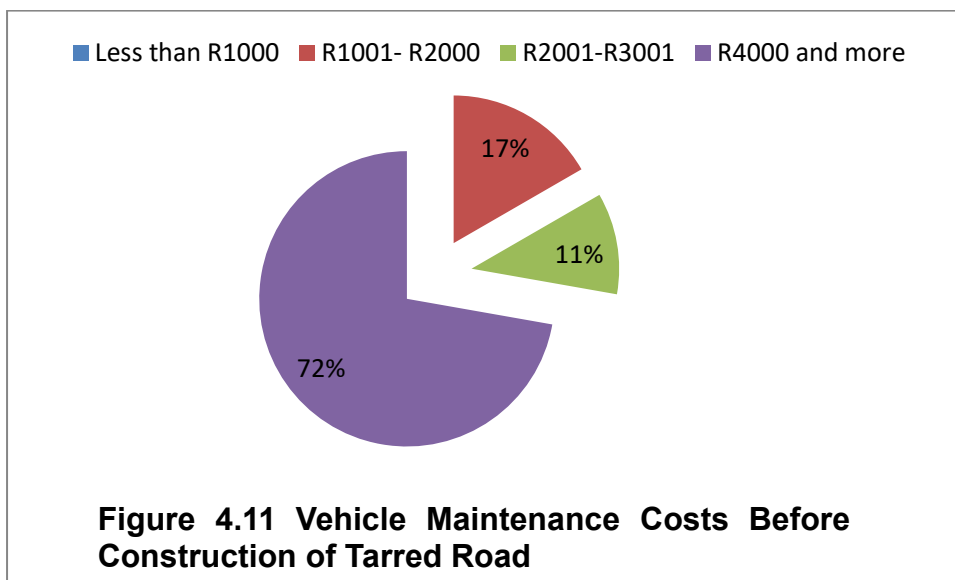


Figure 4.10, above, shows that most of the vehicle owners in the village frequently drive on this newly tarred road (84 per cent on a daily basis). The remaining 16 per cent indicated they drove once a week as they relied on public transportation for work purposes.

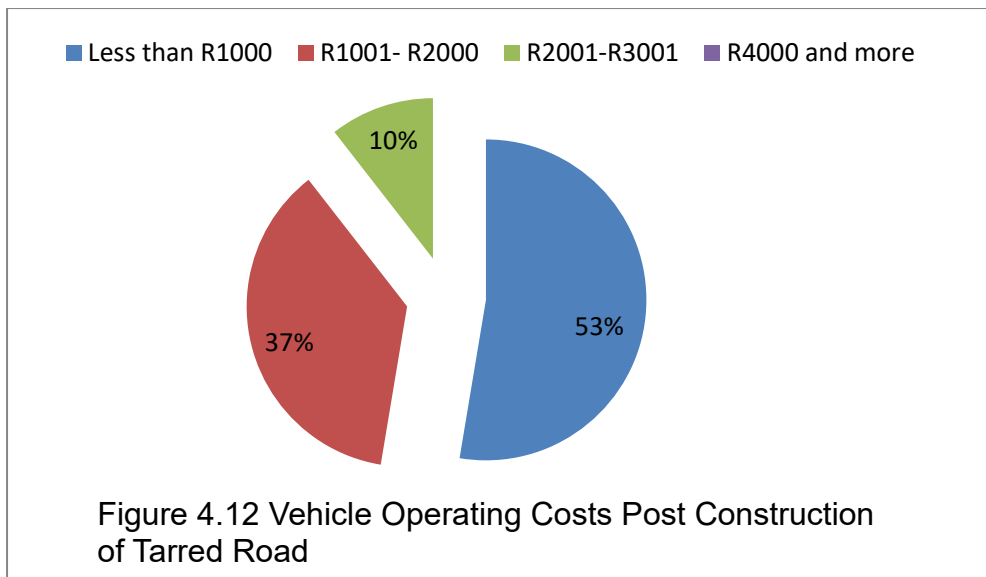
3.15. Vehicle maintenance before the construction of tar road



The above results indicate that 72% of vehicle owners paid more than R4000 per month for the maintenance of their vehicles prior to the tarring of the road. Seventeen per cent 17% of the vehicle owner respondents paid between R1000 and R2000 a month, and 11% between R2000 and R3000. Gravel roads in poor condition (excessive dust and potholes) are typically associated with high maintenance costs

for vehicles (Naazie, Braimah & Atindana, 2018:168-170). According to Salih, Edum-Fotwe and Price (2014:472-476), studies have demonstrated a clear connection between road surface conditions (such as rutting, smoothness, roughness and potholes) and vehicle operating costs. Driving on damaged roads with potholes leads to regular maintenance and increased fuel consumption, raising vehicle maintenance costs (Naazie et al., 2018:168-170). Local respondents indicated that the previous gravel road was in a very poor condition and inaccessible in rainy conditions. This explains the high maintenance costs experienced by vehicle owners before the construction of the tarred road.

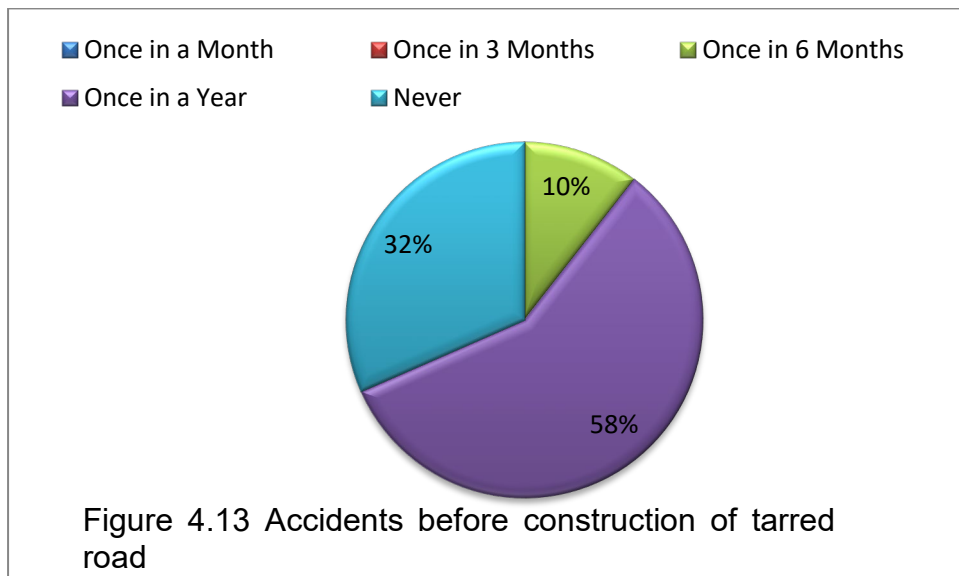
3.16. Vehicle maintenance cost post the construction of tarred road



Vehicle maintenance costs are based primarily on road roughness and road geometry features (Kerali, 2003:256-262); that is, paved roads are associated with lowering the cost of operating vehicles by providing a smooth running surface (Donnges, Edmonds & Johannessen, 2007:52-55). As depicted in Figure 1.12 above, 53% of the

respondents indicated that their vehicle maintenance costs had decreased to R1000.00 and less per month after the construction of the tarred road. Thirty-seven per cent of respondents indicated that their current vehicle maintenance costs ranged from R1000 to R2000, while the remaining 10% of respondents reported a marginal improvement in their vehicle maintenance costs, which were typically between R2000 and R3000.

3.17. Frequency of road accidents before construction of tarred road



According to Maina, the impact of traffic, loading, ageing and severe weather conditions such as floods and rain will steadily degrade the condition of roads (Bikam, 2019:1-9). Inadequate road maintenance leads to frequent road accidents and vehicle

repairs (Karani, 2007:1-9). The gravel road of the village under study was in a poor condition, full of potholes and generating a disproportionate amount of dust. This explains the majority of respondents (58%) having an accident about once a year. As many as 10% of respondents indicated that they were involved in accidents about every six months, while a lucky 32% had been accident-free.

3.18. Frequency of road accidents after the implementation of tarred road.

Tarred roads have been associated with an increase in the accident rate due to the comfort of driving experienced by drivers, leading them to drive faster than before (Ohira & Takanashi, 2008:5-9). However, none of the residents had seen an accident since the tarred road had been constructed.

4. Road quality

4.1. The quality of tarred road provided in the village: responses to the statement that “The quality of the tarred road is good”.

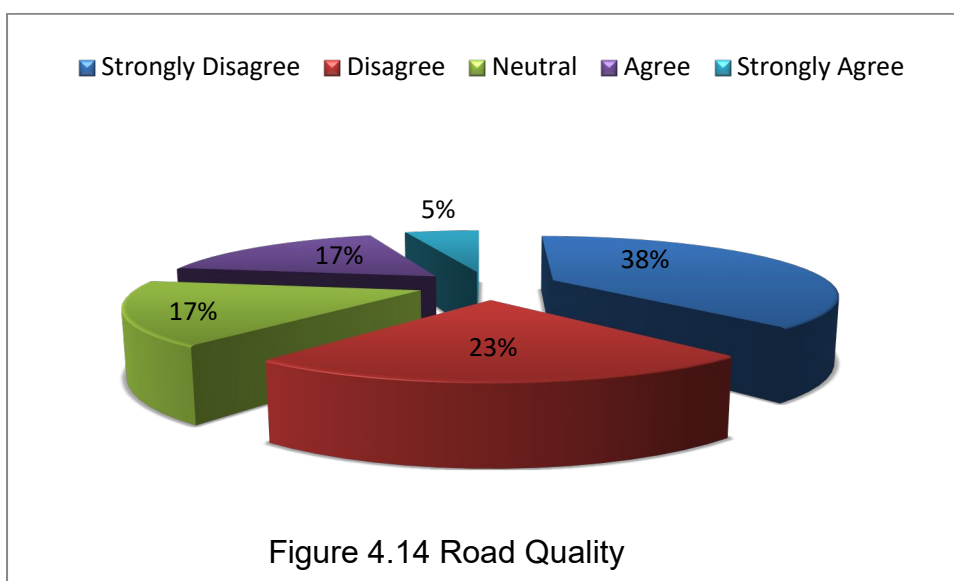


Figure 4.14 above illustrates the quality of the tarred road as the local residents perceive it. According to Mamabolo (2013:15-20), the quality of road infrastructure remains a challenge in most rural areas because the road accident record is still high in South Africa. The researcher therefore investigated the perceived quality of the newly tarred road in the village, in order to obtain accurate information on its sustainability and the satisfaction of residents. As depicted in this figure, 61% of residents are not satisfied with the quality of the tarred road delivered by the Municipality and are of the opinion that the road is not going to be sustainable. On the other hand, approximately 22% of respondents are pleased with the quality of the road, while the remaining 17% could not clearly express their views in this regard.

4.2. Road Maintenance: responses to the statement that “The municipality maintains the road in good condition”.

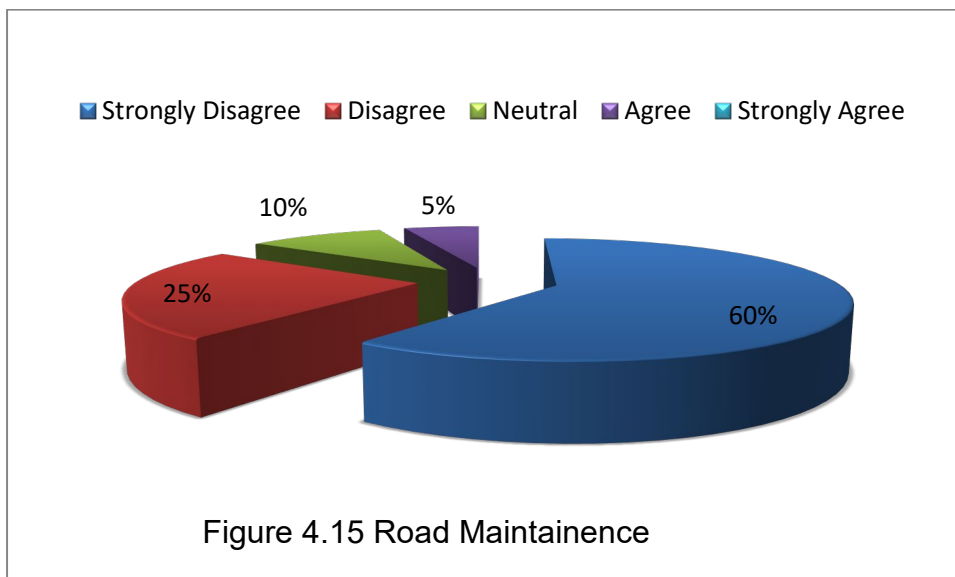


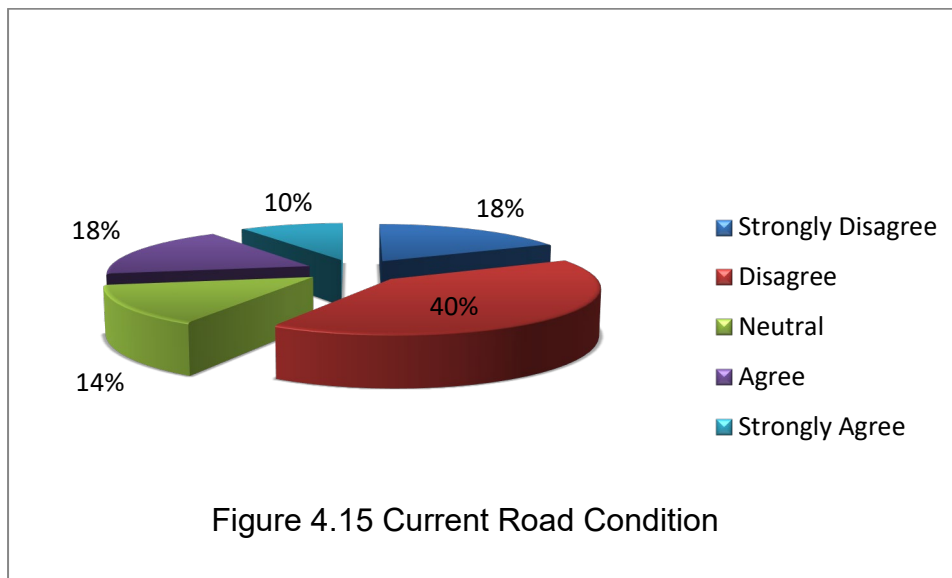
Figure 4.15 portrays perceptions of the municipality's road maintenance in the village under study. The researcher sought to gather information on how the municipality was performing in ensuring that the roads remained in good condition and were accessible

to village residents. If roads are not regularly maintained, they become damaged and impassable (Hine et al., 2016:3-9). According to this statistic, the majority of respondents (85%) agreed that the municipality did not maintain the roads in their village (the previous gravel road was not maintained regularly, so access on this road was difficult, and since the tarred road was built, it has not been maintained). However, 30% of respondents thought that the municipality was routinely engaged in maintaining the roads, while 10% were unsure.

4.3. Current road condition

As noted by Blöndal (cited in Ferf et al., 2014:10-18), it is anticipated that roads will have a positive impact on the livelihood and social and economic wellbeing of citizens in the neighbourhood. This study explored the current status of the tarred road provided by the local municipality to the village to obtain accurate information and to find out whether the condition of the road was affecting the livelihood of local residents.

Responses to the statement: “The current condition of the road is good”.



According to Figure 4.16, 58% of respondents are not satisfied with the current condition of the tarred road. Respondents pointed out that the road was unfinished and drivers were attempting to use the road regardless of its faults, posing a danger to pedestrians and to their vehicles. Twenty-eight per cent of respondents believed

that the road was in good condition and were satisfied with it. As many as 14% remained neutral, unsure of whether the road condition was satisfactory or not.

5. Socio-economic activities

5.1. The tarred road has resulted in economic benefits to the community

Road infrastructure has been shown to be capable of reducing poverty, affecting the livelihoods of local residents through increased market access and lower-priced transport (Ferf, Hilhorst & Mashanda, 2014:10-18). The research study conducted by Intermediate Technology Transport in the Philippines found a relationship between access to social and economic services and income level: improved access to markets ultimately raised household income (cited by Booth et al., 2000:1-33).

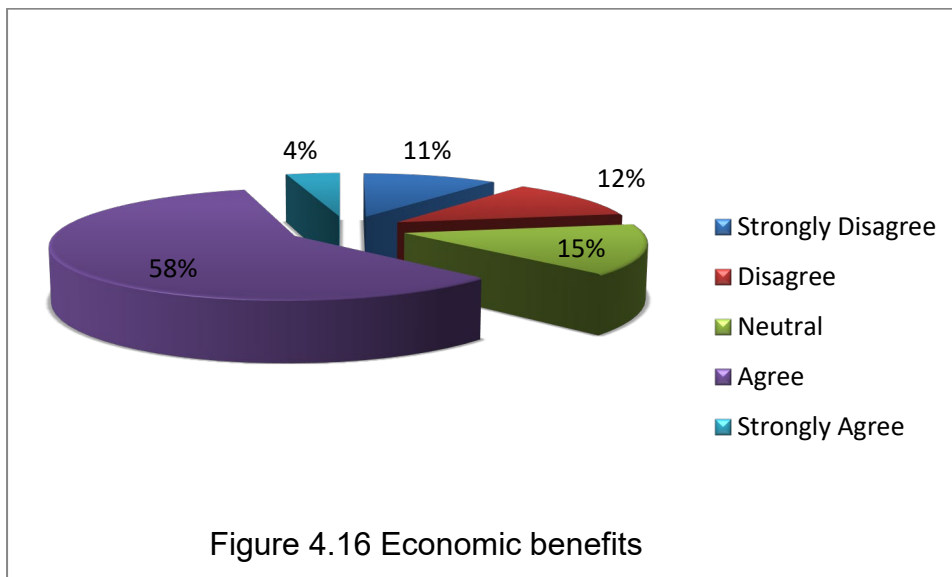
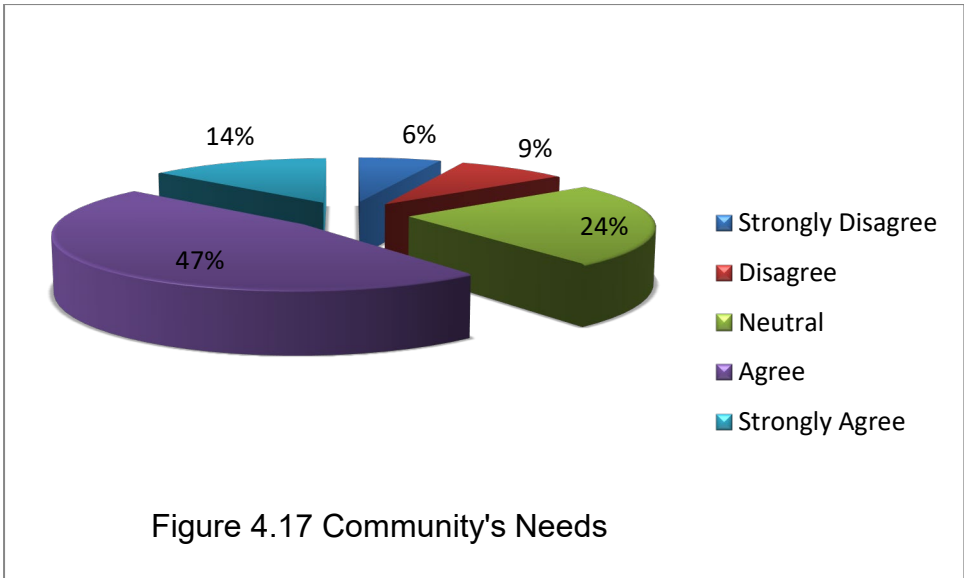


Figure 4.16, above, presents the results from the question about economic benefits accruing from the tarred road. A majority of respondents (62%) acknowledges that the tarred road benefited them economically, while others (23%) disagreed that the intervention had had an economic impact on their livelihoods. The remaining 15% were not sure whether they had benefitted economically from the tarred road.

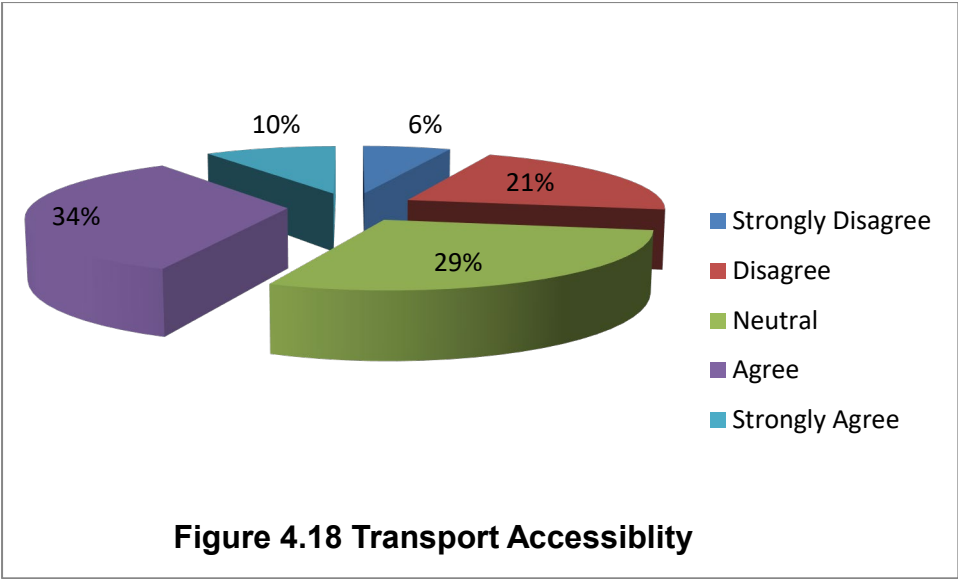
5.2. The project provides for the needs of the community.



This question was posed in order to analyse the perceptions of local residents regarding the extent to which their expectations of the tarred road were being met. As shown in this figure, the vast majority of respondents (61%) believe that the tarred road has met their community needs. Some of the respondents indicated that their initial problems (dust, mud and transport) had been resolved by the tarred road. The statistics also show that 15% of respondents were not satisfied and believed that the road had not met their needs as a community. As much as 24% of the respondents were undecided on the issue.

5.3. Access to Transport

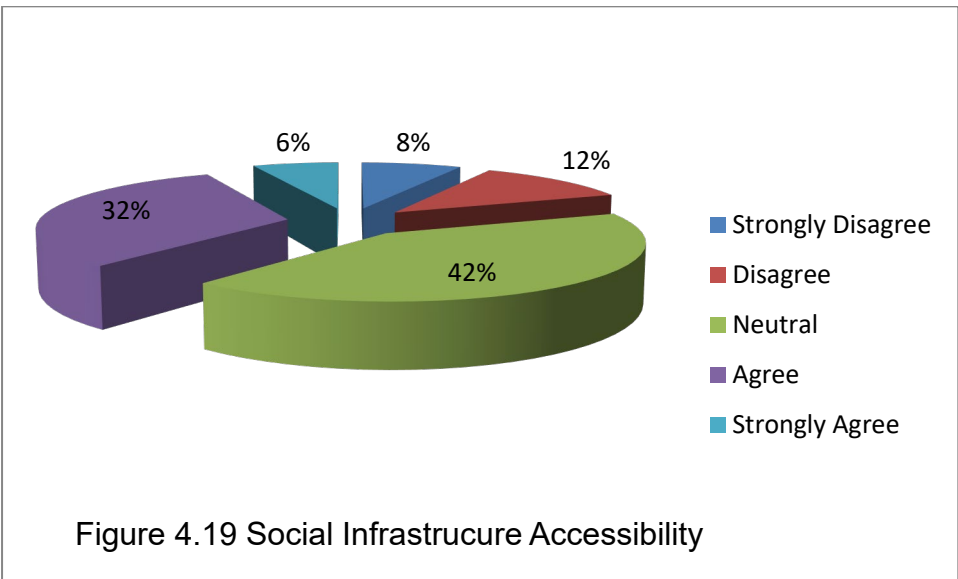
According to Starkey and Hine (2014:14-22), effective transport infrastructure is a necessary condition for economic growth and sustainable development. Residents of the village under study reported that the gravel roads were extremely difficult to access during rainstorms, making public transport scarce and unreliable. Figure 4.18, below, shows the perceptions of residents regarding the accessibility of public transport since the tarring of the road to their village:



The figure above indicates that 44% of respondents think that the tarred road has enhanced the accessibility of public transport, while 27% are still dissatisfied with the accessibility of public transport. A high 29 per cent of respondents were unable to give their views on the matter.

5.4. Access to government facilities

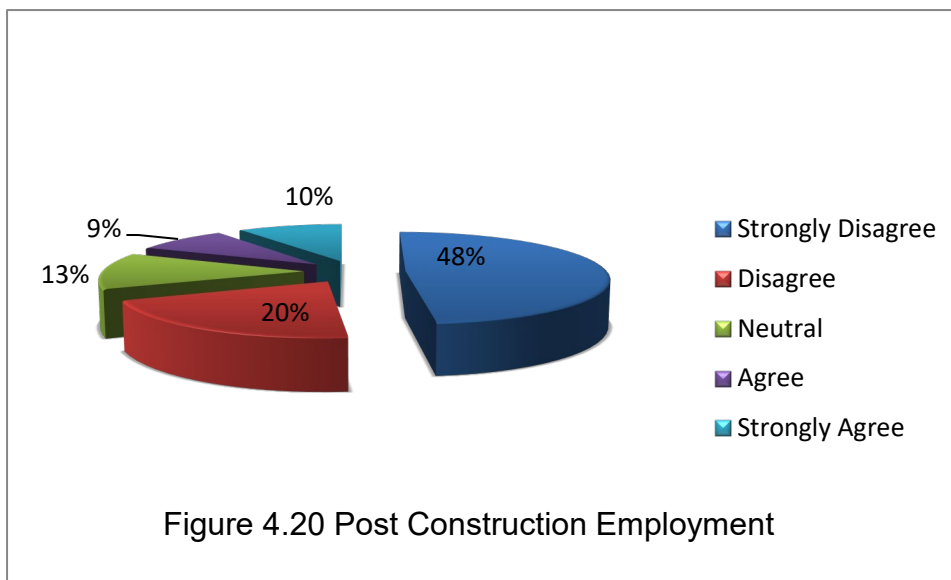
Numerous scholars have connected newly constructed roads with increased access to public infrastructure (Van de Walle; Booth et al.; Musekene, and many others). The figure below outlines the findings regarding access to social infrastructure by local residents now that they have a newly tarred road in their village:



This figure (Figure 4.19) above depicts that a large number of respondents (42%) were unable to offer a definite opinion on their access to social infrastructure. Meanwhile, 38% were confident that their access to social infrastructure had improved significantly from the previous situation, including the availability of ambulances in emergencies. Very few respondents (14%) claimed that there had been no change in access to social services.

5.5. Employment after the construction of tarred road

Figure 4.20, below, presents the findings on the employment of residents following the construction of tarred roads:



According to the above figure, 68% of the respondents indicated that residents did not gain any kind of employment after the tarred road had been constructed. The respondents also indicated that they expected to be employed in the maintenance of the road or other road-related jobs. Approximately 19% of respondents agreed that some residents were employed after the construction of the tarred road, while 13% of respondents did not have a definitive opinion as to whether or not residents had got more work after the intervention.

5.6. Improved social lives

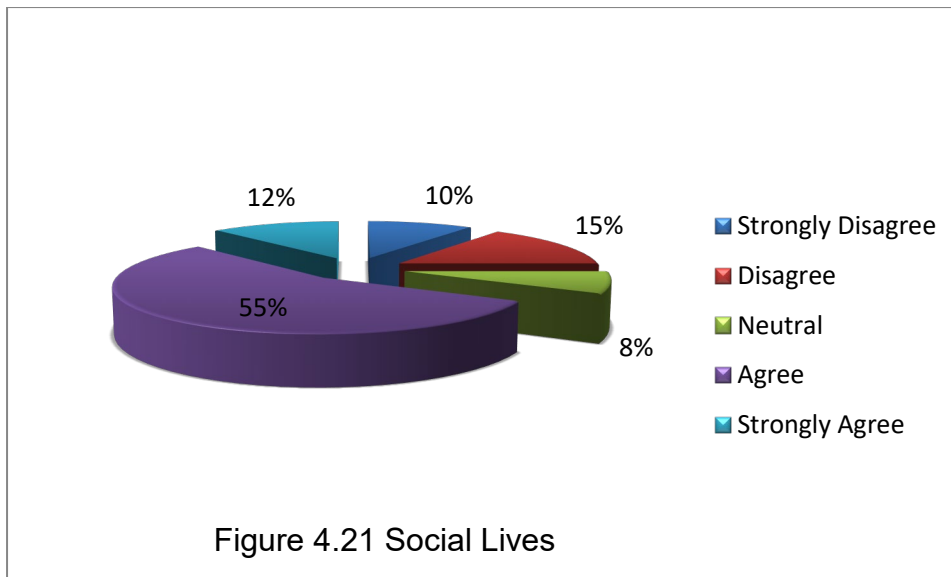
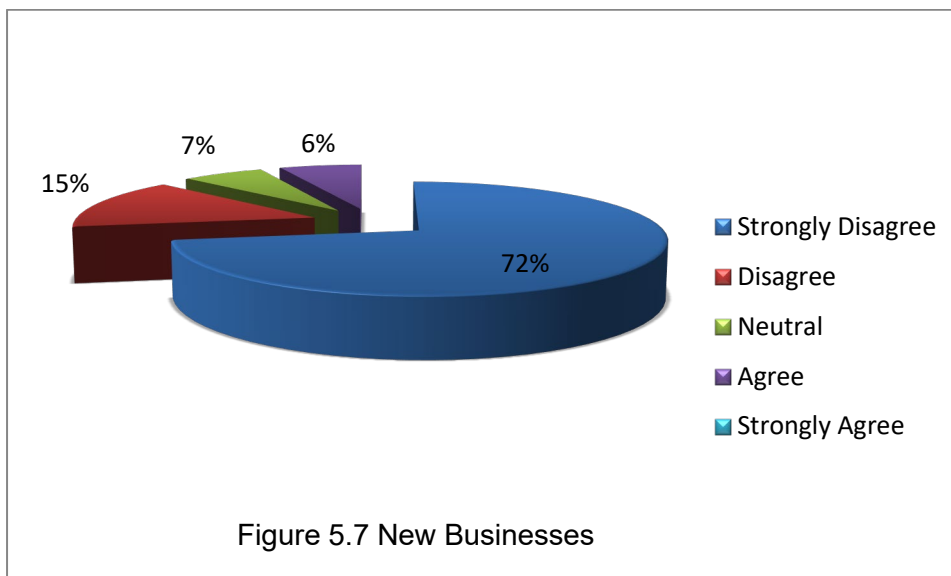


Figure 4.21 above indicates that the majority (67%) of respondents observed a shift in their social lives after the tarred road was constructed. The respondents mentioned that they could now visit their relatives in other cities, and could go out at any time irrespective of weather conditions. Others even said that they could now participate in enjoyable activities. Only 25% of respondents felt that the new road had had little impact on their social lives, while 8% had no definite opinion to offer.

5.7. New businesses established



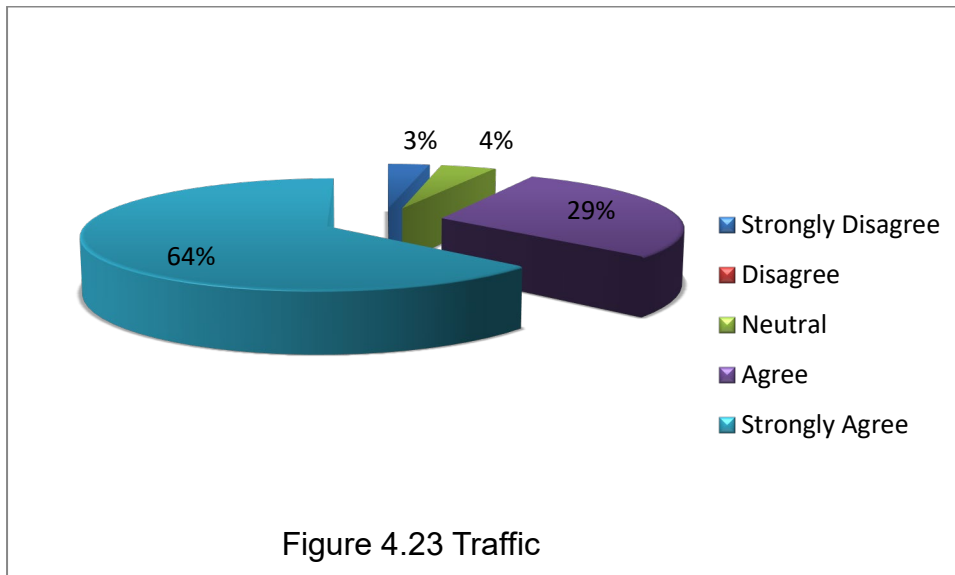
As Van de Walle (2008:15-20) points out, one of the medium-term effects of road construction is the emergence of new businesses in the area. The researcher therefore sought the views of the respondents on the emergence of businesses in the

village since the road was upgraded to tar. According to Figure 4.22 above, the highest percentage of respondents (87%) reported that there were no new businesses in the village, while 22% were not sure. The remaining 6% of respondents were confident that new businesses had emerged in the village.

6. Safety and Traffic

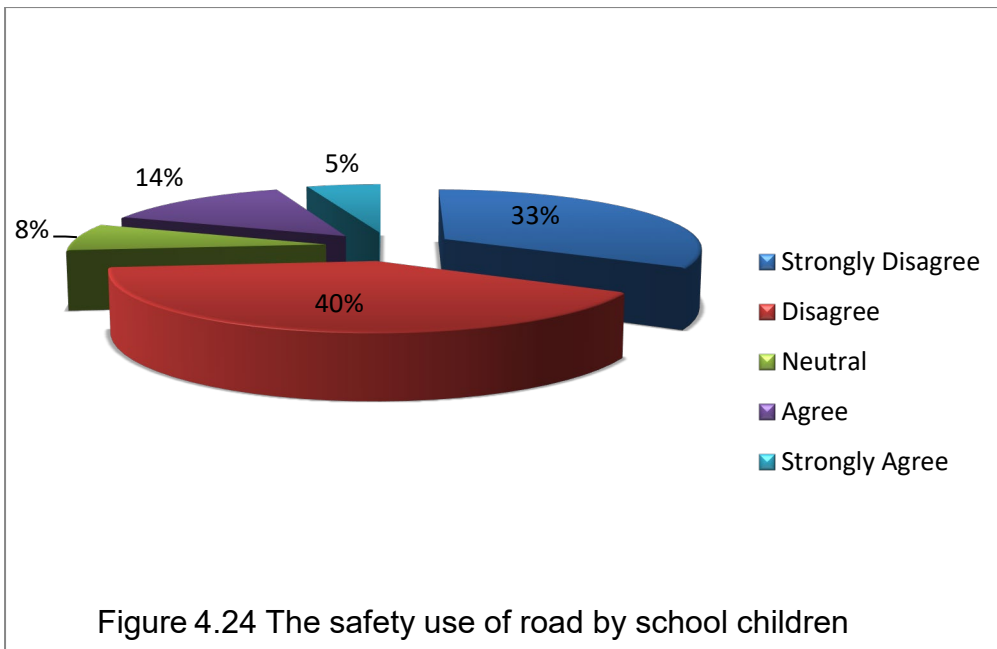
6.1. Increased vehicle traffic

A reduction in vehicle running costs (owing to a better road surface) could lead to increased traffic (Norman, 2013:5-11). This question was posed to explore the perceptions of village residents about the movement of vehicles and how this might be affecting their livelihoods. Figure 4.23, below, shows the findings on vehicle flow after the road had been upgraded to tar.



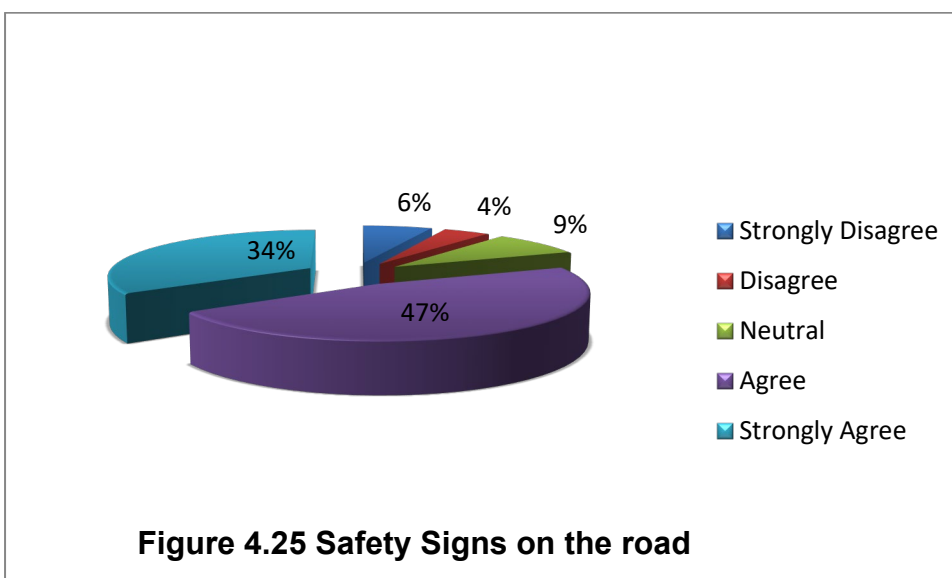
As depicted in Figure 4.23 above, most respondents (93%) acknowledged that the number of cars on their roads had increased significantly. They also noted that the number was growing even higher during the festive season. This seems to indicate that the road has had a positive impact on residents' well-being by improving road accessibility at any season and reducing vehicle running costs. Only 4% of the respondents were indecisive, and a mere 3% thought that the number of cars using the road had not increased.

6.2. The safety use of road by school children



The above figure presents the findings on the safety of school children using tarred roads. According to these results, 63% of the respondents agreed that making use of the road without guidance was not safe for young schoolchildren, who needed an older student or adult to help them cross the road. Approximately 19% of the respondents thought that making use of the road was safe for school children, and 8% of respondents were unable to say either way.

6.3. Safety signs on the road



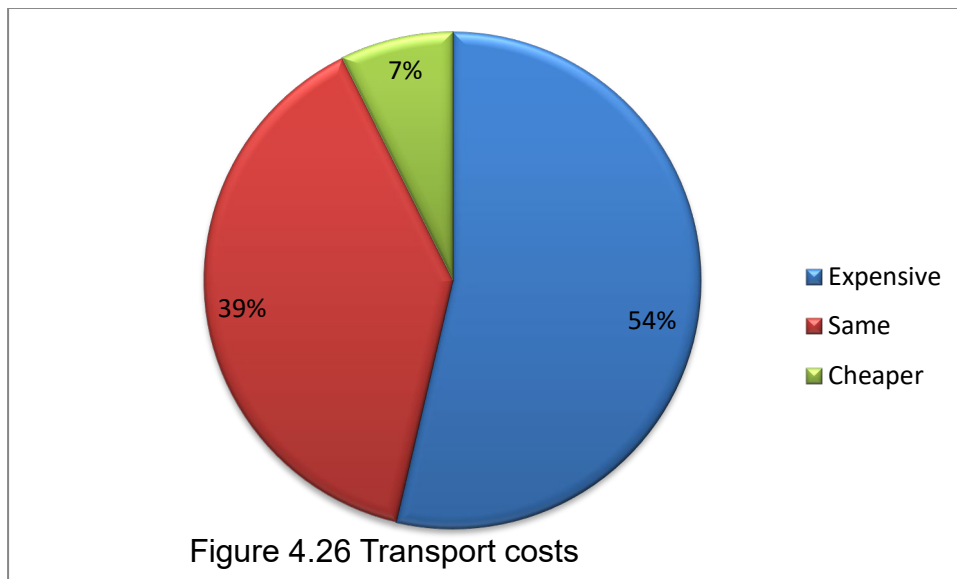
The above figure indicates that respondents were satisfied with the safety signs on the tarred road, with 81% of them agreeing with the statement. Some respondents (10%) disagreed, claiming that safety signs were missing or wrongly located, which could lead to accidents. The remaining 9% of respondents felt unable to answer this question objectively.

- 6.4. The researcher identified issues faced by residents before the construction of the tarred road. This information was collected from the respondents in order to judge whether or not their issues have been resolved.
 - a. Multiple accidents
 - b. Mud
 - c. Potholes
 - d. Lack of service from the municipality
 - e. Lack of transport
 - f. Lack of place to exercise
 - g. Rape
 - h. Inability to access ambulances
 - i. Could not go to school
 - j. Inability to access government facilities

- 6.5. According to the respondents, the development of the tarred road has resolved the problems they had with dust, potholes and mud. In addition, walking from their home to the nearest town is now safe for residents, and emergency services are easily accessible.

- 6.6. The researcher posed this question (What are main challenges of driving in this new road (Motor vehicles owners only) to explore the challenges faced by residents with vehicles. The vehicle owners indicated that the level of the tarred road was too low, so that when it rained, the road became impassable with sand and water flowing onto it. Vehicle owners revealed that some of the speed humps and bridges were incomplete, some of the safety signs did not correspond to the road lines, and the roads had already begun to crack.

6.7. Transport costs comparison before and after the construction of tarred road



Previous studies such as Robbins and Tran (2015:8-13) have identified a relationship among tarred road construction, vehicle operating costs and transport costs. That is why the survey investigated this aspect. According to the above statistics, 54% of respondents are of the opinion that transport costs are still high, or have become higher, while 39% claimed that the price of public transport had not changed since the road had been tarred. A further 7% were not sure about this.

7. The researcher probed the question of the future of the village (What do you think the village will be in the next 5 years) to gather information on how residents see the future of their village. Respondents gave varying views on this issue. Several respondents did not see any hope for the village; they believed that the road would be damaged within five years and that there would be no follow-up. Other respondents believed that transport issues would eventually be resolved, that new businesses would emerge (creating job opportunities) and that the lives of residents would be improved.

CHAPTER 5: SUMMARY OF FINDINGS AND DISCUSSIONS

In this chapter, the results presented in the previous section are summarised and discussed.

Transport

The findings of this study revealed that the most commonly used public transport in this village is the taxi, followed by buses, with a few residents utilising their own vehicles (cars, motorcycles and bicycles). According to Lu et al. (2018:17-26) and Venter (2011:125-130), transport costs can be affected by the quality of infrastructure, and there is a substantial body of literature indicating a decrease (by up to 70%) in transport costs due to improvements in transport infrastructure. Nevertheless, residents revealed that the cost of transport is still a major concern in the village.

According to the residents, the majority of issues such as dust, mud, vehicle operating costs, etc., have been solved. But a major remaining concern with transport is the cost. The findings of this study reveal that transport is considered expensive because there are no taxis operating directly between their village and town; locals need to take two taxis in order to get to town, which increases the fare. High transport costs can compromise the ability of poor households to access services they need to sustain or improve their livelihoods, which can translate into improved living conditions (World Bank, cited by Venter, 2011:125-130). Residents had hoped for a good transport system with low or affordable transport fares, and the high fares currently being charged are an expense they can hardly afford. Transport affordability is of the utmost importance in the context of market access, access to schools and emergency services, social infrastructure, economic growth and households' financial wellbeing (Porter, 2014: 29-33). High transport costs may compel residents to walk from their respective villages to the nearest town, from one village to another and from their villages to school, which places an additional burden on them and their families.

Road quality

This study has found that the quality of the road is not satisfactory to the residents. Residents mentioned that the road had cracked, bridges, speed humps and kerbs had not been completed, and the road had been built too low, so that sand washed over it on rainy days. These challenges can negatively impact the community as a whole;

they pose a threat to safety and may lead to accidents. A study by Haulle and Kisiri (2016:256-260) concluded that road accidents were a consequence of poor infrastructure, legal impunity, ineffective regulation, incompetence and negligence by drivers, lack of road safety education and road signs, overloading of vehicles and corruption. In addition, poor quality road engineering can directly cause an accident, particularly when certain elements of the road environment mislead a road user and lead to human error (Ahmed, 2013: 20-23).

In the case of the community's livelihood, road accidents can lead to injury, job losses and mortality. Gebru (2017:18-22) notes that road traffic accidents often result in a serious burden on the livelihood of victims and their families; their income is negatively affected, particularly when the family loses a breadwinner or has to care for someone disabled due to a road accident.

Socio-economic activities

The vast majority of residents were very positive and satisfied in terms of their access to socio-economic activities since the construction of the tarred road. Public transport may be an issue, but those with vehicles are now able to travel at will. Further, the road has improved access to other villages and the nearest town in terms of safety. That is, the bush has been cleared and it is now safe to walk from one village to another. Access to emergency services has also improved, the residents indicating that ambulances can reach them in any weather conditions. Moreover, residents specified that their ability to socialise with their friends from other villages has now improved; they can visit each other at any time without stressing about mud and dust. Others indicated that their ability to exercise (to go jogging in particular) had improved.

Many residents anticipated some sort of employment after the construction of the tarred road, but according to the results of the study, such a situation did not materialise. This is contrary to the findings of the research study by Musekene (2010:38-44), which reported that jobs are created not only during the execution of the project but also through the maintenance and operation of the road after its completion.

As Van de Walle (2008:15-20) points out, one of the medium-term effects of road construction is the emergence of new businesses in the area. As a result, the researcher explored the views of the respondents on the emergence of businesses in

the village since the road was upgraded to tar. According to the majority of the respondents, there are no new businesses in the area as a result of the intervention. Some respondents pointed out that there were a few car wash businesses on the side of the tarred road, but these were only profitable during the festive season. There is, however, a Home Affairs office that has been established since the road was tarred. This will add to the employment rate of the community as the researcher believes that employees will be sourced from the nearest villages, including the one under study.

Safety and traffic

Questions were asked about the safety of residents who use the new road. An increase in traffic has been noted, with a greater flow of vehicles during the festive season. The road has permitted vehicle owners to use the road at any time and in any weather conditions and has also reduced the operating costs of vehicles. As several residents indicated, there are missing and wrongly located safety signs, which may pose a danger to schoolchildren crossing and walking on the road. Children at primary school level may need a senior person to assist them to cross the road. There is no pavement or pedestrian path, so it is crucial for learners to be very cautious and vigilant when walking on the road to school.

Bad roads

From the findings presented in the previous chapter, the study found evidence of the influence of poor roads on the livelihoods of community members in the village of Malamulele. Roads were not accessible during rainy days and people were therefore unable to access transport. The maintenance and operating costs of vehicles were high and raised the cost of public transport. Bad roads not only affected fares and accessibility, but also the health of community members, which was at risk due to the enormous amount of dust created by road vehicles. Dust is commonly associated with health problems such as asthma, hay fever and hypersensitive pneumonia. Maintenance of the gravel road by the local municipality was poor.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

Upgrading the gravel road to tar has brought many improvements to the community, but according to the results shown in Chapter 5, the results have not been as positive as expected by the residents. The residents anticipated some sort of employment, the development of shops and pedestrian walks, social facilities such as gymnasiums, a library and, finally, cheaper transport. There is no question, however, that the tarred road has brought benefits to the Malamulele area of the Vhembe district. Greater benefits might have ensued had other investments been made in tandem with the road infrastructure project.

Positive effects of the tarred road

The introduction of the tarred road has greatly improved the socio-economic conditions of the community members. Examples can be taken from the results of the study, such as increased physical activity like jogging, small transport related business, access to roads in any weather condition, protection in terms of walking from one village to another and the introduction of social infrastructure such as a branch of the Department of Home Affairs. Transport is available at any time of the day and the dust has been minimised. Car owners spend less on repairs and running expenses. Also, the tarred road has contributed to a reduction in travel time.

Local members also mentioned that they can now walk from their respective village to the nearest town and visit their relatives from other villages. Others have reported that it is now easier to go out to meet friends and that emergency services are on call.

Negative impact of the tarred road

Transport fares have increased, partly because there is no direct commuter omnibus to the central town (refer to Figure 4.18). The extra distance to central town is about 50km. Residents have also noticed a lack of some road signs, which could pose a danger to schoolchildren and others crossing the road. The road has incomplete bridges and speed bumps and has not been maintained since its “completion.” The residents also noted the poor quality of the road. They stated poor drainage and high susceptibility to flooding during rainy days making travelling difficult.

Recommendations

The current government and other decision-makers need to implement innovative policies on road infrastructure in the district to accelerate the appropriate growth that the district deserves. The Government must always review reports (such as post-project evaluations, monitoring and evaluation reports) so as to verify if the initiatives being undertaken are being carried out correctly and to ensure that the evaluation of standards is the number one priority. Government planning departments should give priority to investment in road infrastructure in rural areas, as this is where the plight of the disadvantaged. This enhances their access to markets and service, thus, lowering transport costs and promoting economic development. The appropriate bodies responsible for road infrastructure planning, development and maintenance should concentrate on converting existing gravel roads to tarred roads, since many roads (about 90%) are still unpaved. Even though new roads are being built, it is also crucial that existing road infrastructure should be well maintained. Failure to do so reverses the benefits of the initial investment over time. It is hoped that the adoption of these recommendations will go some way towards advancing the national transportation system and contribute to bolstering the national economy, thus ensuring that citizens' livelihoods are improved.

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ANNEXURES

Annexure 1 Consent letter from Collins Chabane Municipality



Enq: Mabasa J
Cell: 079 892 8130

Private Bag X9271
Malamulele
0982
Tel (015) 851 0110
Fax (015) 851 0097
11 December 2019

Greetings

I would like to acknowledge receipt of your email dated the **5th December 2019**. Permission to conduct research on the Xikundu ring road is hereby granted.

Regards

X 
Mabasa J
Ward 28 Councillor

Annexure 2 Questionnaire survey

QUESTIONNAIRE SURVEY INVITATION

You are invited to a research survey – A post project evaluation of tarred road project on the livelihood of local residents: case study of Malamulele region in Vhembe District

Dear Participant

You are invited to participate in a research study titled: **A post project evaluation of tarred road project on the livelihood of local residents: case study of Malamulele region in Vhembe District**. This study is being conducted by Basani Hlungwani and the Department of Project Management at Cape Peninsula University of Technology. The purpose of this study is to determine the impact of the tarred road project on the livelihoods of local residents

In this study, you will be asked to complete a questionnaire survey. Your participation in this study is voluntary and you are free to withdraw your participation from this study at any time. The survey should take only 10-15 minutes to complete. This survey has been approved by the Cape Peninsula University of Technology Higher Degree Committee. There are no risks associated with participating in this study. The survey collects no identifying information of any respondent. All of the response in the survey will be recorded anonymously. While you will not experience any direct benefits from participation, information collected in this study may benefit the profession of project management in the future by better understanding the impact of upgrading gravel roads to tar.

By completing and submitting this survey, you are indicating your consent to participate in the study.

Your participation is appreciated.

Thank you

Basani Hlungwani

MTech Candidate at Cape Peninsula University of Technology



QUESTIONNAIRE

SECTION A. BIOGRAPHY

Please cross the appropriate box.

Screening questions

How long have you lived here

(If less than 5 years – do not complete questionnaire)

1. Gender

Female	Male
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2. Age

18 – 25 years	26 – 35 years	36 – 45 years	46 – 50 years	55+ years
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3. For how long did you wait for implementation of tarred road project?

Years Months

4. Do your daily activities require you to use the vehicle?

Yes	No
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5. If yes to question 6, what means of public transport do you or your family members use on daily basis?

Taxi	Bus	Bakkie	Own transport
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6. If yes to question 6, how long does it take you to get public transport?

Minutes Hours

7. How long did it take you to get transport prior to the construction of tarred road?

Minutes Hours

8. Are you employed?

Yes	No
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9. If yes, did your employment happen before or after the tarred road project?

Yes	No
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10. Was your employment the result of the recent development in your area?

Yes	No
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11. Are there any new activities in the community that were not there before the project?

Yes	No
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12. If yes, would you relate these new activities with the recent development of tarred road?

Yes	No
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13. Do you own a vehicle? (motor, bicycle, motorbike, etc.)

Yes	No
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14. If yes on Question 13, how often do you drive or use the road?

Daily	Once in a weekly	Once in a month
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15. How much did you spend on your car maintenance before the construction of tar road?

R200 and less	R300	R400	R500 and more
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16. How much do you now spend on the maintenance of your car?

R200 and less	R300	R400	R500 and more
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17. Have you encountered accidents on the road?

Yes	No
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18. If yes, how many have you seen so far?

1	2	3	4	5 and more
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SECTION B

Please indicate your level of agreement to each of the following statements by crossing the most applicable option.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Socio-economic activities					
I am satisfied and happy with the construction of tarred road	1	2	3	4	5
I can now access public transport with ease	1	2	3	4	5
I easily access government facilities	1	2	3	4	5
Many community members have gotten jobs after the tarred road has been constructed	1	2	3	4	5
My social life has improved since the project has been implemented	1	2	3	4	5
There are new businesses in the community because of the improvement of the road	1	2	3	4	5
The tarred road has improved our living standards	1	2	3	4	5
The service rendered by the local municipality is good	1	2	3	4	5
Safety and traffic					
There is an increase in number of cars on the new road as compared to before	1	2	3	4	5
It is safe for children to walk on the tarred road when going to school	1	2	3	4	5
Safety signs and traffic control signs are in place	1	2	3	4	5

SECTION C

Please indicate your level of agreement to each of the following statements by crossing the most applicable option.

Community Involvement in the project	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The project has benefitted the community	1	2	3	4	5
The project provides for the needs of the community	1	2	3	4	5
The community was involved during initiation of the project.	1	2	3	4	5
The tarred road project improved the quality of lives in the community	1	2	3	4	5
Most of the community members were employed to work on the project	1	2	3	4	5
Road quality					
The road provided by the municipality in your village is of good quality	1	2	3	4	5
The municipality maintain roads on a regular basis	1	2	3	4	5
The tarred road was well planned	1	2	3	4	5
The tarred road resulted in economic benefits to the community.	1	2	3	4	5
The current status of road provided in your village is good	1	2	3	4	5
The previous road (gravel) was in good condition and maintained regularly	1	2	3	4	5

SECTION D

GENERAL QUESTIONS WITH REGARDS TO THE LIVELIHOOD OF RESIDENTS BEFORE AND AFTER TARRED ROAD PROJECT.

1. What can you do now that you could not do then when there was still a gravel road?

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2. What issues were you facing before the tarred road was constructed?

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3. How were the issues resolved?

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4. What were your expectations from tarred road project?

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5. Were your expectations met?

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6. What are main challenges of driving in this new road? (**Motor vehicles owners only**)

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7. Does the tarred road have an impact on your social lifestyle?

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8. If yes, in what way?

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9. How would you compare the transport costs now as before the construction of the road?

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10. What do you think the village will be in the next 5 years?

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End of questionnaire

Thank you for your valued assistance