THE ESSENCE OF ANNUAL STATISTICS ON ROAD INFRASTRUCTURE DEVELOPMENT AND MAINTENANCE OF LOCAL AUTHORITIES IN NAMIBIA: A CASE STUDY OF THE ONGWEDIVA TOWN COUNCIL

A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF PUBLIC ADMINISTRATION

OF

THE UNIVERSITY OF NAMIBIA

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APRIL 2024

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ABSTRACT

The study was based on the influence of annual statistics on road infrastructure development and maintenance of the Ongwediva local authority in Namibia. The study was unique in its nature as it primarily focused on questioning why there were no national annual statistics on road infrastructure development and maintenance in relation to the road infrastructure under the jurisdiction and management of local authorities in Namibia. The study, used mixed research methods in which questionnaires and interview guides were the research instruments used for data collection. The targetted sample size for the study was 30 respondents, and snowball and judgmental sampling techniques were used in the process of selecting research participants. The quantitative data was presented and analysed with the use of charts and frequency tables while the qualitative responses were presented verbatim. The study found that 86% of the research participants were not satisfied with the road infrastructure development and maintenance of Ongwediva. It further found that 100% of the research participants concluded that collecting annual statistics is a positive initiative. However, the study also found that collecting annual statistics is costly. The study recommends that statistics are critical and very useful to assess and inform policies and projects. Hence, proper planning for developing and maintaining road infrastructure is vital. The study recommends that local authorities should adopt a strategic plan to address the disparity in road infrastructure development and maintenance between each local authority's central business district and its less used roadways. The study further recommends that it is essential to conduct yearly reviews of the Local Authority Act to ensure it remains aligned with the evolving demands of the global village.

KEY WORDS: *Annual Statistics, Road Infrastructure, Local Authority*

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List of Acronyms and Abbreviations

AICD	Africa Infrastructure Country Diagnostic
ALAN	Association of Local Authorities in Namibia
ARMFA	Africa Road Maintenance Fund Association
CEO	Chief Executive Officer
DFIs	Development Finance Institutions
EU	European Union
GDP	Gross Domestic Product
GVM	Gross Vehicle Mass
HHP II	Harambee Prosperity Plan II
NDP4	National Development Plan 4
NSA	Namibia Statistics Agency
ORC	Oshana Regional Council
OTC	Ongwediva Town Council
PCE	Project Control Engineer
PSIP	Public Sector Investment Programmes
RA	Roads Authority of Namibia
RE	Regional Engineer
RFA	Road Fund Administration
SADC	Southern African Development Community
SDG	Sustainable Development Goals

SOEs	State Owned Enterprises
UK	United Kingdom
UNAM	University of Namibia
USA	United States of America
WBM	Water Bound Macadam
WEF	World Economic Forum

ACKNOWLEDGEMENTS

My appreciation goes out to the following people and institutions that supported me towards the completion of this study:

Firstly, I am thanking God Almighty for always being by my side up until this point and for giving me the ability, courage, strength and wisdom to complete this study.

I also wish to acknowledge and express my cordial gratitude to my father (Mr. Frans Vatileni Mbidi) for funding my Masters of Public Administration. Without his financial support, this thesis would not have been possible.

I express my deepest appreciation to my supervisor Dr Sitali Brian Lwendo for the excellent supervision, guidance and academic support rendered to me in completing this study; your honest and prompt responses during the process of this study were extremely helpful.

To my family members, especially my mother (Martha Kafute Sheetekela), thank you, for your support and prayers. To all my friends, thank you, for all your sacrifices.

I would also like to thank the Ongwediva Town Council, Oshana Regional Council, Namibia Statistics Agency, Namibia Construction, Nexus Group, Shange Civils, Roads Authority, and the residents of Ongwediva for providing me with valuable information for this study, thank you and God bless you all.

I finally want to register my thankfulness to all of you, without your sincere participation this study, which was based on the essence of annual statistics on road infrastructure development and maintenance of local authorities in Namibia: a case study of the Ongwediva Town Council, would not have been a success.

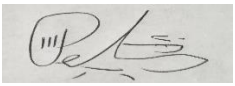
DEDICATION

This study is dedicated to my family for having stood by my side during my academic journey. I want to single out my parents, my mother Martha Kafute Sheetekela for her prayers and guidance, and my father Frans Vatileni Mbidi for being a true believer in what I strive to achieve academically and for always pushing me to attain an education.

This study is also dedicated to my close friends for advising me to make my studies a priority, your immeasurable love is a blessing to me.

DECLARATIONS

I, Petrus Ndeumono Mbidi, declare that this thesis is a result of my research investigation and findings unaided. Sources of information other than my own have been acknowledged and referenced accordingly. This work has not been submitted to any other university for another degree award.



Signature

April 2024

Date

CHAPTER ONE

INTRODUCTION AND BACKGROUND OF THE STUDY

1.1 INTRODUCTION

Public institutions are required to submit an annual report to shareholders outlining their operations and financial standing (Hayes, 2022). On the other hand, the collection, description, analysis, and drawing of conclusions from quantitative data are all tasks that fall under the purview of statistics, a branch of applied mathematics (Chappelow, 2023). The use of statistics is to analyse data, draw conclusions, and make predictions (Frost, 2022). Statistics is a critical component of scientific discovery in which individuals can comprehend a topic considerably more thoroughly due to statistics (Frost, 2022). This chapter introduces the study. Specifically, the chapter presents the background of the study, statement of the problem, research questions of the study, significance of the study, limitations and the delimitations of the study. The chapter also provides the outline of the thesis.

1.2 BACKGROUND OF THE STUDY

In the year, 1990 Namibia gained its independence from South Africa and became an independent nation. The independence of Namibia paved the way for the country to establish public institutions and agencies for effective governance. In 1992, the Namibian government through the legislative branch of government passed the Local Authorities Act which allowed for the establishment of local authorities and local government in Namibia. In line with the legislation on local authorities in Namibia, Ongwediva was

proclaimed as a town council in 1992. In the same year, the first Local Authority Council of Ongwediva was elected. Provision for local authorities in Namibia to exercise both operational and financial duties independent of the central government.

The Roads Authorities Act (Act 17, 1999) states that national roads networks development and maintenance is under the control and management of the Roads Authority of Namibia, logically implying that the development and maintenance of roads within a local authority's jurisdiction is under the control and guidance of various local authorities in the country. Ebatamehi (2018) postulate that Namibia is one of the African countries with the best national roads in Southern Africa and in Africa broadly. However, the same cannot be said about roads within the jurisdiction of local authorities in the country partially because there are no annual statistics presented on the local authority with the best road infrastructure development and maintenance.

In accordance with Act 17 of 1999, in 1999 the policy on road infrastructure in Namibia was passed with the mandate of managing the national road network of the country. Hence, the aim of the road infrastructure policy is to administer national roads that are managed and under the supervision of the Roads Authority and it does not cater for roads developed and maintained by local authorities. Thus, the study was based on the local authority of Ongwediva as the local authority is one of the fast-growing local authorities in Namibia and the level of development in terms of road infrastructure is on the rise. Therefore, the study was based on annual statistics on road infrastructure development and maintenance of local authorities, primarily focusing on the local authority of Ongwediva.

1.3 PROBLEM STATEMENT

There is a knowledge gap in terms of sufficient studies done on the subject matter of annual statistics on road infrastructure development and maintenance of local authorities in Namibia, as there were limited studies study done. Out of the few studies done, such as the study by Petrus (2020) that focused on roads infrastructure funding and financing in Namibia only addressed the relationship between the road generated revenue and its allocation towards the national road network expenditure. Other than the study by Nwagwara (2019) which focused on the assessment of the environmental impact of roads infrastructure in countries, a case study of Namibia, none of these studies touched on the influence of annual statistics on the development of a local authority. The limited availability of literature on the influence of annual statistics on road infrastructure development and maintenance of local authorities in Namibia, indicates that there was a knowledge gap and it opened doors for studies to be carried out.

The Roads Authority of Namibia only focuses on the national development of a road transport sustainability plan for the country, focussing only looking on national roads, and excluding roads of local authorities. Furthermore, the Roads Authority does not preside over the development and maintenance of roads within the jurisdictions of local authorities, unless a national road passes through. Currently, local governments need between N$10 million and N$20 million annually on average just for the upkeep of paved roads (Tendane, 2023). This does not include the creation of new roads or improvements like pavements and kerbs (Tendane, 2023). Moreover, there are no statistics regarding the local authorities in Namibia with the best road infrastructure, thus conducting this study was of great importance.

Namibia as a nation, does collect and provide annual statistics on the national road network and as a result, the national road network of Namibia can be comparatively equally critical to other countries of the world. Nevertheless, due to the researcher's observation and lack of annual statistics on road infrastructure development and maintenance of local authorities in Namibia, the country is unable to determine which local authority in the country has the best roads in terms of development and maintenance. Therefore, the study looked at recommending the adoption of annual statistics on the health of the road infrastructure in terms of the development and maintenance within local authorities, which was inclusive of ranking local authorities with the best road infrastructure in Namibia. The study was able to analyse the quality of road development and maintenance in the different areas within the local authority of Ongwediva.

Notably, there were other challenges that were interrelated towards addressing local authority road challenges such as funding or subsidisation by central government, cost recovery of basic services to cross subsidise road maintenance and development of local authorities, and decentralization challenges. This paper was only based on annual statistics as a critical element in the process of addressing the Ongwediva local authority road challenges.

1.4 RESEARCH QUESTIONS

Based on the research problem, the following questions were proposed:

1.4.1 What other factors that can influence the development and maintenance of quality roads at local authority level?

1.4.2 What sort of contribution can annual road statistics of local authorities in Namibia generate?

1.4.3 Why are there no annual statistics on road infrastructure development and maintenance of local authorities in Namibia?

The following research objectives were adopted for the thesis study:

1.4.4 To determine factors that can influence the development and maintenance of quality roads at local authority level.

1.4.5 Identify the contribution that annual road statistics of local authorities in Namibia can generate.

1.4.6 Present reasons as to why there are no annual statistics on road infrastructure development and maintenance of local authorities in Namibia.

1.5 SIGNIFICANCE OF THE STUDY

The research was of relevance because through conduction the research, the local authority of Ongwediva as well as other local authorities in Namibia, affected by similar problems are presented with possible solutions as to what can be done in order to solve the existing problems emphasized and elaborated in the research problem statement. Within the Namibian context, there is no literature on the local authorities with the best roads and the thesis sought to recommend the annual tabling of the local authorities with the best road because there must be some statistics on the road infrastructure of local authorities in Namibia.

Moreover, the study presented findings as to why annual statistics on road infrastructure development and maintenance are important for local authorities in Namibia. Lastly, the

study was able to add extra knowledge to the academic body of knowledge by opening doors to allow a study to be done on the essence of annual statistics of road infrastructure within local authorities in Namibia.

1.6 LIMITATIONS OF THE STUDY

The limitations of the study were that there are many stakeholders involved in the development and maintenance of road infrastructure on, which means that the researcher could not access all the stakeholders to represent the sample of this study and this might have affected the generalisation of the findings. Furthermore, a lack of access to classified information that cannot be shared with unauthorised individuals.

Of the research participants that were interviewed, many had a problem with speaking freely and honestly. The research participants' names were not recorded and stated in the thesis study, which ensured anonymity of the research participants.

A lack of time because of COVID-19 and a heavy workload did result in the cancellation and postponement of interviews by some officials and those were some of the limiting factors that were experienced during the process of collecting data for the study. Therefore, for the research participants to make time for interviews and prioritise the process of collecting data, the researcher presented the interviewees with a letter from the University of Namibia (UNAM) through his supervisor. The letter was able to prove and identify that the researcher was indeed a student conducting this study in fulfilment of the requirements of a qualification. As a result, the research participants were able to make room for the student to conduct interviews and collect data from them.

1.7 DELIMITATION OF THE STUDY

Namibia is said to be one of the few countries with extensively good road infrastructure. Due to a lack of sufficient time and lack of finances, this study was only able to place emphasis on road infrastructure development and maintenance in the jurisdiction of the town of Ongwediva.

1.8 THE STRUCTURE OF THE STUDY

This academic paper is made up of five key chapters as stipulated below:

Chapter One: Introduction and background of the study

Chapter one is an overview of the entire study. It looked at introducing the study, discussing the background of the study, the problem statement, research questions, significance of the study, limitation of the study, and delimitation of the study.

Chapter Two: Literature Review

Chapter two reviews the relevant literature in relation to the essence of annual statistics on road infrastructure development and maintenance of local authorities in Namibia, based on the problem statement and research questions highlighted in Chapter One. Chapter two also explains the significance of road development and maintenance. The chapter concludes with a discussion on various ways to overcome poor road development and maintenance.

Chapter Three: Research Methodology

This chapter contains the details as to the different research methods that were employed in the study and how the data was analysed. Furthermore, the chapter describes the mixed methods, population of study and the type of sampling strategies used to select participants from the targeted population. Additionally, the chapter further clarifies the processes of data collection and data analysis, and discusses the steps undertaken to ensure validity and reliability, and lastly the ethical considerations of the study are presented.

Chapter Four: Data presentation and analysis of the findings

The findings of the study are then presented and discussed in chapter four. This was inclusive of presenting the responses of the different research participants within the contexts in which they were discussed in relation to the reviewed literature in Chapter Two. The discussions are organised based on the themes and the research questions of the study.

Chapter Five: Summary, Conclusions and Recommendations

This is the final chapter of the study. It starts by summarising the findings of the study in proportion to the research questions. Afterwards, the chapter presents the study's major conclusions which focused on providing answers to the research problem. The Chapter concludes with various recommendations to address the research problem statement and research questions.

1.8 SUMMARY

This chapter was based at identifying key elements that relate to the influence of annual statistics on road infrastructure development and maintenance of the Ongwediva local authority in Namibia. The chapter explained that although there are many important variables that can affect the type of road being developed or the level of maintenance provided, the purpose of the thesis study was to investigate the potential influence that annual statistics may have on the road infrastructure of the Ongwediva local authority. Therefore, the chapter looked at the background of the study, problem statement, identified main research questions, the significance of the study, limitations of the study, delimitation of the study, and the structure of the study. The next chapter presented the literature review that made reference to the topic and case study.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter looks at the theoretical framework based on literature from other scholars on the research study topic and or research problem. The study further investigates the following literature and theoretical frameworks: defining road infrastructure development and maintenance, looking at the demographic overviews of the town of Ongwediva, road infrastructure policy in Namibia, roads authority manuals on road infrastructure, infrastructure financing in Namibia and the state of the road infrastructure in Namibia. Additionally, the study under this chapter is able to look at the significance of road development and maintenance, the importance of annual statistics, different types of roads, empirical reviews of road infrastructure within the African continent, the development and growth of road infrastructure, the impact of road development and maintenance within local authorities, local authorities with the best road infrastructure and consequences of poor road development and maintenance, and there was a need to look at the various ways to overcome poor road development and maintenance according to other researchers. Lastly, the chapter looked at the theoretical framework that relates to the thesis study conducted.

2.2 DEFINITION OF ROAD INFRASTRUCTURE DEVELOPMENT AND MAINTENANCE

The purpose of road infrastructure is to enable the transportation of people and products. It consists of all different types of roadways in an area. According to Ivanova and

Masarova (2013), road infrastructure encompasses all types of roads, facilities, buildings, signs, and electrical systems required to maintain safe, trouble-free, and effective transportation. Road capacity, safety, and condition are frequently taken into account while assessing the quality of road infrastructure (Casey, 2023). Depending on the infrastructure of the roadways and anticipated future demands as predicted by traffic planners, funding decisions for road extension, replacement, or repair are made (Casey, 2023). This section was instrumental in defining what road infrastructure development and maintenance entails, it looked at an old literature and a more recent literature definition. However, both definitions clearly defines what road infrastructure development and maintenance entails.

2.3 DEMOGRAPHIC OVERVIEW OF ONGWEDIVA

Geographically, Ongwediva is positioned between the two oldest towns in the Oshana region. Ongwediva is a town that falls under the Oshana region's purview. Oshakati is six kilometres from Ongwediva, while Ondangwa is 25 kilometres away. According to the 2011 National Population and Housing Census, there are 20,260 people living in the town of Ongwediva.

2.4 ROAD INFRASTRUCTURE POLICY IN NAMIBIA

The importance must be weighed against the requirement to review and change Namibia's national road policy. This is necessary because the national road policy must include the construction of road infrastructure and the upkeep of roads under local governments. The Roads Authority Act 17 of 1999 was approved by the Namibian National Assembly. However, the policy says nothing about highways that are under local government control.

To provide suitable guidance effectively and efficiently on all roads to be constructed, developed, and maintained in the country, it is necessary to change the national road policy.

2.5 ROADS AUTHORITY MANUALS ON ROAD INFRASTRUCTURE

This section does emphasize what needs to be done for Namibia to establish a national road in which key steps that does into the development of road infrastructure were identified. Thus, local governments there might take note and follow suit. Fundamentally, no matter how well a bridge or road is designed, the quality of the facility's construction ultimately determines how good it will be in use (Construction Manual, 2014). Ineffectual construction can also make a good design useless or ineffective. During the construction phase, the consultant has the chance to identify design defects and quickly fix them. There are good contractors, others who are not so good, and still others who lack the necessary experience for the job (Construction Manual, 2014). The Roads Authority of Namibia (RA) procurement procedure assures that a contractor hired for a RA project will have the experience, capital, and equipment to complete the work.

The attitudes of the many protagonists ultimately determine the success of a construction project, and in this regard, how the consultant's site personnel performs their monitoring function will play a vital influence in determining the project's end (Construction Manual, 2014). The construction manual's secondary goal is to describe the procedure for overseeing construction projects, with special attention to activities and interactions among the various parties involved. The construction manual is applied by RA and it can also be applied by local authorities in Namibia to ensure that their roads are developed

with the best quality. On a much larger scale, a building manual or construction manual is similar to the user manual someone might get for a washing machine (Sims, 2017). The preparation of the file is the responsibility of the principal contractor who is building a new building or upgrading an existing one (Sims, 2017).

It is not the intention of this document to repeat the actions, activities, and requirements for quality control that are specified in the standard and project specifications, but rather to expand upon them where necessary and to address any areas that are specifically left out of the aforementioned documentation. To avoid the possibility of a significant degree of conflict between this manual and the management systems of consultants, it is necessary to read the manual in conjunction with the latter. The emphasis throughout has generally been on what the RA expects must be done, rather than on how things are to be done. In relation with the Construction Manual (2014), key steps in the road infrastructure construction has been identified.

2.5.1 Site handover

The consultant is responsible for making sure that his site personnel is informed of the design principles and parameters as well as any crucial or delicate issues that must be taken into consideration during construction. The Regional Engineer (RE) and his or her senior materials technician must be present, as well as the contractor's contract manager and site agent. A meeting must then be arranged by the engineer to hand over the site to the contractor. It is best to invite the Project Control Engineer (PCE) and, at his or her discretion, the RE. The meeting's objectives are to formalize the start of site activities and to decide how the contract will be administered on a local level. An annexure should

include a checklist of common topics to be covered during the site handover meeting; this list should be altered to fit the specifics of the contract if necessary. This step relate to the Ongwediva local authority in the sense that the local authority has to ensure that the individuals identified in the step are present at every road site handover.

2.5.2 Liaison with landowners or occupiers

Following the start of the work, the RE and the site agent must jointly visit all landowners or occupiers who will be impacted by the project to distribute notifications regarding entry onto private property as required by the roads ordinance and to provide a general explanation of what will be done and when it will be done. The landowner must be informed about any haul roads that will be built, as well as how these and quarry or borrow areas will be restored, in cases where materials are to be derived from or spoiled on their property. The issue of how building activities affect agricultural activities, wildlife, and livestock must be considered, and when necessary, practical solutions must be developed.

Each visitor must be given the RE's contact information and a reporting procedure in case any construction-related issues arise. Dealing with the impact of livestock and wild animals on construction activities is equally important, especially in cases where the road reserve is not or will not be fenced. Finally, each landowner or occupier must be handed the Landowner Release Form, which will later become the Clearance Certificate, and informed of its significance. This step is instrumental to ensure that the residents of the Ongwediva local authority are aware of the road construction taking place within the area. The importance of this step is also drawn towards preventing accidents from happening while the road construction is taking place.

2.5.3 Liaison with local authorities, police and service authorities

The Regional Governor's office and its local counterpart must be visited by the RE and the site agent after the start of site activities, together with the local police, traffic police, and impacted municipalities. The RE is responsible for a variety of duties, including alerting concerned parties about the work and how it might affect them. This is done to ask for their cooperation and understanding. The monthly site meetings are to be attended by the RE, relevant additional local authorities, and service authorities.

2.5.4 Working hours

In order to fully inspect the works, it is typically required that the RE and his or her team be there during the same hours as the contractor. Additionally, in order to ensure that the works are adequately monitored, the RE must make arrangements to stagger the working hours of his workers if the contractor puts in excessively long hours or works on the weekends. As an alternative, the Site Agent must be notified in writing if the RE is going to be away from the job site for any reason, together with information on how the RE's responsibilities will be carried out in the interim.

2.5.5 Setting out

The RE must make sure that the beacons and benchmarks required for the contractor to outline the tasks are available and show no evident signs of disturbance, in accordance with the 2014 construction manual. The contractor must then get the beacons and benchmarks in writing from him or her. The contractor must inspect the products and

report any inconsistencies to the RE, who will subsequently make sure that issues are fixed.

2.6 INFRASTRUCTURE FINANCING IN NAMIBIA

Infrastructure development and modernization, according to Namakalu, Niishinda, Kadhila, Fillipus, Mukasa, and Mushendami (2014), is one of the NDP4's primary priority areas that is currently being implemented. They continued by stating that this section examines the nation's current road, rail, water, port, and energy infrastructure with a focus on short-term expansion and improvement plans. As outlined in the preceding section, Namibia has a wide network of infrastructure in place, whose construction were mostly funded by the Namibian government and unsurprisingly the main sources of infrastructure funding the government has been budget financing, external concessional loans, Development Finance Institutions (DFIs) loans and issuance of bonds. Hence, the need for this section to review expenditure on infrastructure, those undertake directly by the government as well as those expedited by State Owned Enterprises (SOEs).

The Walvis Bay municipality will receive more money from the Road Fund Administration (RFA) to maintain its roads (Klerk, 2023). The Walvis Bay council was given N$6.7 million for the upkeep of the town's highways, which is crucial for the movement of large amounts of goods going to both domestic and foreign markets (Klerk, 2023). The mayor of Walvis Bay, Trevino Forbes, said that the town's roadways are being burdened by considerable foreign traffic, especially trucks bringing products (Klerk, 2023). However, taxpayers bore the full responsibility for road maintenance and repair (Klerk, 2023).

To improve continental integration and promote intra-African trade, then-Finance Minister Calle Schlettwein once urged African road funds to fortify alliances and invest in vital road projects (Shaanika, 2019). These statements were given at the start of the Southern Africa focal group meeting of the Africa Road Maintenance Funds Association (ARMFA), which took place in Windhoek, Namibia (Shaanika, 2019). The issue of cost effectiveness and research money for road projects has consistently climbed above inflation, according to the then-finance minister, and is worthy of their attention (Shaanika, 2019). The RFA was asked to provide N$1 billion by the Namibian Association of Local Authorities in Namibia for the upkeep of urban roads last year (Tendane, 2023). The Namibian Association of Local Authorities in Namibia stated that they wanted the funds to be used for planning, constructing, and building roads as well as maintaining high-quality, safe urban roads and streets over the course of two years (2023 and 2024) (Tendane, 2023). The RFA was first suggested to give local and regional governments N$1 billion from its expected N$2,4 billion in annual revenue by the local authorities and the Association of Local Authorities in Namibia (ALAN) (Tendane, 2023). Currently, local governments need between N$10 million and N$20 million annually on average just for the upkeep of paved roadways but this does not include the building of new roads or additions like kerbs and pavements (Tendane, 2023).

The minister Schettwein noted that while traditional financing sources like a fuel fee are typically inflationary and erode with time, the road funds should ensure that the money are administered fairly and that the quality of the results is directly proportional to the expenditure outlay (Shaanika, 2019). According to reports, Africa's economy has significant development potential, but this potential cannot be realized without concentrated investments in infrastructure, technology, and skills (Shaanika, 2019).

The construction of sustainable suitable roads should be proportionate to the needs of modernization, the aspirations of younger generations, and the constantly expanding technologies, the then-finance minister cautioned (Shaanika, 2019). With the goal of ensuring that the countries of southern Africa and Africa at large do become more connected and cost-efficient in travel across the borders as it, would boost commerce and economic growth, development funds should find answers to both financial and technological elements (Shaanika, 2019). Without properly constructed and maintained roads, it cannot be effectively promoted to bring about economic development and social transformation (Shaanika, 2019). Schlettwein emphasized that Namibia in particular has invested extensively in enhancing the different transportation corridors, including as the Trans Zambezi, Trans Kunene, and Trans Kalahari highways, in response to the need to stimulate trade and economic growth through the roads network (Shaanika, 2019). To enable effective intermodal transportation to and from the area, Namibia has also invested in the extension and depth of the port of Walvis Bay, he remarked (Shaanika, 2019). Furthermore, landlocked nations have transitioned into land-linked states thanks to better road infrastructure and dry ports. Schettwein stated, "We act as a logistics hub for the sub-region, allowing investor and trade communities to travel to and from the larger Southern African Development Community (SADC) and international markets".

The construction of dual carriageways between Windhoek and Okahandja, Windhoek and Hosea Kutako International Airport, these are dream projects that do not justify the traffic for decades to come and money spend per km, according to the consulting engineer Hendrik Kruger, in the ballpark of N$78 million per km while climbing lanes could have accommodated the increase in traffic much more economically. According to Crispin

Chilikwela, director of corporate services at Zambia's national road fund agency, the ARMFA southern Africa focus group is a non-profit, non-partisan continental organisation that requires funding to be active (Shaanika, 2019). Chilikwela urged member nations to develop plans for yearly donations to raise money in this way. The organization contributes to continental integration and, consequently, trade and economic growth between African countries by providing appropriate financing for the upkeep and maintenance of roads (Shaanika, 2019).

This section, which describes how infrastructures are financed in Namibia, was crucial to the performed thesis study. It also described how the national road system is created and maintained under RA's direction. It was important to note that the section included information on the major parties involved in obtaining funding for road development and maintenance, as well as the sources from which local authorities in the nation obtain their funding for roads. The paucity of finances allotted to the parties responsible for local authorities in Namibia may be the cause of the discrepancy in road infrastructure development and upkeep between the Ongwediva local authority and other local authorities in Namibia.

2.7 STATE OF THE ROAD INFRASTRUCTURE IN NAMIBIA

The Namibian High Commission in London (2017), emphasized that Namibia has a well-established road infrastructure while discussing the state of the country's road network. A nationwide road system with 4,500 km of tarred highways and 48,117 km of high-quality gravel trunk, main, and district road networks that can connect to most towns and localities (Namibian High Commission London, 2017). According to Country Reports (2020), Namibia's roads are often kept in good condition. However, few offer "pull-off" lanes or

shoulders for stranded automobiles. In Namibia, roaming wildlife presents a unique driving hazard, particularly at night when antelope or cow encounters at high speeds can be lethal (Country Reports, 2020).

Namibia's road network connects it to South Africa, Angola, Zambia, Zimbabwe, Botswana, and other members of the Southern African Development Community. The Trans-Kalahari and Trans-Caprivi Highways make it feasible to travel comfortably between Namibia's port of Walvis Bay on the Atlantic coast and landlocked neighbouring countries. The port is connected to Botswana via the Trans-Kalahari Highway, and Namibia is connected to Gauteng, the country's industrial hub, via the same route. Through the port of Walvis Bay, the Trans-Caprivi Highway links Namibia with its neighbouring landlocked nations of Botswana, Zambia, Zimbabwe, and the Democratic Republic of the Congo.

The Trans-Kalahari and Trans-Caprivi Highways are essential for regional trade and national economic development because they offer a regional transportation corridor that is designed to cut the time it takes for goods to travel from neighbouring countries to markets in Western Europe and the Americas by at least five days when compared to traditional routes in Southern Africa (Namibian High Commission London, 2017). Namibia's two main highways are essential, but the Trans-Kalahari Highway has considerably aided in making Namibia a gateway nation, evolved the idea of the western corridor, and paved the ground for the future growth that the SADC area as a whole may look forward to (Namibian High Commission London, 2017). The primary thoroughfares both inside and outside the towns have been tarred almost entirely (Country Reports,

2020). Other than that, all roads are made of gravel or sand, which is typically not a concern (Country Reports, 2020).

Namibia has maintained its position at the top of the list of the best roads on the African continent for the fifth year in a row (New Era, 2021). In terms of high-quality roads in Africa, Namibia continues to be unrivalled, placing higher than South Africa and Rwanda in the World Economic Forum's (WEF) Global Competitive Report Index of 2020 (New Era, 2021). On a global scale, Namibia also performed well, coming in at number 23, ahead of economic behemoths like China, India, and Italy (New Era, 2021). Namibia's success is credited to two key elements: an efficient maintenance strategy on existing road infrastructure, which is essential to extending its lifespan, and the upgrading and building of new roads, which significantly improve the calibre of national roads (New Era, 2021). According to President Hage Geingob, the government will upgrade 1,480 kilometres of the nation's road network to increase access and mobility for Namibians nationwide (Tjitemisa, 2021). The improvement of infrastructure stimulates economic growth, social advancement, and makes a substantial contribution to international competitiveness and investment appeal (Tjitemisa, 2021). One of the nicest highways on the continent is thought to be in Namibia (Tjitemisa, 2021). The recently unveiled Harambee Prosperity Plan II (HPP II) promises to implement a substantial infrastructure plan that will also spur job possibilities. The dual carriageway between Windhoek and Okahandja, the upgrading of the Swakopmund-Henties Bay-Kamanjab gravel route, and the dual carriageway upgrade of the Swakopmund-Walvis Bay road are among the roads given priority (Tjitemisa, 2021). Others include finishing the Gobabis-Aranos road upgrade to bitumen

standard and turning the road from Windhoek to the Hosea Kutako International Airport into a dual carriageway (Tjitemisa, 2021).

There was not enough literature on this area because there were insufficient statistics on the roads under local authorities' control in Namibia. This demonstrates why it was crucial to carry out the thesis study. However, the state of Namibia's national roadways could be used to provide information about the performance of local authorities in terms of the state of their road infrastructure.

2.8 THE SIGNIFICANCE OF ROAD DEVELOPMENT AND MAINTENANCE

The primary source of finance for road infrastructure in developing nations has historically been direct government appropriation through Public Sector Investment Programmes (PSIP), vehicle license fees, and fuel levies. According to Berg, Deichmann, and Selod (2015), roads are the veins through which the economy beats. Roads are essential to any development plan because they connect producers to markets, workers to jobs, students to school, and the ill to hospitals (Berg et al., 2015). More than 260,000 km of roads have been built or renovated by the World Bank since 2002 (Berg et al., 2015). The unrestricted movement of people and products, which is at the core of the idea of a common market, is made possible by road infrastructure, which is a significant national asset (Mackie & Smith, 2017). In addition, roads are also marked by growing returns to scale during the design stage and congestion after delivery, just as other utility sectors. A substantial geographical natural monopoly makes up the majority of the network (Mackie & Smith, 2017). Except for areas with significant traffic densities to allow both limited access

motorways and general purpose roads along the same routes, competitive networks are basically unthinkable (Mackie & Smith, 2017).

Road infrastructure is an essential component of any nation since it contributes significantly to economic development and progress and offers significant social advantages (Malkoc, 2015). Roads are essential to a country's growth and development (Malkoc, 2015). Additionally, road networks are essential in battling poverty because they give people access to jobs, social services, health care, and educational opportunities. As they guarantee people may travel from one location to another with convenience and efficiency, roads are a crucial component of any nation's infrastructure (Basit, 2021). Roads have always played a significant role in transportation ever since civilization first emerged (Basit, 2021). Due to the highly developed road system of the Roman Empire, its culture and influence were able to spread throughout all of Europe (Basit, 2021).

Road infrastructure is the most crucial of all public assets because it expands horizons and promotes economic and social development (Malkoc, 2015). The European road network has 5.5 million km and is estimated to be worth over €8,000 billion, which suggests why it is the most significant public asset (Malkoc, 2015). However, over time and as a result of use, the road infrastructure is aging, necessitating ongoing investments in its upkeep. As a result, road infrastructure needs upkeep, replacement, and upgrading (Malkoc, 2015).

According to polls cited in Malkoc (2015), keeping up-to-date road infrastructure is necessary to sustain and improve the advantages of having one. But due to a backlog of unfinished maintenance, the road network has irreversibly deteriorated to the point where,

if insufficient maintenance is carried out, roadways may require replacement or significant repairs in as little as a few years (Malkoc, 2015). A road system's widespread deterioration can have an immediate impact on costs that surge and have a significant financial impact on the economy and citizens (Malkoc, 2015). Therefore, decision-makers must understand the value of maintenance considering this.

The type of business that people can operate depends on the local road network (Basit, 2021). This relates to the degree of accessibility that consumers have to products. Although there are undoubtedly many other elements at work in this situation, having a robust infrastructure makes it simpler for customers to do business with a company and for vendors to sell their goods (Basit, 2021). The ability to access roadways is a crucial consideration when launching any business, and people should take this into account before becoming overly committed in their company (Basit, 2021). For reciprocal relationships and limits, road infrastructure and tourism represent good implications. Today, it is easier than ever to see how road infrastructure affects tourism and vice versa (Mazrekaj, 2020). Tourism has an impact on the road network through extensive construction and modernization, an increase in the number of transport options and their modernization, an increase in the movement of people and products, and the introduction of new modes of transport organisation (Mazrekaj, 2020).

In general, the world is changing, and this is part of evolution. These aspects of change serve to emphasise the necessity of building and maintaining road infrastructure. This section explained why Ongwediva's governing body should keep funding the construction and upkeep of its road infrastructure. This suggests that increased investment in road

infrastructure will be directly beneficial to the local authority of Ongwediva's economic growth. The town would also be able to draw in more tourists as a result of having high-quality road infrastructure, which would generally be beneficial to local businesses and the local populace.

2.9 THE IMPORTANCE OF ANNUAL STATISTICS

In layman's terms, statistics are important because they provide the justification for creating policies and they aid in identifying needs, establishing goals, and tracking success (Kelegama, 2016). The development progress is blind without accurate statistics: policymakers cannot learn from their errors, and the public cannot hold them accountable. Statistics is a mathematical science process that includes gathering, analysing, and interpreting data as well as effectively communicating and presenting findings that are dependent on the data gathered (Kelegama, 2016). The author went on to say that by using various statistical tools and procedures, the raw data is made relevant and produces information for decision-making purposes, statistics and analyses, which are frequently employed to explain research findings, provide study findings and conclusions their credibility. Additionally, it is critical that those who use research understand statistics in order to be informed, assess the validity and value of information, and take appropriate action (Kelegama, 2016).

An annual report is a thorough account of the operations of an institution for the previous year. Its goal is to inform users, such shareholders or potential investors, on the business's activities and financial performance (Corporate Finance Institute, 2020). It is significant to note that many annual reports do not follow the traditional format of lengthy text

reports; instead, many businesses frequently include a lot of visuals and images, creating a document that is pleasing to the eye (Corporate Finance Institute, 2020). In accordance with Kelegama (2016), several objectives have come to be widely recognized as the goal of economic policy and development. Moreover, macroeconomic stability and higher national welfare are thought to result from progress toward their achievement, but timely, comprehensive, precise, and trustworthy statistics are essential for establishing and maintaining a development environment that is supportive of robust, equitable growth (Kelegama, 2016). Additionally, this is a crucial component for the construction of effective economic development strategies, which makes the government's decision-making and development plans more concentric. According to the United Nations, statistics can be used to analyse a country's degree of national development through time as well as serve as a guide for finding solutions (Kelegama, 2016).

Data could help measure progress towards the Sustainable Development Goals (SDGs) related to cities and migration, implement the Global Compacts on Migration and Refugees, which emphasise the role of cities as stakeholders in migration, and carry out migration-related commitments in the UN Habitat's New Urban Agenda (Duncan & Popp, 2018). Data could also help with urban planning and the delivery of public services (Duncan & Popp, 2018).

Regarding this part, the absence of data collected within the Namibian context can be used to demonstrate why it is crucial to develop academic knowledge to close the knowledge gap that currently exists. Annual statistics are crucial because they support the need for policies by defining needs, setting objectives, and monitoring progress. Therefore, the Ongwediva local authority's annual statistics on road infrastructure would aid in

identifying important areas where the local authority has to improve in terms of roads infrastructure.

2.10 TYPES OF ROADS

Given that local governments may not be able to finance some types of roads, examining other types of roads is crucial because they may be able to pay for them. Thus, Anupoju (2016), highlighted various types of roads that local authorities in Namibia could develop.

2.10.1 Earthen roads

Since they are made of soil, earthen roads are the least expensive, and less populated or rural places have access to this type of route (Anupoju, 2016). Furthermore, the fact that this sort of road has a superior drainage system also contributes to its exceptional performance over a longer length of time. Well-graded soil with a liquid limit of less than 35% and a plasticity index of 4–10% is necessary for the earthen road (Poudel, 2019). The cheapest form of road that can be built on a tight budget is this kind (Poudel, 2019). Although frequent maintenance is needed, especially after a lot of rain (Poudel, 2019). This type of road is not in Ongwediva but it can be an option to the local authority given that there is a lack of funds allocated to road infrastructure development and maintenance.

2.10.2 Gravel roads

Even though gravel roads are of poor quality, they are preferable to earthen roads (Anupoju, 2016). In addition, pavement material for gravel roads is a compacted blend of gravel and earth. According to Dempsey and Tutumluer (2015), gravel roads are unpaved road surfaces made of loose aggregate materials like sand, gravel, or crushed stone. They

also frequently exist in rural areas and provide efficient transportation infrastructure. Access to isolated areas is made possible by gravel roads, which are also frequently used in low-traffic areas where paved roads may be unaffordable to build and maintain (Dempsey & Tutumluer, 2015). Gravel roads are within the jurisdiction of the Ongwediva local authority. However, having gravel roads is not an ideal solution given that mostly tarred roads are preferred within urban areas.

2.10.3 Murrum roads

Murrum is a substance created when weathering processes break down local rocks, and murrum roads are constructed with this (Anupoju, 2016). Murrum roads are a typical type of unpaved road in rural areas, especially in places with little infrastructure or access to resources (Ndarana et al., 2019). These roads are built utilising murrum, a local soil composition that is a blend of gravel, sand, and clay. Murrum roads offer an affordable transit option, improving connectivity and accessibility in places where building paved roads might not be practical or cost-effective (Ndarana et al., 2019). This road type is not applicable in Ongwediva and Namibia but it can be an option given the lack of funds as well as other critical elements linked to poor road development and maintenance at local government level in Namibia.

2.10.4 Kankar roads

Kankar is an impure variety of limestone, and Kankar roads are constructed wherever there is a reasonable supply of lime (Anupoju, 2016). Additionally, the Kankar roads are ineffective and of poor quality. Kankar is a locally accessible material made up of calcareous nodules that is used to build kankar roads, which are unpaved roads (Singh &

Gupta, 2018). These roads are frequently found in kankar-rich locations and offer a practical means of constructing a minimal transportation infrastructure in rural and isolated places (Singh & Gupta, 2018). This type of roads are also not found within the jurisdiction of Ongwediva.

2.10.5 Water Bound McAdam roads

In order to build Water linked Macadam (WBM) roads, various layers of materials, including crushed stones, are compacted and linked together with water (Rao, 2014). This technique produces a long-lasting, reasonably priced road surface that can handle heavy traffic and enhance transportation in rural and semi-urban locations (Rao, 2014). The development of WBM roads in the Ongwediva has the potential to improve accessibility, expand the road network, and promote regional economic growth. It is crucial to note that specific projects, policies, or initiatives implemented by the Ongwediva local authority will necessitate additional research from local sources, official papers, or reports. The use of WBM roads may be part of the Ongwediva's own construction-related guidelines, regulations, or implementation plans.

2.10.6 Bituminous roads

The thickness of bituminous roads is dependent on the subgrade soil characteristics, and it is inexpensive and acceptable for driving conditions (Anupoju, 2016). Bituminous roads, commonly referred to as asphalt roads, are built by layering an asphaltic material made of bitumen, stones, and various fillers (Nilsen & Hanssen, 2013). These roads give an improved level of comfort and safety when driving, as well as a smooth and long-lasting surface ideal for big traffic volumes (Nilsen & Hanssen, 2013). To enhance the

road network, facilitate transport and assist regional economic growth, the authority may take on projects for the building and upkeep of bituminous roads in the Ongwediva.

2.10.7 Concrete roads

In the case of concrete roadways, the pavements are built using cement concrete, these are the most widely used and expensive forms of roadways, and because they are rigid, they require less upkeep (Anupoju, 2016). Cement, aggregates, water, and occasionally additives are combined to create concrete roadways, which have a rigid pavement structure (Li et al., 2015). These roads are ideal for long-lasting transportation infrastructure because of their outstanding strength, durability, and resilience to large traffic loads (Li et al., 2015). To promote connectivity, increase road safety, and encourage regional economic growth in the Ongwediva, the authority may take on projects for both the construction and maintenance of concrete roads.

2.11 EMPIRICAL REVIEWS OF ROAD INFRASTRUCTURE WITHIN THE AFRICAN CONTINENT

According to McKinsey (2020), the majority of Africa falls behind the rest of the globe in terms of the coverage of important infrastructure classes, such as water, energy, and road and rail transportation. For instance, the continent has around 31 kilometres of paved roads for every 100 square kilometres of land, compared to 134 kilometres in other countries with low incomes (McKinsey, 2020). Furthermore, the quality of current roads is declining as work to build the trans-African road networks is ongoing. An advantageous, dependable road network is essential for Africa's development (Cormon, 2022). Currently, the lowest accessibility in the developing world is found in rural areas, where just one-

third of residents live within two kilometres of an all-season road (Cormon, 2022). Additionally, the network's decline is accelerated by inadequate financing for routine maintenance, leaving numerous roads in bad shape. According to Holtz and Heitzig's (2021) research, the spatial allocation of Africa's transport infrastructure is inefficient and uneven, with some regions being overly equipped and others being undeveloped.

The fifth (5th) straight year, Namibia remained at the top of the list of the best roads on the African Continent (Lutombi, 2021). Namibia continues to lead the way in terms of high-quality roads in Africa, scoring 5.2 out of 7 in the World Economic Forum's Global Competitive Report Index of 2020 (Lutombi, 2021). South Africa and Rwanda, which scored 5.0 and came in second and third, were ranked second and third, respectively (Lutombi, 2021). Africa's struggle to become self-sufficient is partially due to the fact that many of its nations lack the solid infrastructure that private investment frequently requires (Green, 2023). According to a Deloitte report, many investors are still repelled by Sub-Saharan Africa's lack of physical infrastructure (Green, 2023). The good news is that African leaders are increasingly conscious of how inadequate infrastructure has impeded the development of their countries and people, and they are working to address the issue (Green, 2023). In fact, the Ibrahim 2022 Governance Report's sole classification in which all 54 African nations have shown progress since 2012 is infrastructure. Every African government has pledged to enhance infrastructure and, they argue, its economies, as noted in the Ibrahim Report (Green, 2023). Without properly constructed and maintained roadways, social transformation and economic growth cannot be effectively encouraged (Brandt, 2019). This is particularly true for developing nations and Africa in particular, where there is great potential for economic growth that needs to be harnessed via

concentrated investment in the advancement of infrastructure, technology, and skills (Brandt, 2019).

The importance of this section is drawn towards the presentation of the prospect of the road infrastructure of the African continent. Key presentations such as why the unequal distribution of funds towards road infrastructure within African countries, and the essence of investing in road infrastructure had been highlighted within the section. However, in alignment with the thesis study conducted on the continental stage because of the lack of statistics on road infrastructure we are unable to determine which African city has the best road infrastructure. Thus, due to a knowledge deficit, this study may not only pave the way for changes within the Namibian context but also for the adoption of annual road data for African cities.

2.12 THE DEVELOPMENT AND GROWTH OF ROAD INFRASTRUCTURE

According to Schachtebeck and Mbuya (2016), who share the belief that road infrastructure is crucial to a country's development because it links the various geographical areas of the nation, includes all different types of roads in a given area, includes a variety of structures, and in general transports people and goods. They also believe that all types of roads, facilities, buildings, signage, markings, and electrical systems required for secure, trouble-free, and effective traffic are included in the definition of road infrastructure (Schachtebeck & Mbuya, 2016). Additionally, transportation infrastructure immediately raises the standard of living for all income levels, and there is a global consensus that infrastructure is the key to raising living standards. A well-developed road infrastructure, in particular, is linked to better access to markets and

services, but it also has a favourable impact on income levels due to decreased road transport costs, which in turn affects the cost of consumer products and services (Schachtebeck & Mbuya, 2016).

Road infrastructure expansion and development are essential for promoting economic growth and enhancing connectivity both within and between areas (World Bank, 2014). Countries can improve trade, simplify the movement of goods and services, and draw investments by investing in their road networks (World Bank, 2014). Additionally, greater road infrastructure helps distant people have better access to social, medical, and educational services, which improves their quality of life (World Bank, 2014). According to a 2014 World Bank study, an increase of 10% in investments in road infrastructure might boost economic development by 0.5% to 1%. There are signs that investments in associated services, such as transportation, power, water systems, and communication, increase the productivity of other types of physical capital (Schachtebeck & Mbuya, 2016). On the other hand, investments in social infrastructure that benefit human capital, including those in education and health, can be raised (Schachtebeck & Mbuya, 2016).

In the African setting, strengthening connectivity, fostering economic growth, and advancing social development have all benefited from the creation and expansion of road infrastructure (African Development Bank Group, 2018). Investments in road infrastructure have aided in facilitating trade, promoting regional integration, and connecting rural areas to urban centres, increasing economic opportunities and lowering poverty (African Development Bank Group, 2018). Along with improving access to vital services like healthcare, education, and markets, the construction of road networks has significantly enhanced communities' quality of life (African Development Bank Group,

2018). However, issues including insufficient funding, low maintenance capacity, and the requirement for sustainable and climate-resilient infrastructure continue to be crucial factors in guaranteeing the long-term viability of road construction programmes in Africa (African Development Bank Group, 2018).

Overall, this section illustrated how Ongwediva's road infrastructure development and expansion would benefit the town and its surroundings. It has accelerated economic growth, provided better service access, and improved connection, benefiting the neighbourhood and advancing Namibia as a whole.

2.13 THE IMPACT OF ROAD DEVELOPMENT AND MAINTENANCE WITHIN LOCAL AUTHORITIES

According to a study conducted in 21 African countries between 1980 and 2007, improving road infrastructure has both direct and indirect advantages (Schachtebeck & Mbuya, 2016). In terms of direct benefits, the construction of roads connects the rural people to urban areas, the centre of the economy, improving living circumstances and agricultural outputs for the poor. On the other hand, investing in road infrastructure has indirect effects that help the economy flourish (Schachtebeck & Mbuya, 2016). When it comes to these types of transportation, poor or inefficient roadways might cause issues (Basit, 2021). As a result, highways play a crucial role in any nation's tourism sector. To protect the environment and provide a pleasant ride for cars to easily drive on, roads must be in good shape (Basit, 2021). Up to 1% of a nation's annual Gross Domestic Product (GDP) can be lost due to a bad road system and transporting goods between locations becomes quite challenging (Basit, 2021).

For a number of reasons, local authorities must consider the effects of road construction and maintenance. The risk of accidents and injuries is first and foremost decreased by well-maintained roadways, which also improve safety for commuters and pedestrians (World Bank, 2019). Second, effective road infrastructure reduces travel times and congestion while increasing transportation efficiency (World Bank, 2019). In turn, this promotes greater productivity and economic development within the neighbourhood. Thirdly, a region's ability to draw investors and enterprises depends heavily on the upkeep and development of its roads (World Bank, 2019). When choosing a location for their operations, businesses frequently take into account how well-connected and accessible the road network is (World Bank, 2019). Fourthly, it enhances accessibility to necessary services like healthcare, education, and emergency services, ensuring that locals can quickly get to these institutions (World Bank, 2019). Africa's economic growth, social development, and regional integration are all significantly impacted by the construction and maintenance of its roads (African Development Bank Group, 2018). African nations can benefit from regional and global markets because to improved road infrastructure, which makes trade and business easier (African Development Bank Group, 2018). In addition, it improves community connectivity, encourages tourism, and improves access to basic services. The important significance of road infrastructure in Africa's growth is highlighted in a thorough research done by the African growth Bank in 2018.

This section was crucial in demonstrating how Namibia's local authorities' road development and upkeep affect the nation's infrastructure and socioeconomic development. With its huge area and varied topography, Namibia heavily depends on road transport for connection and trade. Road design, building, and maintenance fall under the

purview of local authorities in Namibia. Their activities support local economic development by enhancing the state of the roads, ensuring safety, and ensuring public health.

2.13.1 Economic prosperity because of proper Road Development and Maintenance

For economic expansion and development, there must be a sufficient transport infrastructure (Rothenberg et al., 2022). Road networks can boost regional trade, integrate goods markets, promote output growth, and improve economic wellbeing by easing the movement of people and commodities between different locations (Donaldson, 2015). A growing body of research has estimated the various effects of newly built transport infrastructure links, including analyses of significant initiatives like China's new national trunk roads, new trains in colonial India, or US motorways (Rothenberg et al., 2022). The advantages of preserving and improving those road investments, however, are not well supported by the information that is accessible (Rothenberg et al., 2022).

By increasing transportation effectiveness, lowering logistical costs, and luring investments, proper road development and maintenance promote economic success (International Road Federation, 2016). The transportation of goods and services is facilitated by well-maintained roadways, which also help enterprises reach their target markets more quickly (International Road Federation, 2016). Additionally, effective road building and upkeep generate employment opportunities, both directly in construction and maintenance tasks as well as indirectly through increased trade and economic activity (World Economic Forum, 2019). Countries may attract enterprises, boost tourism, and encourage investment in rural areas by providing dependable and accessible road

networks, which will result in the development of jobs and economic growth (World Economic Forum, 2019). Additionally, effective transportation of goods and services made possible by well-maintained roadways boosts competition, enabling businesses to diversify their markets and raise productivity.

China has made significant investments in its road infrastructure, which have been essential to the country's development and progress. The expansion of the motorway system, which includes the national highway network, has greatly increased transportation effectiveness, enhanced trade, and made it easier for economies in different regions to integrate (World Bank, 2019). According to a World Bank research, China's growing road network helped the country's GDP rise by 6.5% between 1985 and 2008 (World Bank, 2019). Germany's strong economy and high industrial productivity are both a result of its efficient and well-maintained road system (World Bank, 2019). The efficient transportation of products and services is made possible by the nation's renowned Autobahn system, which is of high calibre and dependability (World Bank, 2019). German industries and international trade have benefited greatly from the country's excellent road system (World Bank, 2019). These illustrations show the beneficial relationship between a developed and maintained road network and economic growth. It is crucial to remember that the influence of road infrastructure can vary depending on a number of variables, including the size, population, economic structure, and political system of the nation.

2.13.2 Theoretical importance of investing in Road Infrastructure

For the eradication of hunger, reduction of poverty, and enhancement of human life quality, road infrastructure is crucial (Ben, 2019). Road transport is a mode of transport

that provides door-to-door delivery, making it appropriate for sending finished goods to consumers (Ben, 2019). To fully realise the potential of rural areas, road infrastructure has the potential to turn subsistence farming into a profitable and dynamic farming system (Ben, 2019). For a road infrastructure project to be managed effectively, it is essential to comprehend the circumstances under which additional or new road infrastructure does, in fact, promote economic growth (Ben, 2019).

According to the economic growth theory, investment in road infrastructure is a factor of production, a complement to other factors of production, a stimulus for factor accumulation, a stimulus for aggregate demand, and a tool for industrial policy (Ross & Townshend, 2018). On the other hand, ineffective or inadequate investment in road infrastructure may displace private sector investment, raise operational costs, shorten the lifespan of private sector capital, require the expenditure of private capital adjustment costs, reduce labour productivity, and have an adverse impact on human development (Ross & Townshend, 2018). Many nations strive to encourage economic expansion and the construction of road infrastructure in economically underdeveloped areas (Ng et al., 2019). This is due to the critical function that road infrastructure plays in ensuring accessibility to a wide range of commercial and social activities as well as mobility for the effective movement of people and products (Ng et al., 2019). However, concentrating only on the improvement of road infrastructure would not be sufficient to produce sustained economic growth (Ng et al., 2019). It was stated that to achieve a sustainable economic growth, road infrastructure development policies should be adopted in conjunction with other socioeconomic and urban growth policies (Ng et al., 2019).

The New Economic Geography theory is one theoretical viewpoint that highlights the need of funding road infrastructure (Felbermayr & Kohler, 2015). The formation of economic geography and regional development is significantly influenced by transportation costs, according to this idea put out by Paul Krugman (Felbermayr & Kohler, 2015). The movement of commodities is facilitated, economies of scale are made possible, and agglomeration effects are supported by improved road infrastructure, all of which result in higher productivity and economic growth (Felbermayr & Kohler, 2015).

It is theoretically important to invest in road infrastructure in Namibia, notably in the town of Ongwediva, in order to promote economic growth and regional integration. Enhanced market access, reduced transportation costs, and a boost to trade inside and outside of Namibia can all be attributed to better road connectivity. Ongwediva can attract investments, support company growth, and advance socio-economically as a whole by investing in road infrastructure, which encourages easier transportation of products and services. The benefits of road infrastructure investment in generating agglomeration effects, increasing economic productivity, and supporting regional development are emphasised by theoretical frameworks like the New Economic Geography theory.

2.14 LOCAL AUTHORITIES WITH THE BEST ROAD INFRASTRUCTURE

It might be difficult to pinpoint which local authorities have the best road system because it depends on so many different variables (World Economic Forum, 2019). However, certain cities have a reputation for having a well developed road system, such Tokyo, Zurich, and Singapore (World Economic Forum, 2019). To assure high-quality road infrastructure, these communities have made major investments in their road networks,

employing effective planning, maintenance, and technological developments (World Economic Forum, 2019).

In the context of Namibia, it is accurate to say that there is a dearth of data and literature on the local governments with the best roads. This study hopes to encourage the annual publication of the local governments with the best roads. The lack of annual information on the condition of local government road infrastructure in Namibia served as the impetus for this thesis study on the significance of annual statistics on local government road infrastructure development and maintenance in Namibia.

2.15 CONSEQUENCES OF POOR ROAD DEVELOPMENT AND MAINTENANCE

The importance of improving and maintaining road infrastructure cannot be overstated given how much it contributes to economic growth, regional integration, social development, security, and efficient public administration in any given nation. Additionally, governments can maintain the quality and safety of the road condition relatively near to the original design through maintenance, which lowers the costs associated with using the roads, the accident rate, the degree of poverty, and even the cost of reconstruction. Therefore, postponing maintenance is equivalent to having it rebuilt because it incurs substantial direct and indirect expenses. According to Mostafa (2018), many nations, not only those in Africa, often only provide 20 to 50 percent of their total budgets for road maintenance.

It is regrettable that road maintenance is consistently last on the priority list of many governments around the world because, according to World Bank reports, delaying maintenance at any point may result in paying three times or more of maintenance

expenditures (Mostafa, 2018). In a 2021 assessment of infrastructure in the country, the American Society of Civil Engineers highlighted the effects of inadequate road maintenance on economic competitiveness, productivity, and safety. Numerous consequences of poor road construction and maintenance can harm communities and economies (American Society of Civil Engineers, 2021). It may result in more traffic congestion longer travel times, and less effective transit systems (American Society of Civil Engineers, 2021). Furthermore, poor road maintenance can lead to worsening road conditions, greater vehicle running expenses, and a rise in the likelihood of accidents and injuries.

The Asian Development Bank (2017), has performed a study that highlights the urgent need for greater road maintenance and development. The study investigates the effects of bad infrastructure, including poor road conditions, on poverty reduction and economic development in emerging nations (Asian Development Bank, 2017). In developing nations, poor road construction and maintenance can lead to poor connection and restricted access to essential services like clean water, healthcare, and education (Asian Development Bank, 2017). In especially for marginalised people in rural places, it might worsen social and economic inequities (Asian Development Bank, 2017). To reduce the costs associated with road maintenance and building, Mostafa (2018) proposes that it is crucial for African nations to establish a database connected to all other nations.

This part was essential in showing the potential consequences for the Ongwediva local authority and Namibia's other 56 local authorities should they continue to disregard the necessity of funding the construction and upkeep of roads. The part also discussed the effects of poor road construction and upkeep in both technologically advanced and

developing nations. The results show that the effects of substandard road construction and maintenance are getting worse across the board, in both developed and emerging economies, which points to how substandard road construction and maintenance can affect national development.

2.16 WAYS TO OVERCOME POOR ROAD DEVELOPMENT AND MAINTENANCE

There are numerous options, and there is no quick fix for finding an appropriate option. However, the five best practices that will be highlighted and presented in this part should guide any nation's quest for improvement.

2.16.1 Maintain rigorous, fact-based, and transparent project selection

According to Halleman and Garemo (2019), a thorough, fact-based project review and an open process for determining what can be done and in what order are essential for effective project selection. Furthermore, according to the two authors, having a single organization in charge of assessing projects and building a fact basis enables decision-makers and elected officials to determine the right priorities (Halleman & Garemo, 2019). The International Transport Forum's study, which emphasises the value of data-driven approaches and stakeholder involvement, offers insights into best practises and guidelines for project selection in the development of road infrastructure (International Transport Forum, 2015). Maintaining strict, fact-based, and open project selection procedures is essential to combating subpar road development and maintenance (International Transport Forum, 2015). This entails carrying out in-depth analyses of the infrastructure requirements for roads and ranking projects according to quantifiable factors like traffic volume, economic impact, and social justice concerns (International Transport Forum,

2015). The public's trust in the decision-making process is ensured by the transparency of the project selection process (International Transport Forum, 2015). To address poor road development and maintenance, the Namibian Roads Authority employs a strict and open project selection procedure (Roads Authority Namibia, 2015). This could be the difference between the road infrastructure under the management of Roads Authority Namibia and those under local authority management.

2.16.2 Streamline delivery

The primary goal of improving sector cooperation is to speed up delivery while the infrastructure owner determines the type of contract and the project's tendering process (Halleman & Garemo, 2019). An illustration in the form of a choice made to switch from design-bid-build to design-build contracts could be fruitful (Halleman & Garemo, 2019). Delivery processes must be streamlined if bad road development and maintenance are to be addressed (World Road Association, 2015). To achieve this, project management must be optimised, coordination between key parties must be improved, and road development and maintenance projects must be implemented on schedule (World Road Association, 2015). Delivery may be made more efficient, delays can be reduced, and resources can be used more wisely (World Road Association, 2015). This is relevant to both urban and rural areas, where road infrastructure is essential for connection and economic development. As a result, there will be better overall road infrastructure quality and resource utilisation, as well as fewer project delays.

2.16.3 Make the most of existing infrastructure

Even though governments frequently attempt to solve transportation needs by initiating new projects, the current stock of roads will always be more significant than network additions (Halleman & Garemo, 2019). To overcome poor road construction and maintenance, it is essential to make the most of the current infrastructure. This may entail employing asset management programmes to monitor and maintain current roads, putting into practise affordable rehabilitation initiatives, and maximising the capacity of current road networks through effective traffic management (World Bank, 2017). Towns can extend the life of their roads, lower maintenance costs, and improve the performance of their entire road network by making the best use of their current infrastructure.

2.16.4 Ensure effective sector governance

The diagnostic work by Hellman & Garemo (2019) revealed that, generally speaking, three enablers' capabilities, collaboration, and governance need to be improved for the road infrastructure sector to function better. According to their research, which involved thousands of infrastructure and construction projects, project management expertise is the single most important factor that influences a project's success (Halleman & Garemo, 2019). The WEF's "Enabling Trade: Valuing Growth Opportunities" research sheds light on how crucial competent sector governance is to fostering effective infrastructure development and upkeep (WEF, 2016). To improve inadequate road development and maintenance, strong sector governance is essential. This entails developing precise guidelines, rules, and institutional structures that support accountability, transparency, and effectiveness in the management of the road infrastructure (WEF, 2016). The Ongwediva

local authority should take note of the fact that by assuring correct resource allocation for road development and maintenance projects, solid supervision systems, and stakeholder involvement are all essential components of effective sector governance.

2.16.5 Enhance funding and finance frameworks

Emphasized that while funding for roads will probably continue to come mostly from government budgets, many countries would benefit from having access to private capital to supplement state funding (Halleman & Garemo, 2019). Based on their research, the authors emphasized that while there isn't a single solution that works for all nations, a variety of tools, including toll booths, infrastructure bonds, real-estate appreciation capture, congestion fees, public-private partnerships, build-operate-transfer, and other methodologies, can be added to the toolbox and taken into consideration as a way to supplement the funds that are already available.

By investigating alternative financing options including infrastructure bonds, public-private partnerships, and dedicated road funds, it is possible to improve the funding and financial frameworks for road development and maintenance (Global Infrastructure Hub, 2021). These strategies can aid in securing long-term sustainable financing for road projects, leveraging extra money, and luring private sector investment. The Global Infrastructure Hub (2021) provides helpful information and resources on cutting-edge funding strategies for infrastructure, particularly roads, which may be implemented by nations and local governments. The Global Infrastructure Hub is an organisation focusing on infrastructure investment and development. For instance, nations can look into infrastructure investment funds or use regional development banks like the African

Development Bank to get funding. These organisations provide knowledge and funding to support infrastructure initiatives, such as the construction and upkeep of roads (Global Infrastructure Hub, 2021). Utilising such collaborations can assist in ensuring sustainable funding for road infrastructure programmes while also helping to diversify funding sources (Global Infrastructure Hub, 2021). Therefore, it would be ideal for towns in Namibia to make changes to their policies so they can find funding on their own and without the help of the national government.

2.17 THEORETICAL FRAMEWORK

Asset management is the process of accumulating, preserving, and exchanging investments with the potential to increase in value over time (Ganti, 2023). The value that an institution's assets provide can be maximised by continuously assessing the effectiveness of the asset management framework and making necessary modifications (Shachoy, 2018). An asset management strategy should be reviewed and refined throughout time to make sure it still matches the organization's aims, according to the literature (Shachoy, 2018). To gauge the effectiveness of their policies, institution officials gather data, and their asset management plans include methods for ongoing evaluation (Shachoy, 2018). To monitor the effectiveness of its framework, for instance, information on operational expenses, asset condition, asset utilisation, and operating income might be included (Shachoy, 2018).

According to Ceres (2012), sustainable infrastructure development refers to the planning, creation, and use of the final product in a way that balances the social, economic, and environmental practises required to uphold diversity, human fairness, and the efficiency

of natural systems. Infrastructure that is environmentally friendly, economically advantageous, and socially beneficial both now and in the future (Ametepey et al, 2019). To enhance overall ecological quality and provide useful services, sustainable infrastructure is made up of a variety of goods, devices, and procedures that rely on natural processes (Ametepey et al, 2019).

The study used the asset management framework and the sustainable development framework. The use of the asset management framework was utilized because it focuses on optimizing the performance, cost, and risk of road assets. In relation with the case study, it would mean that if sufficient financial allocations, qualified and experienced road contractors are employed then well developed and maintained road infrastructure would be attained at the Ongwediva local authority. Sustainable infrastructure development framework was used in the study to inform and educate on the essence of any local authority (not only Ongwediva) in Namibia having well developed and maintained road infrastructure because the future generation are set to use the same infrastructures being utilized in the present.

2.18 SUMMARY

Finding different pieces of literature that relate to the research study was crucial for the study. Examining literature such as the demographic overview of the town of Ongwediva and the types of roads was essential since it provides local authorities with a variety of road types they can create and subsequently learn to manage. The chapter on literature reviews examined pertinent writings associated with the research investigation. Significantly, the study made reference to the Ongwediva local authority at the end of

each section of the literature reviewed in the chapter, highlighting the measures that the authority could take or forego in order to ensure the effective and efficient development and maintenance of roads within its jurisdiction. The research's varied approaches are examined in the chapter that follows.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 INTRODUCTION

The current chapter focused on how the data of the thesis study was collected and presented.

subsequent to reviewing the details of the thesis study in chapter one, as well as the relevant literature reviews concerning the case study and research topic in chapter two, this chapter focuses on the different research methodologies used for data collection. It goes without notice that there are various methods of data collection for thesis studies exist, and this chapter identifies the approaches most suitable for this particular thesis study. The research methodology chapter was instrumental in highlighting how the paper was to be designed, the population and sample population of the study, research procedures, research instruments to be used, how data was to be presented and analysed, and the required research ethics followed.

3.2 RESEARCH DESIGN

According to Saunders, Lewis, and Thornhill (2016), research design is a part of the blueprint for data collection, measurement, and analysis in which researchers choose to integrate the various elements of the methodology they have chosen in a logical and cogent manner, thereby ensuring that a research problem is effectively addressed. Therefore, the research design for this study included both qualitative and quantitative methodologies (mixed research methods).

According to Creswell (2018), researchers do not limit themselves to the sorts of data collecting that are often associated with qualitative research or quantitative research methodologies. Instead, they employ all the tools for data collection that are available. Therefore, a mixed technique was adopted with interviews and questionnaires as the primary research instruments of the study to ensure that it produced the intended results. As a result, questionnaires were used to create the quantitative data. It is important to make clear that the mixed research approach was used in this study to analyse Namibian local authorities' annual statistics on the construction and maintenance of roads. The use of a mixed method was justified by the various views generated from interviews conducted and questionnaires handed out to residents of Ongwediva. In reference with the topic, the study had to present some data in the form of tables and charts (quantitative responses) as a reflection how road infrastructure development and maintenance was measured in terms of numbers. Equally so, in line with the judgemental sampling methods professionals were asked to further elaborate the quantitative data presented.

3.3 POPULATION

The total population of the local authority of Ongwediva according to the National Population and Housing Census (2011) is said to be 20 260 inhabitants. In accordance with the Ongwediva local authority, its Human Resources Manager stated that the Ongwediva Town Council (OTC) employs 73 employees, and there were eight members of the management committee and seven council members.

3.3.1 Figurative Population Table

Table 3.1: Figurative Population Table

POPULATION GROUPING	
ONGWEDIVA INHABITANTS	20 260
EMPLOYEES OF THE OTC	73
MEMBERS OF THE MANAGEMET COMMITTEE	8
MEMBERS OF THE COUNCIL	7
TOTAL	**20 348**

3.4 SAMPLE

The targeted sample size for the study was 30 respondents. A total of 8 officials from multinational companies operating in Ongwediva whereby two multinational companies were selected and four representatives from each of the multinational companies selected did form part of the study, four officials in the Planning and Development departments at the OTC two officials from the Oshana Regional Council (ORC). Furthermore, the study was made up of ten residents of the Ongwediva local authority, two officials from the Namibia Statistics Agency (NSA) (a Statistician and a Data Capturer) one official from Namibia Construction (Project Manager) one official from Shange Civils (Project Manager) one Civil Engineer from Nexus Group, and one Civil Engineer from RA. Notably, the thesis study consisted of a limited sample size of 30 respondents, as the researcher and supervisor mutually determined that this number would provide a

reasonable representation for the thesis article, taking into account financial limitations associated with the data collection process.

3.4.1 Figurative Sample Size

Table 3.2: Figurative Sampling Size Table

SAMPLING SIZE GROUPING	
MULTINATIONAL COMPANIES	8
OTC EMPLOYEES	4
ORC EMPLOYEES	2
ONGWEDIVA INHABITANTS	10
NSA EMPLOYEES	2
NAMIBIA CONSTRUCTION EMPLOYEES	1
SHANGE CIVIL EMPLOYEES	1
NEXUS GROUP EMPLOYEES	1
RA EMPLOYEES	1
TOTAL	**30**

3.4.2 Random sampling method

The snowball random sampling method was used in which the first white house in the first ten streets were selected to form part of the sample population and each of the ten houses selected the head of the household was given a questionnaire to complete. Moving on, two

questionnaires were handed out to two multinational companies that were near to the OTC head office.

3.4.3 Judgmental sampling method

Judgmental sampling method was employed whereby the researcher interviewed four officials at the Ongwediva local authority, one official at Namibia Statistics Agency, one official at Namibia Construction, one official at Shange Civils, two officials at ORC and one Civil Engineer fat Nexus Group and one at RA in search of getting expert strategic answers that were aimed at resolving the problem and answering the research questions.

3.5 RESEARCH INSTRUMENTS

The researcher made use of multiple instruments and techniques within the qualitative approach of data collection. A mixed technique was adopted with structured interviews and questionnaires as the primary research instruments that were employed. Notably, only the residents of the town of Ongwediva were required to complete the questionnaire whereas data of other research participants were generated through various interviews.

3.6 PROCEDURE

Both primary and secondary data were used to collect data from the research participants. The researcher made use of the primary data by means of conducting structured interviews. Furthermore, face to face interviews were held with all research participants whereby a tape recorder was used and then transcribed. Secondary data in the name of documents and books were explored.

3.7 VALIDITY AND RELIABILITY

Regarding validity, it is crucial to assess the research tools' credibility and their capacity to yield correct results by assessing what is intended to be measured (Sekaran & Bougie, 2013). In addition, according to Haimbala's (2014) theory, test validity measures how well a test can assess or validate how reliable the data acquired is by comparing it to the observed data and the data that was collected from the relevant respondents. In order to assess the validity of the study, the researcher used mixed method research tools to make sure that the viewpoints of chosen respondents were included in the research findings. Etchegaray and Fischer (2010) have noted the significance of confirming that the variable being studied is accurately measured by the data instrument intended to measure the particular concept in question. Face validity checks if the comments in the questionnaire are consistent with the primary findings of yearly statistics on the construction and upkeep of local governments' road infrastructure in Namibia, with an emphasis on the OTC.

Moving on, Fraenkel, Wallen, and Hyun (2012) define reliability as the extent to which test results are reliable indicators of the variables being measured by the research instrument. Additionally, reliability addresses the degree to which a method yields comparable results under consistent circumstances by decreasing errors and biases within a study (Haimbala, 2014). In any study, reliability is used to assess if a test can be repeated again while still producing reliable results or whether there are any potential errors or omissions (Haimbala, 2014). Hence, the thesis study ensured that reliability was employed.

3.8 DATA ANALYSIS

The researcher made use of coding, transcription and thematic analysis, data was be presented through tables as well as charts and it was interpreted in a narrative form. Whereas, face to face interviews were tape recorded and then transcribed. The researcher was able to classify similar responses and interpreted them into various discussions and categories, this helped the researcher to examine the interview transcript and documentary note before identifying the pattern and organizing the data into categories. Document analysis did assist the researcher to evaluate the influence of annual statistics on road infrastructure development and maintenance of the Ongwediva local authority in Namibia by analysing documents such as the RA policy on national roads which formed part of the chapter two of the thesis study. Data from the questionnaire was instrumental in the presentation of the quantitative data whereas the interview schedule was fundamental in analysing and presenting the qualitative data and it was done in various subheadings (themes) in alignment with the research questions and objectives,

3.9 RESEARCH ETHICS

The right to privacy, anonymity, and confidentiality of information was ensured in which the research instrument used did not require research participants (respondents) to revile private and confidential information. Data collected from all various stakeholders that were involved in the thesis study was only used for academic purposes, the researcher was able to present proof in a form of a letter that state that he is indeed collecting data for academic purposes only. Notably, the researcher was issued an ethical clearance certificate by the University of Namibia Ethics Committee with the ethical clearance reference number DEC FOC/22/13. To ensure that the right to privacy is adhered to the

researcher refrained himself from recording names of his research participants, and to ensure that there was anonymity the thesis study referred to its research participants as officials rather than stating their portfolios. Regarding the confidentiality of information that were collected and presented, the researcher was able to strictly only use that information for academic purposes and all research participants were given the privilege to take legal action against the researcher if he did not comply with his own ethical code of conduct.

3.10 SUMMARY

The chapter aimed at highlighting the different methodologies that the thesis utilised in an effort to collect and present data that was instrumental in solving the research problem and find answers to the research questions. Under the guidance of the assigned supervisor, data for the thesis study was gathered from 30 research participants, whereby some participants were interviewed, while others were provided with questionnaires to complete. The data collection process, presentation and discussion of the gathered data, and the composition of the final thesis paper adhered to the ethical guidelines of the UNAM. The next chapter presents the results of the study, following the data analysis and the discussions of the results under literature control to come up with the findings.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 INTRODUCTION

The study used mixed research methods, and this chapter presents and analyses the results based on both the qualitative and quantitative research methods used. After the outlining of the diverse research methodologies utilised by the thesis study in chapter three, this chapter ensured the effective implementation of the chosen research methodologies. Furthermore, the thesis study adopted a mixed research approach, employing interviews and questionnaires as the research instruments for data collection. The data was gathered from a sample of 30 research participants, and this chapter guarantees its presentation and discussion align with the mixed research approach. Thus, the chapter presents the discussion of the results and the findings from the analysis of the data collected through interviews and the use of various questionnaires.

4.2 QUANTITATIVE DATA PRESENTATION

With regards to this method, questionnaires were used to collect the data, and charts, tables and graphs were used to interpret and present the quantitative data. The total number of respondents who formed part of the study was 30 as per the sample population of the study.

4.2.1 Gender representation

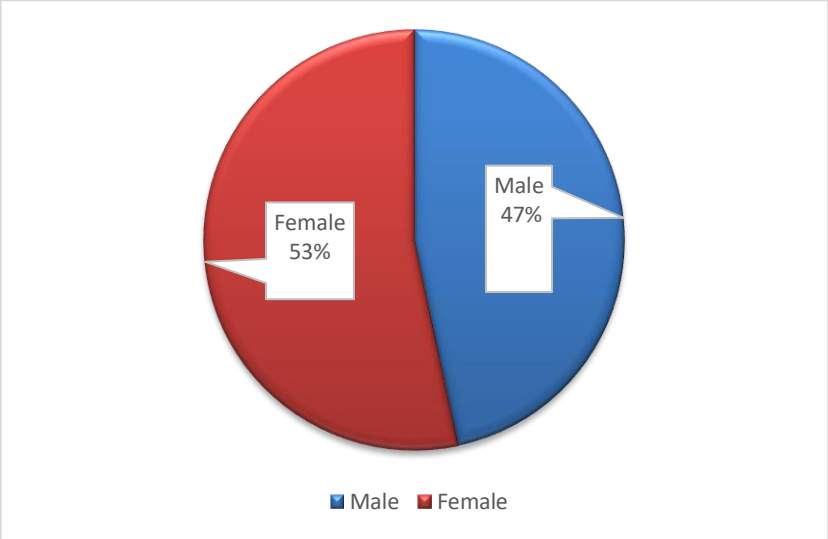


Figure 4.1: Gender representation

Figure 4.1 present that 47% of the research participants were male while 53% were female. This presenting that out of a total of 30 participants 16 were female (majority) and 14 were male. To avoid supposing anything about the gender of the participants who were a part of the thesis study, it was important to obtain this data.

4.2.2 Duration of Multi-National companies operating in Ongwediva

Table 4.1: Duration of Multi-National companies operating in Ongwediva

Options	**Frequency %**	**Tally ///**
Less than 5 years	12.5	/
5 years	12.5	/
Less than 10 years	0	
10 years	25	//
More than 10 years	50	////
Total	100	8

Table 4.1 illustrate that 50% in terms of the frequency show that four businesses out of eight have been doing business within the Ongwediva local authority for over ten years. Additionally, 25% which is two businesses have been conducting business activities for ten years while 12.5% which represent one business was recorded in relation with businesses that have been doing business in the town of Ongwediva for five years and less than five years. 0% was recorded in relation to a business (s) who have been doing business within the town for less than ten years. It was crucial to collect this data because it presents evidence on how well these individuals are familiar with the town of Ongwediva.

4.2.3 How long have you been residing in Ongwediva?

Table 4.2: Duration of residents in Ongwediva

Options	**Frequency %**	**Tally ///**
Less than 5 years	10	/
5 years	0	0
Less than 10 years	10	/
10 years	0	0
Over 10 years	80	/// ///
Total	100	10

Table 4.2 present how long have the residents of Ongwediva have been residing in the town. The table indicate that eight out of the total ten residents have been residing in Ongwediva for over ten years while one resident has been residing in Ongwediva for less than ten years and less than five years respectively. Lastly, zero residents have been residing in Ongwediva for five years and ten years respectively. This data was gathered to support the respondents' differing opinions, which were part of the thesis study and concerned the fact that they had not all lived in Ongwediva for the same number of years. Consequently, the thesis study's numerous perspectives.

4.2.4 Number of years the Engineers and Project Managers have been in the Civil Engineering industry

Table 4.3: Experience within the Civil Engineering industry

Options	**Frequency %**	**Tally** ~~////~~
Less than 5 years	25	/
5 years	25	/
Less than 10 years	25	/
10 years	0	0
Over 10 years	25	/
Total	100	4

Table 4.3 indicate that out of the four people that were questioned on the basis of civil engineering shows that one person represented being in the civil engineering industry for less than five years, five years, less than ten years, and over ten years respectively. No person represented having been in the civil engineering industry for ten years. This section was crucial because it illustrate the level of knowledge and expertise of the four individuals that form part of the civil engineering industry.

4.2.5 Satisfaction with the road infrastructure development and maintenance in Ongwediva

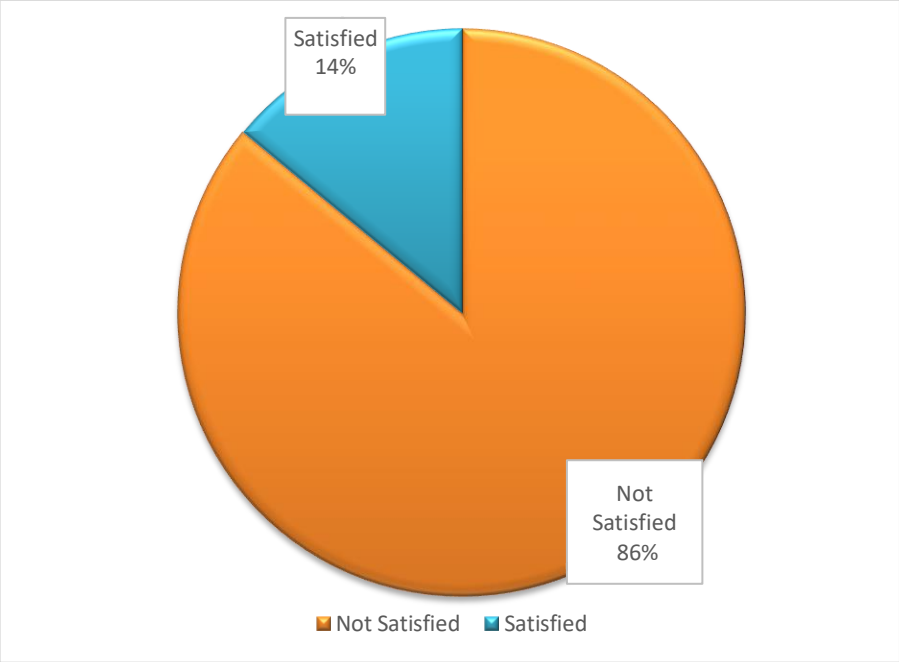


Figure 4.2: Status of road infrastructure development and maintenance within Ongwediva

Figure 4.2 show that from the collected data 86% of the research participants are not satisfied with the road infrastructure development and maintenance of the Ongwediva local authority. Moreover, 14% of the research participants were however satisfied with the road infrastructure development and maintenance of the Ongwediva local authority. Fundamentally, it was of significance to collect this data because it speaks to the thesis problem statement and it was able to further help answer key research questions. Therefore, the study found that there has been a substantial difference between the participants that were satisfied with the road infrastructure development and maintenance of the Ongwediva local authority in relation with those that were not satisfied.

4.2.6 Data on whether construction companies are liable for a poorly developed and or maintained road within the jurisdiction of a town

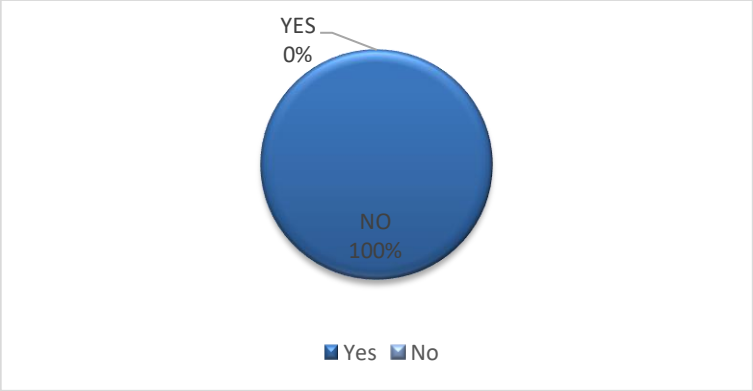


Figure 4.3: Liability of Construction companies for Poorly Developed and Maintained Roads in a Town

Figure 4.3 was based on a question that was posted to the expertise or specialist in the field of civil engineering. They all said no construction companies are not liable for a poorly developed and or maintained road. The pie chart indicates that indeed 100% of the research participants answered no. This data was generated to show that the construction companies that formed part of the study understood the Local Authority Act in relation with a poorly developed and maintained road infrastructure within the jurisdiction of a town.

4.2.7 Settlement sector

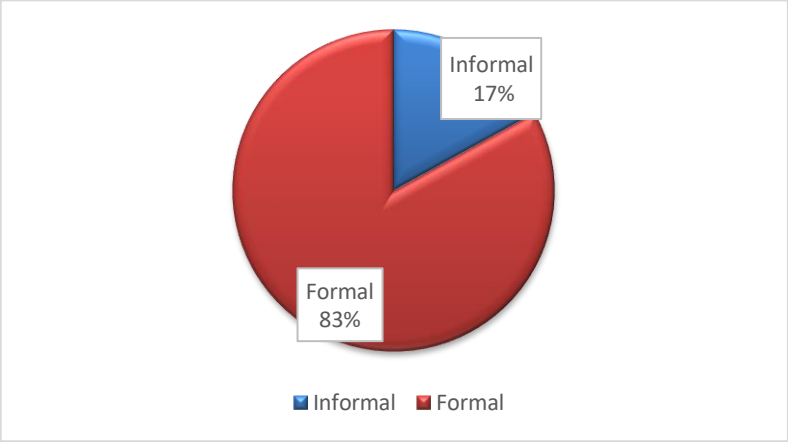


Figure 4.4: Settlement sector

Figure 4.4 was based on the settlement sector whereby it was recorded that 83% of the residents of Ongwediva live in the formal sector whereas 17% of the residents live in the informal sector of the town. Incorporating research participants that are from both, the informal and formal sector was key because the thesis study was aimed at tackling every area within the jurisdiction of Ongwediva.

4.2.8 Ongwediva as a permanent residence

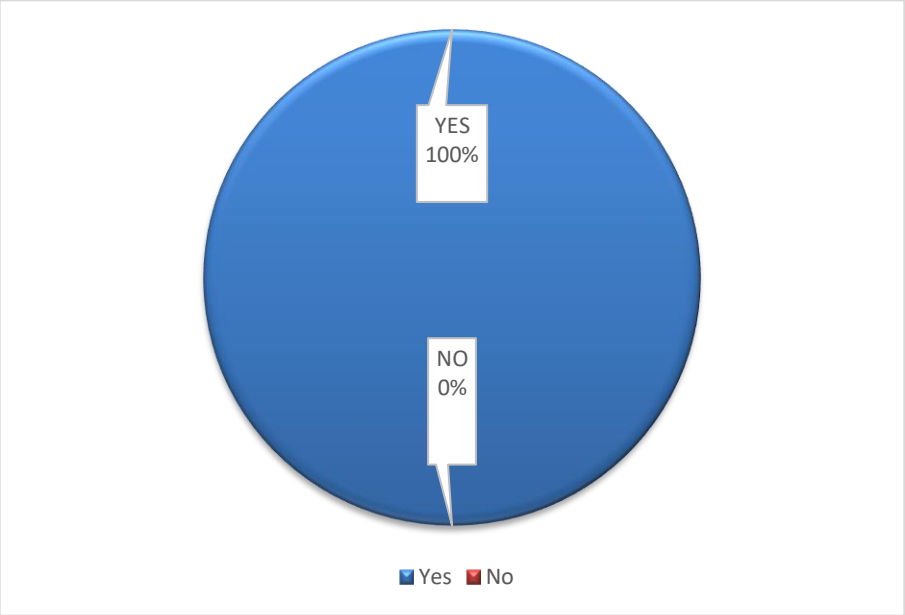


Figure 4.5: Ongwediva as a permanent residence

Figure 4.5 indicate the percentage of the research participants that are permanent residents of the town of Ongwediva. Therefore, all the residents and the OTC employees were permanent residents of Ongwediva.

4.2.9 Data on whether collecting annual statistics is costly

Table 4.4: The Cost of Collecting Annual Statistics: Analysing the Expenses Involved

Options	**Frequency %**	**Tally-~~###~~**
Yes	100	//
No	0	0
Total	100	2

Table 4.4 illustrate data that was collected from the employees of NSA whereby a 100% in terms of frequency was collected to stipulate that yes indeed the process of collecting annual statistics is costly. 0% was recorded in relation to option no collecting annual statistics is costly. This data indicates that the reason why local authorities in Namibia do not collect annual statistics in terms of road infrastructure development and maintenance is because the process is costly.

4.2.10 Data on whether collecting annual statistics is a positive initiative

Table 4.5: The Benefits of Collecting Annual Statistics: Examining the Positive Impact of this Initiative

Option	**Frequency %**	**Tally ///**
Yes	100	//
No	0	0
Total	100	2

Table 4.5 illustrate that given a sufficient amount of money towards the presentation of annual statistics on road infrastructure development and maintenance is a positive prospect. The table indicate that a 100% frequency is presented in relation to the option yes on the prospect of collecting data on road infrastructure development and maintenance while a 0% frequency was recorded on the option no. Collecting this data speaks towards the main subject matter which was the main topic of the thesis study on whether collecting annual statistics of local authorities in Namibia could change the state of the road infrastructure within local authorities. The data from table 4.5 presented an answer to the topic of the thesis study conducted.

4.3 DISCUSSIONS

This section of the paper collected data based on the use of interview sessions which were held between the researcher and the key informants. The key informants who were involved in the interview session with the research are as follows:

- Four Senior Officials at the OTC
- Two Official at NSA
- Two Officials at ORC
- Eight employees at two Multi-National companies in Ongwediva
- Two Civil Engineers; one from Nexus Group and the other one from RA respectively
- Two Project Managers; one from Shange Civils and the other one from Namibia Construction respectively

4.3.1 The level of road development and maintenance within the town of Ongwediva

Two officials of the town council were of the view that *"the level is not the same as the old roads were constructed with lower-level measurements and specifications while the new roads are constructed in terms of new measurements which uses high level measurements and specifications."* One official was of the view that he is not sure of the cause. However, one would assume poor implementation of the design as well as possible lack of proper supervision by Consulting Engineers. The principal client (the local authority) might have lacked supervision of the project too. The fourth official at the OTC was of the view that, *"the cause of a difference in the level of development and maintenance in roads as per various locations depends on the budget."*

4.3.2 The inception of collecting annual statistics on road infrastructure development and maintenance of local authorities in Namibia

Responses for this discussion were extracted from the question that was posted to the officials at Oshana regional council. Whereby, one official was of the suggestion that,

"there would be a need to construct a system-based database with a friendly and ergonomic interface that should be used to capture, maintain, and produce end-report (statistical information) on all roads developed and maintained annually." The other official was of the idea that, *"the law needs to be passed in order to regulate the collecting of annual statistics on roads and later incorporate it within the local authority act."*

4.3.3 Important elements that goes into the planning of a road construction

The two Project Managers were collectively said that, *"cost and the availability of construction material are key planning elements that has to look at when it comes to road construction."* One of the Project Manager went on to specify that, *"one has to have the right measurements when it comes to pavement, road margins, traffic separation, and the width of the road."*

The OTC officials are of the view that, *"it is fundamental to have a feasibility study and consultation with the local community before any development is incepted."* One went on to state that, *"strategic planning, budgeting, procurement plan, project planning, implementation through bidding, and alternative (Detour) road to keep traffic low are some of the crucial elements the local authority has to employ."* Another official stated that, *"a number of properties in a settlement and the standard of the settlement as well as finances are taken into account when planning for a road construction."*

4.3.4 The issue of underdeveloped road

This discussion was made up of views from the two Civil Engineers. The Civil Engineers were of the view that, *"low or high-volume fill design, material used and the cost of constructing the roads are some of reasons that result in some roads to be well developed*

and others underdeveloped." "Additionally, also the type of vehicles that use the roads have a huge role to play towards a road being well developed and maintained as well as it being underdeveloped."

4.3.5 The accuracy and reliability of annual statistics

Answers to this discussion were solely generated from the two officials of Namibia Statistics Agency that formed part of the thesis study. One of the officials was of the opinion that, *"because statistics are taken for demographic, economic and social sector reasons they are very accurate because they are collected using international methods and standards."* The second official was of the view that, *"official statistics of any interval (monthly, annual, bi-annual, ad-hoc) collected by the statistics are assessed against the national data quality assessment framework to examine the quality in all processes such as planning, sampling, collection, analysis, and dissemination of statistics."*

Furthermore, the second official went on to state that, *"the quality of statistics collected by other institutions will have to be certified by NSA through the Statistician General looking at all aspects." "Any national data or statistics its accuracy and reliability have to be verified by NSA,"* they collectively stressed.

4.3.6 Ways on monitoring and ensuring that a specific road is properly maintained and utilized

The two Civil Engineers strongly said, *"Roads are designed to cater for a certain class of vehicles at a given speed." "Therefore, if a small street in Ongwediva is not designed to cater for trucks, clear signage should be put up to monitor the use of the street." "Furthermore, roads can be properly maintained by fixing potholes when they occur*

instead of waiting until it has turned into a pond that cannot be managed." "The use of quality material in fixing potholes is also essential," says the Engineers.

4.3.7 Reasons why Namibia's national roads (one of the best on the global stage) cannot be compared to roads under the management and within the jurisdiction of local authorities

One of the two Civil Engineers gave a strategic response by stating that, *"national roads are maintained by RA and their budget is only on roads whereas local authorities have a budget that is broken down in many ways and goes towards various services such as roads, water and electricity and they also have different investments." The* second Civil Engineer was of the view that, *"competent and professional contractors who are expensive and mostly foreigners construct national roads and the same cannot be said in relation to a road within the jurisdiction of a local authority."* She further went on to conclude that, *"very few local contractors are used in the construction of a national road network."*

4.3.8 Thoughts on whether research participants are in agreement and or disagreement with the thesis study, mainly the problem statement

This discussion does make up or sums up the entire thesis study as it was derived from the problem statement of the study and all research participants were asked to give their views on it. In relation with the collected data and the thesis study conducted, it is right to state that over 90% of the research participants were in agreement with the study and its problem statement.

In relation with this theme the officials of the ORC both officials were in agreement with what the study is advocating for, one stated that she is in agreement with the significance or importance and design of what is to be done. The other official stated that roads need to be constructed with quality and existing roads should be well maintained, and both activities should be recorded.

The town council officials were also in agreement with the study. One official stated that she is in agreement with the study because it is needed for proper planning towards the development and maintenance of infrastructure. One went on to say that, statistics are essential for planning and budgeting as well as monitoring and evaluating road infrastructure within a local authority. Another official said that he was in agreement because the study will at the end of the day ensure quality and sufficient road network within various local authorities in the country.

Most of the residents were also in agreement with the theme. Some spoke in relation to the fact that they use the road on a daily basis and they need quality and better roads because it increases the chances of road safety and that can only be achieved when there are statistics in place. A few residents stated that annual statistics especially in the public office spectrum are quite essential towards holding public office bearers accountable.

Both Project Managers were also in agreement with theme. One said that he is in agreement mainly for the purpose of keeping track of the behaviour of the road over the years, it can also indicate whether road material deteriorates over the years or not. The second Project Manager agreed because the data can be used for different studies, reused to check different variables such as jam densities and speed limits.

In relation with the Civil Engineers that formed part of the study, one was in agreement with the theme while the other one disagreed with the theme. The one that was in agreement said that firstly some of these infrastructures are part of the manifesto of local authorities when it is that time of elections. If these stats are not available, how will the voters know where they should stand with their leaders? She asked. Secondly, you get new leaders coming in every other year. Thus, this will help to keep on the legacy of development for the specific local authority. The Engineer that disagreed said that the country does not need annual statistics right now because the current development rate of the nation is still low to think about adopting what the study is advocating.

The officials of NSA were also in agreement with the theme. One said that she is not objecting because statistics are needed by all sectors for planning and road infrastructure is not an exemption. The other official spoke in favour of effective planning when it comes to collecting annual statistics on roads of local authorities in Namibia.

In accordance with the eight employees of the Multi-National companies operating in Ongwediva, one employee was in disagreement with what the study is advocating for while the other seven employees were in agreement with the study. The one that disagreed with the study said he is disagreeing because what is important to him is what you use these statistics for while some of the employees that agreed with the study said that it is collect such statistics is important for development purpose since information will be documented and published for investors. Other employees agreed based on the reason that it is only through certified statistics that they can critic or applaud any leadership based on the results of the case studies provided and that is only when local authorities are able to make developments that contribute to the economy of the country as a whole.

4.4 RESEARCH QUESTIONS THAT WERE ADDRESSED IN THE STUDY

This section looked at the main research question of the thesis study, answers were provided for each research question.

- What other factors influence the development and maintenance of quality roads at local authority level?
- What sort of contribution can annual road statistics of local authorities in Namibia generate?
- Why are there no annual statistics on road infrastructure development and maintenance of local authorities in Namibia?

The following were the key answers to the research questions:

4.4.1 What other factors influence the development and maintenance of quality roads at local authority level?

In accordance with the data collected from the residents of Ongwediva who formed part of the study, a collective opinion states that they are not quite certain on the type of criteria the town council uses to determine the development and maintenance of quality roads. They further went on to say that, the frequency of people and cars on a certain path may influence the development of a certain road. Also, if the path leads to a certain place that offers essential services to the community at large. A fair number of the residents were also of the view that the type of leadership and governance from those in charge at the local authority and also the ability of the residents to keep the roads intact and in a good condition can influence both the development and maintenance of roads.

From the perspective of the OTC, two employees were of the same view stating that the set of standard and measurement, which are set by the OTC and RA, are fundamental to influencing the development and maintenance of roads at the local authority level. One official was of the view that the volume of traffic, the type of vehicles using the road, density and general development of the location are the main factors that influence the development and maintenance of quality roads at local authority level. Another official of the Ongwediva local authority was of the view that finances as well as the standard of the settlement does influence the development and maintenance of quality roads at local authority level.

One of the two Civil Engineers interviewed was of the point that the population of a local authority, the number of loads that will be on the roads, and the availability of resources and investors are what influence the development and maintenance of roads at the local level. The other Engineer also emphasized on the availability of funds, investors, and the inflow of tourists or visitors in the area.

The response from one of the two Multi-National companies was that road development and maintenance is the prerogative of the line ministry and the town council. Thus, the development thereof is based on their long-term vision. From a financial perspective, the ability of the town council to generate sufficient user chargers affects the development and maintenance of roads. Meaning each road user provides a percentage (based on the GVM of their vehicle) logistics companies such as ours with a fleet size of approximately fifteen (15) in Ongwediva alone contribute significantly towards these developments and maintenances. Therefore, it is much more profitable from the town to maintain the central business district rather than every local network. The other Multi-National company gave

the same views as the Civil Engineers in stating that population growth, employment rates, good leadership, annual statistics, road occupants, climate change, and consistent progress are the factors that influence road infrastructure development and maintenance.

4.4.2 What sort of contribution can annual road statistics of local authorities in Namibia generate?

The two Multi-National companies that formed part of the study were in agreement with this question. One stated that annual road infrastructure development statistics play a vital role in investment. The availability of this data provides an insight to entities such as ours on the business prospects within the town. Ongwediva is less than 15 Kilometres away from a much more developed and investor friendly Oshakati but Ongwediva has an advantage based on its geographic location. From an investor perspective, the documentation and publication of these statistics would help us make an informed decision as to where to invest next, as it would highlight the development rate of the town, ease of access within and around the town, and administrative and business cost. The other Multi-National company state that annual statistics on road infrastructure development and maintenance will help monitor the development progress of local authorities' leadership as well as keep leadership accountable for their decision making and application when it comes to road infrastructure.

Some of the residents were of the view that statistics are important and it is the only thing that helps one measure the level at which development and maintenance is being done, and it further helps hold the town council accountable. Other residents state that it is important to collect statistics on roads of local authorities because just like other many

other projects roads too need to be regularly monitored or evaluated and have their statistics documented and reported to confirm whether they are effective in serving their original purpose and are keeping up with the development of times.

The Civil Engineers collected different views where one was in agreement while the other was in disagreement with the theme. One stated that it allows the local authority to better plan for future development and to also track on how far along they are with short and long-term goals of the local authority in terms of infrastructure development. The other Civil Engineer said annual statistics will cost a lot of money and some information that are not development oriented will be recorded.

Both Project Managers were in agreement with the theme. One stated that collecting annual statistics would give the local authority an indication of the quality of work with reference to its expected life span. The second Project Manager stated that it could help access road quality by determining annual maintenance costs, record traffic flows and for future planning.

The ORC officials were also in agreement with the theme. One official stated that it is important to produce and maintain annual statistics on road infrastructure development and maintenance to update both the public, taxpayers, road users, and donors or funders of the road. The other official added that it will keep all stakeholders informed and such statistics would be used for proper planning.

In relation to the officials at the OTC that formed part of the study they were all in agreement with the question. One said that the annual statistics would help keep record for renovation when the roads reach their maximum obsolete. Alternatively, one official

said that collecting annual statistics on the road infrastructure development and maintenance of local authorities in Namibia gives a proper reflection of the development and it further provides indication of what should be done moving forward in line with strategies.

One official of NSA did not agree or disagree with whether having annual statistics is important or not, she said that maybe it could be important for planning or decision making and or policy development. However, the other official of NSA stated that statistics are a crucial tool that informs policy and project design, implementation and evaluation in any area of service. The road infrastructure development and maintenance of local authorities certainly cannot be an exception.

4.4.3 Why are there no annual statistics on road infrastructure development and maintenance of local authorities in Namibia?

This research question was extracted from the officials of NSA and it was able to be answered with the help of two sub sections.

4.4.3.1 Constraints Namibia as a country is likely to encounter if it is to adopt annual statistics on road infrastructure development and maintenance of local authorities in Namibia.

One official stressed that committing to the compilation of annual statistics in any respect takes a lengthy process. This cuts across gazetting the decision at cabinet level, identifying and specifying key data producers and users, understanding specific data needs and requirements, as well as clarifying financial needs and sources. Constraints will vary time to time. It may begin with specifying the technical data requirements of what statistics

will be collected concerning road infrastructure development and maintenance of local authorities. These areas are quite wide and therefore care will be required in identifying the statistics that will be collected, such that they are not duplicating what is already in place, and such that they are able to directly inform government policies.

Another challenge may arise in identifying and committing specific offices to this task. This will require fitting this task in an existing institution's strategic plan, as well as establishing and training human resources to this regard. This will also include establishing a community or cooperation of offices that will work hand in hand in ensuring the realization of this task. Financial resources may also pose as a challenge, especially in an economy heavily impacted by the Covid-19 pandemic. The other employee said that she would not comment much on this given the response given by her colleague but it would be costly given that the Namibia Statistics Agency has never collected this type of data before.

4.4.3.2 The role NSA will have to employ in order to make annual statistics on road infrastructure development and maintenance of local authorities in Namibia a reality

The officials stressed that the institution would hold consultations with local authorities to identify the needs. The need first has to be discussed with the Statistician General and the Chief Executive Officer (CEO) of the local authorities. Committing to this exercise requires that it is gazette as per the Statistics Act No.9 of 2011. Depending on the role that the office would take up, the Namibia Statistics Agency may spearhead data collection and analysis as advised by the data users and key offices, or it (Namibia Statistics Agency) may provide logistical and technical support to another office that would be required to

produce these statistics. In case of the latter, the Namibia Statistics Agency would then assess the quality of the produced statistics as the national data quality standards.

4.5 COMBINED ANALYSIS OF THE RESEARCH QUESTIONS AND OBJECTIVES

This section looked at analysing the findings of the study in line with the research questions and objectives.

4.5.1 Factors that influence the development and maintenance of quality roads at local authority level.

In alignment with this research question and objective, it was found that the type of leadership and governance from those in charge at the local authority level can influence both the development and maintenance of roads. This implying that a lack of good governance at local authority level could hinder proper maintenance and development of road infrastructure. In addition, standards and measures set by a respective local authority in collaboration with RA are fundamental towards the type of road infrastructure being developed and maintained. Thus, it is of essence to carefully adhere to the demands of the set standards and measures. Budget allocation towards the development and maintained of roads at local authority does also influence the type of road infrastructure being developed and maintained whereby a lack of funds towards the road infrastructure agenda could mean poor roads being developed of not maintained as per the set standards and measures.

4.5.2 The sort of contribution that annual road statistics of local authorities in Namibia could generate

It was discovered that the creation of annual statistics on road infrastructure is quite vital towards local authorities making informed road infrastructure decisions while also attracting investment in various forms if the local authority has well developed and maintained road infrastructure. However, the study found that the creation of annual statistics on road infrastructure development and maintenance at any level of government would be costly. Despite the financial implications that could be drawn from the creation of road infrastructure at the local government level, the creation of annual statistics could be a crucial tool towards policy reforms and project design, implementation and evaluation in any area of service.

4.5.3 The reasons as to the realisation of having no annual statistics on road infrastructure development and maintenance of local authorities in Namibia

The main reason towards addressing this question and or research objective is drawn towards the fact that it is a costly exercise to come up with annual statistics on this kind. It has also been found that the process of adopting and implementing new legislations in the form of policies is lengthy and challenging as implicating factors would vary from time to time. A classic example is the fact that the national government is faced with a huge debt and the economy is still recovering from the financial effects of the Covid-19 pandemic.

4.6 DISCUSSING THE FINDINGS OF THE STUDY IN RELATION WITH THE LITERATURE REVIEWED

Two theoretical frameworks were used in the study in which the asset management framework by Shachoy (2018) and Ganti (2023) was in line with the finding of the study as the study found that the creation of annual statistics on road infrastructure of local authorities in Namibia is not only a lengthy process but also costly. However, the asset management framework advocate for institution to look past how expensive the management and development of assets might be and best focus on the benefits of having assets well managed. The second framework was the sustainable road infrastructure development which was centred on developing and maintaining road infrastructure for the future generation to best use the same infrastructure. The study found that within the town of Ongwediva roads in different areas of the town were developed and maintained differently which is not in line with what the sustainable road infrastructure development framework is advocating for.

In accordance with Tendane (2023), the RFA was first suggested to give local and regional governments N$1 billion from its expected N$2,4 billion in annual revenue by the local authorities and the Association of Local Authorities in Namibia. Based on the same author, local governments need between N$10 million and N$20 million annually on average just for the upkeep of paved roadways but this does not include the construction of new roads or additions like kerbs and pavements. The study found that cost and the availability of construction material were key planning elements whereas the cost of constructing the road were some of the reasons that result in the road being well developed or underdeveloped. The literature by Tendane (2023) indicate that the lack of funds that

local authorities get from its stakeholders could be the reason the road infrastructure of local authorities in Namibia being considered underdeveloped. The study was able to identify that the cause in the difference in the level of development and maintenance in roads does depend on the budget allocation.

According to the literature by Duncan and Popp (2018), the highlighted that collecting data could be helpful with urban planning and the delivery of public services. In consistency with Duncan and Popp, the study found that even though collecting annual data is a costly exercise they are taken to address demographic, economic and social problems. Furthermore, the study found that statistics were needed for all sectors and road infrastructure was not an exemption.

Schachtebeck and Mbuya (2016) identified the impact of road infrastructure and they relate to what the study found. In addition, Basit (2021) expressed that up to 1% of a nation's GDP can be lost due to a bad road system and the transportation of goods between locations becomes quite challenging. The study through the data collected from two Multi-National companies found that from a financial perspective the ability of the OTC to generate sufficient user chargers, it is much more profitable for the town to maintain the central business district rather than every local road network. Moreover, the World Bank (2019) postulate that effective road infrastructure reduces travel times and congestion while increasing transportation efficiency. The study found that there has been a substantial difference between the participants that were satisfied with the road infrastructure of the Ongwediva local authority and those that were not satisfied with the town's road infrastructure. As a result, 14% of the research participants were satisfied with

the road infrastructure while 86% of the research participant were not satisfied with the road infrastructure at the town.

According to Mostafa (2018), many nations, not only those in Africa, often only provide 20 to 50 percent of their total budgets for road maintenance. The same author went on to state that postponing maintenance is equivalent to having it rebuilt because it incurs substantial direct and indirect expenses. The study found that finances as well as the standard of the settlement does influence the development and maintenance of quality roads at local authority level. The consequences of having a poor road infrastructure is that it may result in more traffic congestion longer travel times, and less effective transit systems (American Society of Civil Engineers, 2021). Furthermore, poor road maintenance can lead to worsening road conditions, greater vehicle running expenses, and a rise in the likelihood of accidents and injuries. This literature by the American Society of Civil Engineers (2021) is in line with the findings of the study whereby it was identified that the volume of traffic, the type of vehicles using the road, density and general development of the location are the main factors that influence the development and maintenance of quality roads at local authority level.

Moving on, Kelegama (2016) identified the importance of annual statistics whereby it was stated that statistics are important because they provide the jurisdiction for creating policies and they are aid in identifying needs, establishing goals, and tracking success. The literature by Kelegama (2016) further expressed that the development progress is blind without accurate statistics whereby the policymakers cannot learn from their errors and the public cannot hold them accountable. Therefore, the literature by Kelegama (2016) is in alignment with the findings of the study in which the official from Namibia Statistics

Agency was of the suggestion that the law need to be passed to regulate the collection of annual statistics on roads of local authorities in Namibia and later to incorporate the changed law within the Local Authority Act.

4.7 SUMMARY

This chapter presented the results based on the analysis of the data collected. The thesis study used a mixed research approach that combined quantitative and qualitative research techniques. The qualitative data collected was discussed in-depth, while the quantitative data was presented utilising figures and tables. The connection between the study's findings and the literature covered in chapter two was also illustrated in this chapter. The study questions were effectively answered by the researcher through analysis of the questionnaires and interviews that the research participants completed. The study found that even though the collection of annual statistics on road infrastructure is a costly exercise, having annual statistics would ensure that the right decisions are made in relation with the road infrastructure of the Ongwediva local authority. The following chapter focusses on the conclusions and recommendations of the entire study.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

In chapter four, the thesis study presented significant findings that were gathered in order to address the research problem statement and the main research questions of the thesis study conducted. The chapter established and presented key findings, while further ensuring that those findings were closely connected to the relevant literature reviewed in chapter two. The findings of the thesis study were presented in alignment with the mixed research methodology which was employed by the study. This chapter concludes and sums up the findings from the study, based on the main research questions of the study. Furthermore, within this chapter the researcher establishes and presents possible recommendations of the study.

5.2 CONCLUSIONS

Based on the findings of the study, the research was able to prove that coming up with this type of annual statistics would help to contribute to the proper development and maintenance of local authority roads in Namibia. It is safe to state that when a country has well-developed and maintained local-authority-administered roads it should further help contribute and enhance national development, which is important for a country such as Namibia (developing country) that depends on the inflow of foreign direct investment. Factually, when there is limited to very limited development within a jurisdiction of a local authority, then chances of that local authority to attract investment and or business opportunities is little to none.

The study was instrumental in highlighting the various challenges facing the consideration of annual statistics in road infrastructure development and maintenance. The study also emphasised the challenges that a country and collective of local authorities are most likely to encounter given the need to address the problem statement of the study as well as how the study's recommendations can be put into practice.

The world that is ever changing craves for development and evolution of ways of living and being. The annual statistics on road infrastructure development and maintenance of local authorities in Namibia should help ensure that road management is carried out in a simplified manner. As a global village the world is moving into a data driven environment and the study showed that annual statistics could form part of that world, as it would help improve road infrastructure all over the country. Therefore, as a result of tangible data or statistics, there would be a clear indication of where in the country infrastructure funds are mostly needed.

The decision to focus the study on the local authority of Ongwediva was a strategic one, given that Ongwediva is one of the fast-growing local authorities in Namibia and the development of various infrastructures is imminent. Hence, the study could help ensure that proper planning and management of the road infrastructure of local authorities in Namibia is taken into account.

5.3 RECOMMENDATIONS

Based on the findings of the study, the following recommendations can be applied to ensure that the essence of annual statistics on road infrastructure development and

maintenance of local authorities in Namibia is realised, not only for the local authority of Ongwediva but also for all local authorities as a collective.

First recommendation

The study recommends that local authorities in Namibia set aside monies to assist the national government in creating annual statistics on the development and maintenance of local authorities' road infrastructure.

Second recommendation

Based on the findings from NSA, statistics are critical and very useful to assess and inform policies and projects. Therefore, the study further recommends that proper planning for developing and maintaining road infrastructure is vital. Thus, the application of annual statistics for road infrastructure development and maintenance of local authorities in Namibia speaks towards effective and efficient governance.

Third recommendation

The study recommends that local authorities should adopt a strategic plan to address the disparity in road infrastructure development and maintenance between each local authority's central business district and its less used roadways.

Fourth recommendation

Local authorities should make every effort to provide comparable services to address the increasing demand for road infrastructure development and maintenance within their jurisdiction.

Fifth recommendation

It is recommended that local authorities facilitate consultative meetings involving the Ministry of Urban and Rural Development, Association of Local Authorities in Namibia, Road Fund Association, and the NSA. The purpose of these meetings is to explore effective and efficient strategies for adopting the annual statistics on road infrastructure development and maintenance in the country.

Sixth recommendation

The study recommend local authorities in Namibia must advocate for the legislative branch to hold a full discussion and reform the Local Authority Act. These modifications would make it easier to collect annual statistics, which would be crucial information for local authorities in Namibia to use when making decisions about the building and maintenance of road infrastructure.

Seventh recommendation

The study further recommends that it is essential to conduct yearly reviews of the Local Authority Act to ensure it remains aligned with the evolving demands of the global village. These yearly reviews would allow for necessary updates and adjustments to address the changing needs and challenges faced by local authorities in Namibia.

RECOMMENDATIONS FOR FURTHER STUDIES

Based on the findings of the study, the study conclusively recommends for more studies to be done in relation with the development and maintenance of road infrastructure under

the jurisdiction and management of local authorities in Namibia. Therefore, this study presented an opportunity for more studies to be conducted as a way to examine how the development and maintenance of road infrastructure does influence the development of local authorities in Namibia.

REFERENCE LIST

African Development Bank Group (2018). *Road infrastructure in Africa: Challenges and Opportunities.* African Development Bank, Ivory Coast, Abidjan.

American Society of Civil Engineers (2021). *2021 Record Card for America's Infrastructure.* American Society of Civil Engineers, Reston, Virginia, USA.

Ametepey, S. O., Aigbavboa, C., & Thwala, W. D. (2019). *A Conceptual Framework for Sustainable Road Infrastructure Project Implementation in Developing Countries.* Conference: Creative Construction Conference 2019.

Asian Development Bank (2017). *Infrastructure for Sustainable Development: Examining the Role of Development Financial Institutions in Asia and the Pacific.* Asian Development Bank, Mandaluyong, Philippines.

Anupoju, S. (2016). *Classification of Roads and their Details.* The Constructor- Civil Engineering, Miami, Florida, USA.

Basit, N. (2021). *15 Reasons Why Roads are Important.* Curious Desire, USA.

Ben, S. O. (2019). *Significance of Road Infrastructure on Economic Stability.* American International Journal of Multidisciplinary Scientific Research, 5(4), 1-9.

Berg, C., Deichmann, U., & Selod, H. (2015). *How roads support development.* World Bank Blog, Geneva, Switzerland.

Brandt, E. (2019). *Trade corridor infrastructure to play pivotal role in Intra-Africa trade.* The New Era newspaper, Windhoek, Namibia.

Casey, M. J. (2023). *What are the Different Types of Road Infrastructure?* About-Mechanics, USA.

Ceres, P. (2012). *"The 21st Century Corporation: The Ceres Roadmap for Sustainability".* Advancing Sustainable Prosperity.

Chappelow, J. (2023). Statistics in Math: Definition, Types, and Importance. Investopedia, Dotdash Meredith, USA.

Cormon, P. (2022). *Review of Africa's Road Transport Infrastructure.* The Trade Law Centre, South Africa.

Corporate Finance Institute (2020). *Annual Report.* Corporate Finance Institute Education, USA.

Country Reports (2020). *Traffic and Road Conditions in Namibia.* Amazon Services LLC Associates Program, USA.

Construction Manual first Edition, (2014). *Roads Authority Construction Manual.* Roads Authority of Namibia, Windhoek.

Creswell, J. W. (2018). *Research Design: Qualitative, Quantitative and Mixed Methods Approaches (5th Ed.).* London: Sage Publications Ltd.

Dahir, A. L. (2017). *No Paved Roads: African Countries still cannot raise enough Capital to replace their Bad Roads.* Quartz, New York City, USA.

Dempsey, P., & Tutumluer, E. (2015). *Mechanistic-Empirical Design and Performance Prediction of Gravel Roads.* Transportation Research Record: Journal of the Transportation Research Board, (2180), 113=122. Doi 10.3141/2180-13

Donalson, D. (2015). *The Gains from Market Integration.* Annual Review of Economics, 7(1): 619-647.

Duncan, H., & Popp, I. (2018). *World Migration Report 2018, Chapter 10: Migrants and cities: Stepping Beyond World Migration Report 2015.* International Organization for Migration, Geneva, Switzerland.

Etchegaray, J., & Fischer, W. (2010). *Understanding evidence-based research methods Reliability and validity considerations in survey research*. Research Methods column, 131-135.

Felbermayr, G., & Kohler, W. (2015). *New Economic Geograph.* Handbook of the Economics of International Migration, Volume1, 2015, Pages 913-1025.

Fraenkel, J. R., Wallen, N., & Hyun, H. H. (2012). *How to design and evaluate research in education (8th ed.).* New York: Mc Graw Hill.

Frost, J. (2022). *The Importance of Statistics.* Statistics by Jim, American Society of Quality Statistics Digest, USA.

Ganti, A. (2023). *What is Asset Management and what do asset managers do?* Investopedia, Dotdash Meredith, USA.

Global Infrastructure Hub (2021). *Innovative Financing.* Global Infrastructure Hub, Sydney, Australia.

Green, M. A. (2023). *Why Africa talks so much about Infrastructure.* Wilson Center, Pennsylvania, USA.

Halleman, B. & Garemo, N. (2019). *Five (5) Ways to Improve the Delivery of Road Projects.* International Road Federation, Washington DC, USA.

Haimbala A, N. (2014). *An Investigative Study on the Namibian Defence Force's Combat Readiness Focusing on Alternative Policy of Termination and Retention of Expertise in the Military Services.* Windhoek: University of Namibia, Windhoek.

Hayes, A. (2022). *Annual Report Explained: How to Read and Write Them.* Investopedia, Dotdash Meredith, USA.

Holtz, L., & Heitzig, C. (2021). *Figures of the week: Africa's spatial distribution of road infrastructure.* Global Economy and Development, Africa Growth Initiative.

International Transport Forum (2015). *Project Appraisal and Selection: Best Practice Guidelines for Transport Investment Projects.* International Transport Forum, Paris, France.

International Road Federation (2016). *The Socio-Economic Benefits of Road Infrastructure Investment.* Washington DC, USA.

Ivanova, E. & Masarova, J. (2013). *Importance of Road Infrastructure in the Economic Development and Competitiveness.* Alexander Dubcek University of Trencin, Slovakia.

Kelegama, S. (2016). *Role of statistics for the economic and social development of a country.* Institute of Policy Studies of Sri Lanka, Sage Journals, California, USA.

Klerk, E. (2023). *N$248 million for Walvis Bay roads.* The New Era newspaper, 17 February 2023, Namibia, Windhoek.

Li, L., Wag, X., & Zhang, X. (2015). *Performance Evaluation of Concrete Pavements Considering Early-Life Vehicle Operations.* Journal of Materials in Civil Engineering, 27(6), 04014199.

Local Authority Act, 1992 (Act NO.23 of 1992). Government Gazette number 7718, Windhoek, Namibia.

Lutombi, C. M. (2021). *Namibia tops list of best quality roads in Africa.* Roads Authority Namibia, Windhoek, Namibia.

Mackie, P. J., & Smith, N. J. (2017). *Road Transport Infrastructure: Business Models, Trends and Prospects.* Institute for Transport Studies, University of Leeds, UK.

Malkoc, G. (2015). *The importance of road maintenance.* World Highways, Philadelphia, USA.

Mazrekaj, R. (2020). *Impact of Road Infrastructure on Tourism Development in Kosovo.* International Journal of Management, University of Prishtina, Kosovo.

McKinsey (2020). *Solving Africa's infrastructure paradox.* McKinsey & Company, USA.

Mostafa, H. M. (2018). *Road Maintenance in Africa: Approaches and perspectives.* Sustainable Roads, Urban and Transportation (SURT) research group, Department of Civil Engineering, Central University of Technology, South Africa, Bloemfontein.

Namakalu, H., Niishinda, E., Kadhila, I., Fillipus, H., Mukasa, N., & Mushendami, P. (2014). *Infrastructure Financing in Namibia.* Bank of Namibia, Windhoek.

Namibian High Commission London. (2017). *Namibian Infrastructure.* High Commission of the Republic of Namibia, 6 Chandios Street, London.

National Population and Housing Census (2011). *Population of Ongwediva and Oshakati.* National Population and Housing Census, Windhoek.

Ndarana, T., Onduso, I., & Luvanda, E. (2019). *Characterisation of Murrum for Road Construction in Developing Countries.* International Journal of Engineering Research & Technology, 8(2), 1444-1449.

New Era (2021). *Namibia again tops list of best quality roads in Africa.* The New Era newspaper, 25 January 2021, Namibia, Windhoek.

Ng, C. P., Law, T. H., Jakarni, F. M., & Kulanthayan, S. (2019). *Road infrastructure development and economic growth.* 1OP Publishing LTP, Volume 512, Selangor, Malaysia.

Nilsen, S. H., & Hanssen, J. E. (2013). *The Structural Design of Flexible Pavements.* Road Materials and Pavement Design, 149sup1), 21-36.

Poudel, E. M. K (2019). Earthen Road: Construction, 2 Types, Advantages & Disadvantages. Dream Civil International, London, UK.

Rao, G. V. R. (2014). *Construction of Water Bound Macadam Road.* International Journal of Engineering Research & Technology, 3(3), 142-144.

Roads Authority Act, 1999 (Act NO.17 of 1999). Government Gazette number 7718, Windhoek, Namibia.

Roads Authority Namibia (2015). *Strategic Plan 2015-2020: Ensuring Safe, Efficient, and Sustainable Road Transport Infrastructure.* Roads Authority Namibia, Windhoek.

Ross, D., & Townshend, M. (2018). *The Economic Importance of an Optimal Road Investment Policy in South Africa.* School of Economics, University of Cape Town, Cape Town, South Africa.

Rothenberg, A., Gozalez-Navarro, M., Gracner, T., & Gertler, P. J. (2022). *The Benefits of road maintenance: Lessons from Indonesia.* Voxeu Column, Indonesia.

Saunders, M., Lewis, P., & Thornhill, A. (2016). *Research Methods for Business Students (6th Edition).* Harlow England: FT Prentice Hall, Pearson Education.

Schachtebeck, C., & Mbuya, J. M. (2016). *Assessing the Potential Benefits of Road Infrastructure Development for Poverty Alleviation: Lessons Learnt from Developing Economies.* University of Johannesburg, South Africa.

Sekaran, U., & Bougie, R. (2015). *Research methods for business (6th ed.).* West Sussex, United Kingdom: John Wiley & Sons.

Shachoy, A. (2018). *Key Characteristics and Benefits of an Effective Asset Management Framework.* 222 West Las Colinas Blvd, Dallas, USA.

Shaanika, M. (2019). *Invest in roads infrastructure-Schlettwein.* The Namibian newspaper, 01 February 2019, Namibia, Windhoek.

Sims, A. (2017). *What is a Building Manual?* Business West 200, Bristol City, UK.

Singh, R. D., & Gupta, A. (2018). *Evaluation of Soil Stabilization using Kankar for Rural Road Construction.* International Journal of Geotechnical Engineering, 12(4), 348-355.

Tendane, S. (2023). *RFA sets aside N$248m for Walvis Bay road upgrade.* The Namibian newspaper, 13 May 2023, Namibia, Windhoek.

Tjitemisa, K. (2021). *Govt commits to better infrastructure.* The New Era newspaper, 19 April 2021, Namibia, Windhoek.

World Bank (2014). *Africa's Infrastructure: A Time for Transformation.* The World Bank, Switzerland, Geneva.

World Bank (2017). *Sustainable Road Asset Management; A Practical Implementation Guide.* The World Bank, Switzerland, Geneva.

World Bank (2019). *The High Toll of Traffic Injuries: Unacceptable and Preventable.* The World Bank, Switzerland, Geneva.

World Economic Forum (2016). *Enabling Trade: Valuing Growth Opportunities.* World Economic Forum, Cologny, Switzerland.

World Economic Forum (2019). *The Future of Jobs Report 2018.* World Economic Forum, Cologny, Switzerland.

World Road Association (2015). *Road Project Delivery Practices.* World Road Association, Paris, France.

APPENDIX 1: ETHICAL CLEARANCE CERTIFICATE

ETHICAL CLEARANCE CERTIFICATE

Ethical Clearance Reference Number: DEC FOC/ 22/13 Date: 15/06/2022

This Ethical Clearance Certificate is issued by the University of Namibia Ethics Committee (REC) in accordance with the University of Namibia's Research Ethics Policy and Guidelines. Ethical approval is given in respect of undertakings contained in the Research Project outlined below. This Certificate is issued on the recommendations of the ethical evaluation done by the ethics committee.

Title of Project: **:** THE ESSENCE OF ANNUAL STATISTICS ON ROAD INFRASTRUCTURE DEVELOPMENT AND MAINTENANCE OF LOCAL AUTHORITIES IN NAMIBIA: A CASE STUDY OF THE ONGWEDIVA TOWN COUNCIL

Student: Petrus Mbidi Student Number: **201100471**

Supervisor(s): *DR BRIAN LWENDO*

Centre for Research Services

Take note of the following:

1. Any significant changes in the conditions or undertakings outlined in the approved Proposal must be communicated to the ethics committee. An application to make amendments may be necessary.
2. Any breaches of ethical undertakings or practices that have an impact on ethical conduct of the research must be reported to the ethics committee

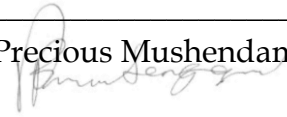
3. The Principal Researcher must report issues of ethical compliance to the ethics committee (through the Chairperson) at the end of the Project or as may be requested by the ethics committee
4. The ethics committee retains the right to:

i) Withdraw or amend this Ethical Clearance if any unethical practices (as outlined in the Research Ethics Policy) have been detected or suspected,

ii) Request for an ethical compliance report at any point during the course of the research.

The ethics committee wishes you the best in your research.

Precious Mushendami (Chairperson Ethics Committee)



Prof. Davis Mumbengegwi (Head, Multidisciplinary Research)

APPENDIX 2: RESEARCH PERMISSION LETTER

CENTRE FOR RESEARCH SERVICES
Office of the Pro- Vice Chancellor: Research, Innovation & Development
University of Namibia, Private Bag 13301 , Windhoek. Namibia
340 Mandume Ndemufayo Avenue. Pioneers Park. Office F223 F Block, Second Floor

☎ +264 61 206 4673; E-mail:kmbulu@unam.na; URL: http//www.unam.edu.na

UNAM
UNIVERSITY OF NAMIBIA

UNAM

RESEARCH PERMISSION LETTER

Date: 30/06/2022

Student Name: Petrus Mbidi

Student Number: 201100471

Programme: Masters of Public Administration

Approved Research Title: The Essence of Annual Statistics on Road Infrastructure Development and Maintenance of Local Authorities in Namibia: A Case Study of The Ongwediva Town Council.

TO WHOM IT MAY CONCERN

I hereby confirm that the above-mentioned student is registered at the University of Namibia for the programme indicated. The proposed study met all the requirements as stipulated in the University guidelines and has been approved by the relevant committees.

The proposal adheres to ethical principles as per attached Ethical Clearance Certificate.

Permission is hereby granted to carry out the research as described in the approved proposal.

Best Regards

Dr. AEF Shikongo
Head: Postgraduate Support Services
Tel: +264 61 206 3129
E-mail: aeshikongo@unam.na

CENTRE FOR RESEARCH SERVICES
Office of the Director
2022 -06- 30
University of Namibia
UNAM

APPENDIX 3: INFORMED CONSENT

THE ESSENCE OF ANNUAL STATISTICS ON ROAD INFRASTRUCTURE DEVELOPMENT AND MAINTENANCE OF LOCAL AUTHORITIES IN NAMIBIA: A CASE STUDY OF THE ONGWEDIVA TOWN COUNCIL

Name of Researcher: Petrus Ndeumono Mbidi

Dear……

You are hereby kindly requested to take part in the abovementioned study. Your participation to this important study will be deeply appreciated. Kindly read the following information carefully. Please ask the researcher if there is anything that is not clear or if you need more information.

STUDY PROCEDURES

This interview, with your kind and explicit permission, will be recorded with an iPhone voice recording application (face to face). The researcher (interviewer) may make notes during the course of the interview, again with your kind permission. As participant to the study you as the undersigned voluntarily grant this right and permission to the researcher. As participant, your involvement is voluntary and confidential at all times. Should you for whatever reason feel that you want to withdraw from the study, you are welcome to do so.

The researcher will abide by the ethics, norms and values of the social scientific community and the data obtained will be treated in the strictest confidence and used for academic purposes only. No names will be mentioned under any conditions to protect the confidentiality of you as participant to the study.

CONFIDENTIALITY

Your responses to the questions in this interview schedule will be anonymous and strictly confidential. Every effort will be made by the researcher to preserve confidentiality including the following:

- Storing all audios on iCloud embedded password, and deleting them from the phone's hardware.
- Assigning code names/numbers for participants that will be used on all research notes and documents
- Keeping notes, interview transcriptions, and any other identifying participant information in a locked file cabinet in the personal possession of the researcher. Until the completion of the study where after such documents will be destroyed.

Participant data will be thus be kept strictly confidential under all circumstances.

CONTACT INFORMATION

If you have questions at any time about this study, or you experience adverse effects as the result of participating in this study, you may contact the researcher whose contact information is provided on the first page. If you have questions regarding your rights as a research participant, or if problems arise which you do not feel you can discuss with the Researcher please contact the UNAM Centre for Research & Publications at research@unam.na or contact UNAM Research Ethics Committee at **+264 061 2063061** or pclaassen@unam.na. Should you wish to contact the supervisor to this study, Prof. Ian Liebenberg (sblwendo@unam.na or mobile: +264811479001) you are most welcome.

VOLUNTARY PARTICIPATION

Your participation in this study is voluntary. It is up to you to decide whether or not to take part in this study. If you decide to take part in this study, you will be asked to sign a consent form (see below). After you sign the consent form, you are still free to withdraw at any time and without giving a reason. Withdrawing from this study will not affect the relationship you have, if any, with the researcher. If you withdraw from the study before data collection is completed, your data will be returned to you or destroyed.

CONSENT

I have read and I understand the provided information and have had the opportunity to ask questions. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason and without cost. I understand that I will be given a copy of this consent form. I voluntarily agree to take part in this study.

Participant's signature _____ Date _____

Researcher's signature _____ Date _____

APPENDIX 4: QUESTIONNAIRE

A QUESTIONNAIRE TO BE ANSWERED BY THE RESIDENTS OF THE TOWN OF ONGWEDIVA

I, Petrus Ndeumono Mbidi, a MASTERS OF PUBLIC ADMINISTRATION (PMT-5972) Student, (Student Number 201100471) a postgraduate student at the University of Namibia (UNAM) School of Postgraduate Studies. I am carrying out a thesis on ***"THE ESSENCE OF ANNUAL STATISTICS ON ROAD INFRASTRUCTURE DEVELOPMENT AND MAINTENANCE OF LOCAL AUTHORITIES IN NAMIBIA: A CASE STUDY OF THE ONGWEDIVA TOWN COUNCIL"***

The main research questions of the thesis study:

1. What factors influence the development and maintenance of quality roads at local authority level?
2. How important will the recording of annual statistics on road infrastructure development and maintenance of local authorities be on the growth and development of local authorities in Namibia?
3. Why are there no annual statistics on road infrastructure development and maintenance of local authorities in Namibia?

SECTION A: Demographic

Please circle where applicable.

1. How long have you been a resident of Ongwediva?

(a) Less than 5 Years

(b) 5 Years

(c) Less than 10 Years

(d) 10 Years

(e) Over 10 Years

2. What is your Gender?

   (a) Male

   (b) Female

3. Is Ongwediva your permanent place of residence?

   (a) Yes

   (b) No

4. Are you satisfied with the road infrastructure within the town of Ongwediva?

   (a) Yes

   (b) No

5. Between formal and informal, which one is your settlement sector?

   (a) Formal

   (b) Informal

SECTION B: Addressing the main research questions and the status of local authorities' road infrastructure

6. Is the road developed and maintained to your satisfaction within the town? Give an elaborated answer.

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7. Do you like quality of the road infrastructure in terms of the development and maintenance? Give an elaborated answer.

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8. Is there a difference in terms of quality among roads within various locations of the town? Give a detailed response.

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9. What factors influence the development and maintenance of quality roads at local authority level?

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10. Is it important to have annual statistics on road infrastructure development and maintenance of local authorities in Namibia? Give reason for your answer.

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11. The study is based on the essence of annual statistics on the nature of road infrastructure development and maintenance. Are you in agreement or disagreement with what the study is advocating? Please provide a reason for your answer.

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12. Do you have anything else to say in relation to the importance of having annual statistics on road development and maintenance at local authority level in Namibia?

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APPENDIX 5: INTERVIEW SCHEDULE

QUESTIONS TO BE ANSWERED BY OFFICIALS FROM THE PLANNING AND DEVELOPMENT DEPARTMENT AT THE ONGWEDIVA TOWN COUNCIL

I, Petrus Ndeumono Mbidi, a MASTERS OF PUBLIC ADMINISTRATION (PMT-5972) Student, (Student Number 201100471) a postgraduate student at the University of Namibia (UNAM) School of Postgraduate Studies. I am carrying out a thesis on ***"THE ESSENCE OF ANNUAL STATISTICS ON ROAD INFRASTRUCTURE DEVELOPMENT AND MAINTENANCE OF LOCAL AUTHORITIES IN NAMIBIA: A CASE STUDY OF THE ONGWEDIVA TOWN COUNCIL"***

The main research questions of the thesis study:

1. What factors influence the development and maintenance of quality roads at local authority level?
2. How important will the recording of annual statistics on road infrastructure development and maintenance of local authorities be on the growth and development of local authorities in Namibia?
3. Why are there no annual statistics on road infrastructure development and maintenance of local authorities in Namibia?

SECTION A: Demographic

Please circle where applicable.

1. For how long have you been working for the Ongwediva Town Council?

(a) Less than 5 Years

(b) 5 Years

(c) Less than 10 Years

(d) 10 Years

(e) Over 10 Years

1. For how long have you been residing within the town of Ongwediva?

   (a) Less than 5 Years

   (b) 5 Years

   (c) Less than 10 Years

   (d) 10 Years

   (e) Over 10 Years

2. What is your Gender?

   (a) Male

   (b) Female

3. Is Ongwediva your permanent place of residence?

   (a) Yes

   (b) No

4. Are you satisfied with the road infrastructure within the town of Ongwediva?

   (a) Yes

   (b) No

5. Between formal and informal, which one is your settlement sector?

   (a) Formal

   (b) Informal

SECTION B: Addressing the main research questions and the status of local authorities' road infrastructure

6. What qualification (s) do you poses?

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7. Is the road developed and maintained to your satisfaction within the town? Give an elaborated answer.

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8. Do you like quality of the road infrastructure in terms of the development and maintenance? Give an elaborated answer.

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9. Is there a difference in terms of quality among roads within various locations of the town? Give a detailed response.

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10. Arguably, if the level of road development and maintenance within the town is not the same what causes that?

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11. What factors influence the development and maintenance of quality roads at local authority level?

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12. What type of planning and measures are taken before a road is developed within the jurisdiction of the local authority?

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13. Who is responsible for a badly developed or maintained road within the town?

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14. Is it important to have annual statistics on road infrastructure development and maintenance of local authorities in Namibia? Give reason for your answer.

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15. The study is based on the essence of annual statistics on the nature of road infrastructure development and maintenance. Are you in agreement or disagreement with what the study is advocating? Please provide a reason for your answer.

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16. Do you have anything else to say in relation to the importance of having annual statistics on road development and maintenance at local authority level in Namibia?

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APPENDIX 6: INTERVIEW SCHEDULE

QUESTIONS TO BE ANSWERED BY OFFICIALS FROM THE OSHANA REGIONAL OFFICE

I, Petrus Ndeumono Mbidi, a MASTERS OF PUBLIC ADMINISTRATION (PMT-5972) Student, (Student Number 201100471) a postgraduate student at the University of Namibia (UNAM) School of Postgraduate Studies. I am carrying out a thesis on ***"THE ESSENCE OF ANNUAL STATISTICS ON ROAD INFRASTRUCTURE DEVELOPMENT AND MAINTENANCE OF LOCAL AUTHORITIES IN NAMIBIA: A CASE STUDY OF THE ONGWEDIVA TOWN COUNCIL"***

The main research questions of the thesis study:

1. What factors influence the development and maintenance of quality roads at local authority level?
2. How important will the recording of annual statistics on road infrastructure development and maintenance of local authorities be on the growth and development of local authorities in Namibia?
3. Why are there no annual statistics on road infrastructure development and maintenance of local authorities in Namibia?

SECTION A: Demographic

Please circle where applicable.

1. How long have you been working for the Oshana Regional Office?
   (a) Less than 5 Years
   (b) 5 Years

(c) Less than 10 Years

(d) 10 Years

(e) Over 10 Years

2. Are you a resident of Ongwediva?

   (a) Yes

   (b) No

3. What is your gender?

   (a) Male

   (b) Female

4. Is the regional office responsible for monitoring the development of Ongwediva?

   (a) Yes

   (b) No

5. Are you satisfied with the road infrastructure within the town of Ongwediva?

   (a) Yes

   (b) No

6. Can the regional office fund for any developmental activity of a town within its jurisdiction?

   (a) Yes

   (b) No

SECTION B: Addressing the main research questions and the status of local authorities' road infrastructure

7. What qualification (s) do you possess?

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8. Is the road developed and maintained to your satisfaction within the town of Ongwediva? Give an elaborated answer.

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9. Do you like quality of the road infrastructure of Ongwediva in terms of the development and maintenance? Give an elaborated answer.

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10. Is there a difference in terms of quality among roads within various locations of the town? Give a detailed response.

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11. Arguably, if the level of road development and maintenance within the town is not the same what role or measure does the regional office take?

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12. Is it important to have annual statistics on road infrastructure development and maintenance of local authorities in Namibia? Give reason for your answer.

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13. What has to be done in order to come up with annual statistics on road infrastructure development and maintenance of local authorities in Namibia?

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14. The study is based on the essence of annual statistics on the nature of road infrastructure development and maintenance. Are you in agreement or disagreement with what the study is advocating? Please provide a reason for your answer.

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15. Do you have anything else to say in relation to the importance of having annual statistics on road development and maintenance at local authority level in Namibia?

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APPENDIX 7: INTERVIEW SCHEDULE

QUESTIONS TO BE ANSWERED BY PROJECT MANAGERS FROM NAMIBIA CONSTRUCTION AND SHANGE CIVILS

I, Petrus Ndeumono Mbidi, a MASTERS OF PUBLIC ADMINISTRATION (PMT-5972) Student, (Student Number 201100471) a postgraduate student at the University of Namibia (UNAM) School of Postgraduate Studies. I am carrying out a thesis on ***"THE ESSENCE OF ANNUAL STATISTICS ON ROAD INFRASTRUCTURE DEVELOPMENT AND MAINTENANCE OF LOCAL AUTHORITIES IN NAMIBIA: A CASE STUDY OF THE ONGWEDIVA TOWN COUNCIL"***

The main research questions of the thesis study:

1. What factors influence the development and maintenance of quality roads at local authority level?
2. How important will the recording of annual statistics on road infrastructure development and maintenance of local authorities be on the growth and development of local authorities in Namibia?
3. Why are there no annual statistics on road infrastructure development and maintenance of local authorities in Namibia?

SECTION A: Demographic

Please circle where applicable.

1. Are you a resident of Ongwediva?
   (a) Yes
   (b) No

2. What is your gender?

   (a) Male

   (b) Female

3. Have you done road infrastructure development and maintenance on behalf of the Ongwediva Town Council?

   (a) Yes

   (b) No

4. How long have you been in the road construction business?

   (a) Less than 5 Years

   (b) 5 Years

   (c) Less than 10 Years

   (d) 10 Years

   (e) Over 10 Years

5. Are you satisfied with the road infrastructure within the town of Ongwediva?

   (a) Yes

   (b) No

6. Are road construction companies liable for a poorly developed or maintained road within a town?

   (a) Yes

   (b) No

SECTION B: Addressing the main research questions and the status of local authorities' road infrastructure

7. What crucial elements go into the planning of a road construction?

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8. Is the road developed and maintained to your satisfaction within the town of Ongwediva? Give an elaborated answer.

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9. Do you like quality of the road infrastructure of Ongwediva in terms of the development and maintenance? Give an elaborated answer.

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10. Is there a difference in terms of quality among roads within various locations of the town? Give a detailed response.

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11. What results in an underdeveloped road?

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12. How beneficial can a risk management analysis be towards a client?

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13. Is it important to have annual statistics on road infrastructure development and maintenance of local authorities in Namibia? Give reason for your answer.

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14. The study is based on the essence of annual statistics on the nature of road infrastructure development and maintenance. Are you in agreement or disagreement with what the study is advocating? Please provide a reason for your answer.

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15. Do you have anything else to say in relation to the importance of having annual statistics on road development and maintenance at local authority level in Namibia?

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APPENDIX 8: INTERVIEW SCHEDULE

QUESTIONS TO BE ANSWERED BY A STATISTICIAN AND A DATA CAPTURER FROM NAMIBIA STATISTICS AGENCY (NSA)

I, Petrus Ndeumono Mbidi, a MASTERS OF PUBLIC ADMINISTRATION (PMT-5972) Student, (Student Number 201100471) a postgraduate student at the University of Namibia (UNAM) School of Postgraduate Studies. I am carrying out a thesis on ***"THE ESSENCE OF ANNUAL STATISTICS ON ROAD INFRASTRUCTURE DEVELOPMENT AND MAINTENANCE OF LOCAL AUTHORITIES IN NAMIBIA: A CASE STUDY OF THE ONGWEDIVA TOWN COUNCIL"***

The main research questions of the thesis study:

1. What factors influence the development and maintenance of quality roads at local authority level?
2. How important will the recording of annual statistics on road infrastructure development and maintenance of local authorities be on the growth and development of local authorities in Namibia?
3. Why are there no annual statistics on road infrastructure development and maintenance of local authorities in Namibia?

SECTION A: Demographic

Please circle where applicable.

1. Are you a resident of Ongwediva?
   (a) Yes
   (b) No

2. What is your gender?

   (a) Male

   (b) Female

3. How long have you been working for Namibia Statistics Agency?

   (a) Less than 5 Years

   (b) 5 Years

   (c) Less than 10 Years

   (d) 10 Years

   (e) Over 10 Years

4. Is the process of collecting annual statistics costly?

   (a) Yes

   (b) No

5. The prospect of collecting annual statistics on road infrastructure development and maintenance of local authorities in Namibia is it a positive one towards national development?

   (a) Yes

   (b) No

SECTION B: Addressing the main research questions and the status of local authorities' road infrastructure

6. What constraints are we as a country likely to encounter if we are to adopt annual statistics on road infrastructure development and maintenance of local authorities in Namibia?

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7. What role will you as an institution have to employ in order to make annual statistics on road infrastructure development and maintenance of local authorities in Namibia a reality?

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8. How accurate and reliable are the annual statistics? Please justify your answer.

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9. What has to be done in order to come up with annual statistics on road infrastructure development and maintenance of local authorities in Namibia?

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10. Is it important to have annual statistics on road infrastructure development and maintenance of local authorities in Namibia? Give reason for your answer.

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11. The study is based on the essence of annual statistics on the nature of road infrastructure development and maintenance. Are you in agreement or disagreement with what the study is advocating? Please provide a reason for your answer.

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12. Do you have anything else to say in relation to the importance of having annual statistics on road development and maintenance at local authority level in Namibia?

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APPENDIX 9: INTERVIEW SCHEDULE

QUESTIONS TO BE ANSWERED BY TWO CIVIL ENGINEERS, ONE FROM NEXUS GROUP AND THE OTHER FROM ROADS AUTHORITY RESPECTIVELY

I, Petrus Ndeumono Mbidi, a MASTERS OF PUBLIC ADMINISTRATION (PMT-5972) Student, (Student Number 201100471) a postgraduate student at the University of Namibia (UNAM) School of Postgraduate Studies. I am carrying out a thesis on ***"THE ESSENCE OF ANNUAL STATISTICS ON ROAD INFRASTRUCTURE DEVELOPMENT AND MAINTENANCE OF LOCAL AUTHORITIES IN NAMIBIA: A CASE STUDY OF THE ONGWEDIVA TOWN COUNCIL"***

The main research questions of the thesis study:

1. What factors influence the development and maintenance of quality roads at local authority level?
2. How important will the recording of annual statistics on road infrastructure development and maintenance of local authorities be on the growth and development of local authorities in Namibia?
3. Why are there no annual statistics on road infrastructure development and maintenance of local authorities in Namibia?

SECTION A: Demographic

Please circle where applicable.

1. Are you a resident of Ongwediva?

   (a) Yes

(b) No

2. What is your gender?

   (a) Male

   (b) Female

3. How long have you been in the civil engineering industry?

   (a) Less than 5 Years

   (b) 5 Years

   (c) Less than 10 Years

   (d) 10 Years

   (e) Over 10 Years

4. Have you done road infrastructure development and maintenance on behalf of the Ongwediva Town Council?

   (a) Yes

   (b) No

5. Are you satisfied with the road infrastructure within the town of Ongwediva?

   (a) Yes

   (b) No

6. Are road construction companies liable for a poorly developed or maintained road within a town?

   (a) Yes

   (b) No

SECTION B: Addressing the main research questions and the status of local authorities' road infrastructure

7. What causes same type of roads to differ?

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8. How can you monitor and ensure that a specific road is properly maintained and utilized?

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9. Arguably, if the level of road development and maintenance within the town is not the same what role or measure can a local authority take?

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10. Why is it that Namibia's national roads are one of the best continentally while the same cannot be said in relation to roads that are under the management and within the jurisdiction of local authorities?

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11. From a personal perspective, which local authority in Namibia has the best roads and why?

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12. What factors influence the development and maintenance of quality roads at local authority level?

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13. Is it important to have annual statistics on road infrastructure development and maintenance of local authorities in Namibia? Give reason for your answer.

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14. The study is based on the essence of annual statistics on the nature of road infrastructure development and maintenance. Are you in agreement or disagreement with what the study is advocating? Please provide a reason for your answer.

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15. Do you have anything else to say in relation to the importance of having annual statistics on road development and maintenance at local authority level in Namibia?

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APPENDIX 10: QUESTIONNAIRE

A QUESTIONNAIRE TO BE ANSWERED BY TWO MULTINATIONAL COMPANIES OPERATING WITHIN THE TOWN OF ONGWEDIVA

I, Petrus Ndeumono Mbidi, a MASTERS OF PUBLIC ADMINISTRATION (PMT-5972) Student, (Student Number 201100471) a postgraduate student at the University of Namibia (UNAM) School of Postgraduate Studies. I am carrying out a thesis on ***"THE ESSENCE OF ANNUAL STATISTICS ON ROAD INFRASTRUCTURE DEVELOPMENT AND MAINTENANCE OF LOCAL AUTHORITIES IN NAMIBIA: A CASE STUDY OF THE ONGWEDIVA TOWN COUNCIL"***

The main research questions of the thesis study:

1. What factors influence the development and maintenance of quality roads at local authority level?
2. How important will the recording of annual statistics on road infrastructure development and maintenance of local authorities be on the growth and development of local authorities in Namibia?
3. Why are there no annual statistics on road infrastructure development and maintenance of local authorities in Namibia?

SECTION A: Demographic

Please circle where applicable.

1. How long have your business been operating in Ongwediva?
   (a) Less than 5 Years
   (b) 5 Years

(c) Less than 10 Years

(d) 10 Years

(e) Over 10 Years

2. What is your Gender?

   (a) Male

   (b) Female

3. Are you satisfied with the road infrastructure within the town of Ongwediva?

   (a) Yes

   (b) No

4. Between formal and informal, which one is your settlement sector?

   (a) Formal

   (b) Informal

SECTION B: Addressing the main research questions and the status of local authorities' road infrastructure

5. Is the road developed and maintained to your satisfaction within the town? Give an elaborated answer.

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6. From a business perspective, do you like quality of the road infrastructure in terms of the development and maintenance? Give an elaborated answer.

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7. Is there a difference in terms of quality among roads within various locations of the town? Give a detailed response.

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8. What factors influence the development and maintenance of quality roads at local authority level?

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9. Is it important to have annual statistics on road infrastructure development and maintenance of local authorities in Namibia? Give reason for your answer.

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10. The study is based on the essence of annual statistics on the nature of road infrastructure development and maintenance. Are you in agreement or disagreement with what the study is advocating? Please provide a reason for your answer.

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11. Do you have anything else to say in relation to the importance of having annual statistics on road development and maintenance at local authority level in Namibia?

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APPENDIX 11: LANGUAGE EDITING CERTIFICATE

Dr.GM

The Rev. Dr. Greenfield Mwakipesile

ThD, MBA, HBS | mwakipg@outlook.com

CONTACT

PO Box 99539,
UNAM,
Namibia

LANGUAGE & COPY-EDITING CERTIFICATE

9th September 2022

RE: LANGUAGE, COPYEDITING AND PROOFREADING OF PETRUS NDEUMONO MBIDI'S THESIS FOR THE MASTER OF PUBLIC ADMINISTRATION DEGREE OF THE UNIVERSITY OF NAMIBIA

This certificate serves to confirm that I copyedited and proofread **PETRUS NDEUMONO MBIDI'S** Thesis for the **MASTER OF PUBLIC ADMINISTRATION DEGREE** entitled: **THE ESSENCE OF ANNUAL STATISTICS ON ROAD INFRASTRUCTURE DEVELOPMENT AND MAINTENANCE OF LOCAL AUTHORITIES IN NAMIBIA: A CASE STUDY OF THE ONGWEDIVA TOWN COUNCIL**

I declare that I professionally copyedited and proofread the thesis and removed mistakes and errors in spelling, grammar, and punctuation. In some cases, I improved sentence construction without changing the content provided by the student. I also removed some typographical errors from the thesis and formatted the thesis so that it complies with the University of Namibia's guidelines.

I am a trained language and copy editor and have edited many Postgraduate Diploma, Masters' Thesis, Dissertations and Doctoral Dissertations for students studying with universities in Namibia, Zimbabwe, Eswatini, South Africa and abroad. I have also copy-edited company documents for companies in the region and abroad.

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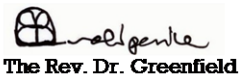

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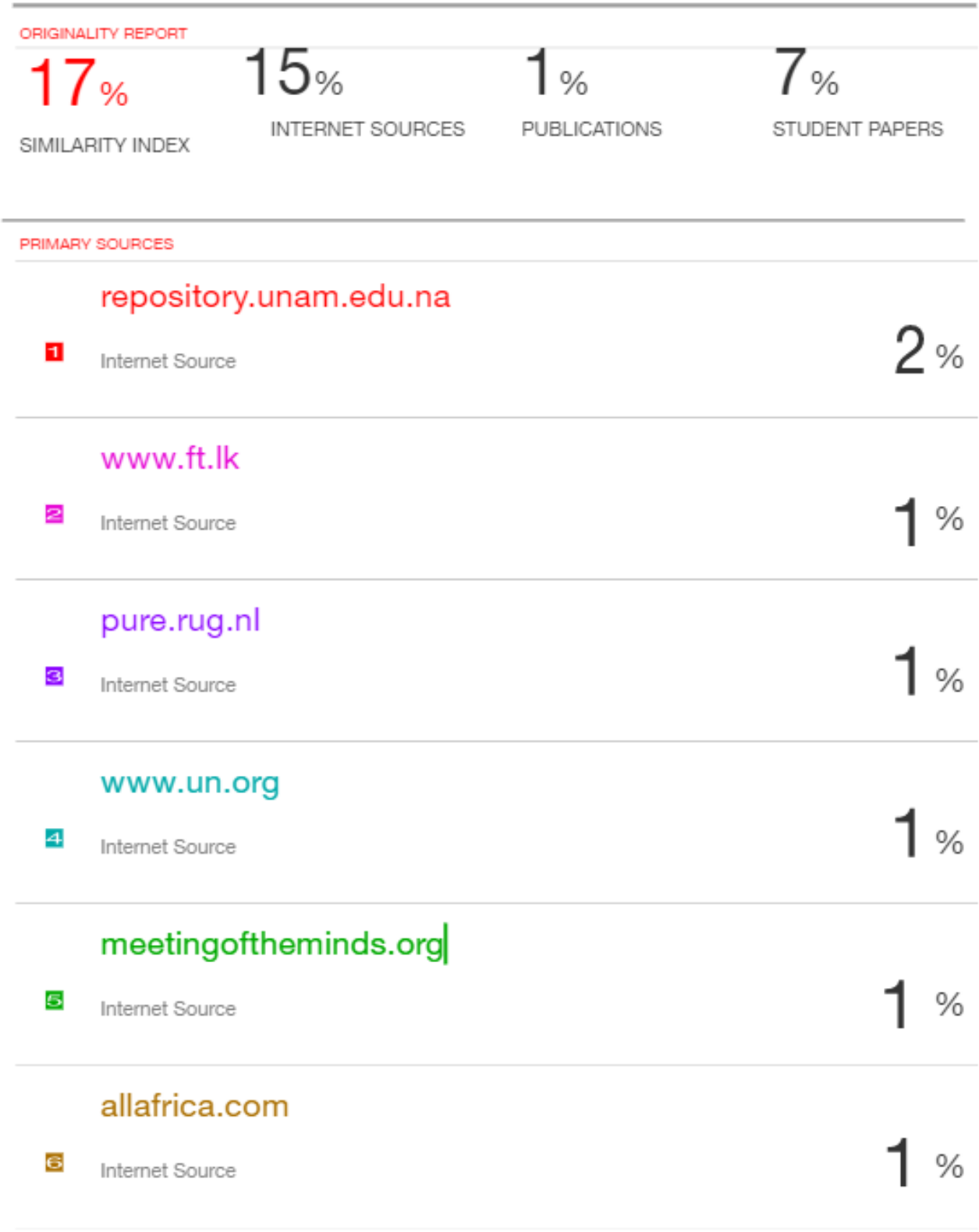

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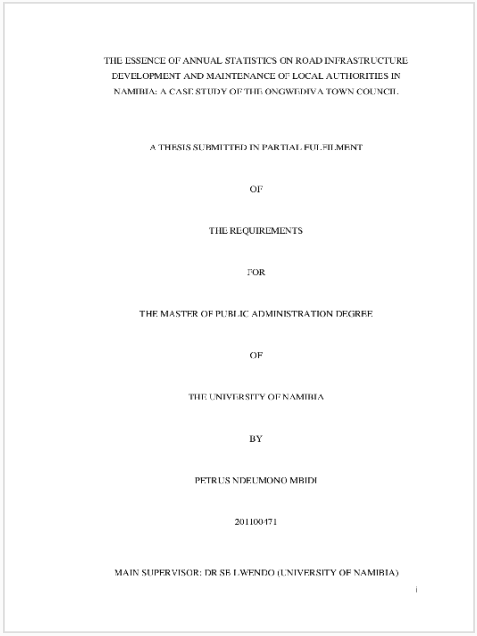

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A THESIS SUBMITTED IN PARTIAL FULFILMENT

OF

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FOR

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OF

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PETRUS NDEUMONO MBIDI

201100171

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