

UNIVERSITY OF KWAZULU-NATAL

Exploring the causes of the delays in the public infrastructure development in the province of
KwaZulu-Natal

By

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A dissertation submitted in partial completion of the requirements for the degree of Master of
Public Administration

in the School of Management, IT and Governance,
University of KwaZulu-Natal,

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2024

DECLARATION

I Nondumiso Annitta Mkhize declare that:

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ABSTRACT

The South African Government bears the responsibility for the infrastructural development of the country and its provinces, which entails the implementation of plans, guidelines, policies, and relevant legislation, alongside allocated budgets, to direct infrastructural growth. Despite the existence of these plans and funds designated for infrastructural reform in KwaZulu-Natal province, significant backlogs and slow progress in infrastructure development persist. Various challenges have been reported that hinder the progress of infrastructural projects and exacerbate the backlog. Consequently, many communities struggle to access basic social and economic infrastructure, while existing infrastructure continues to deteriorate.

This study aimed to address several key research questions, including the primary causes and consequences of project delays, the differing perspectives of the main stakeholders involved in the provincial government development projects, and the identification of mitigation measures to minimise cost overruns and delays in future projects. Minimising the delays will ensure fast economic growth that will have a positive impact on the alleviating of unemployment and poverty in the province.

The research endeavoured to explore the causes of delays in public infrastructure development in KwaZulu-Natal, aiming to uncover the root causes contributing to service delivery backlogs. These backlogs hinder the province and the country from achieving the National Development Plan (NDP) goals of poverty eradication and inequality reduction by 2030. Data for the study was collected through interviews with the KwaZulu-Natal Department of Public Works, which oversees provincial infrastructure and government property management. Participants included department officials and selected project teams. Additionally, secondary data was gathered from various sources, including reports from the Auditor General, Public Service Commission, KZN Legislature, as well as the Department Annual Performance Plans, and Annual Reports.

The study identified several key themes as factors contributing to the delays in public infrastructure development in KwaZulu-Natal.

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LIST OF ACRONYMS

AGSA	Auditor-General South Africa
BEE	Black Economic Empowerment
DoPW	Department of Public Works (Provincial Department)
EIA	Environmental Impact Assessment
KZN	KwaZulu-Natal
NDP	National Development Plan
NIP	National Infrastructure Plan
NPC	National Planning Commission
ICT	Information and Communications and Technology
IDMS	Infrastructure Delivery Management System
IDT	Independent Development Trust
InvITs	Infrastructure Investment Trust
PFMA	Public Finance Management Act
PGDP	Provincial Growth and Development Plan
PICC	Presidential Infrastructure Coordinating Committee
PSC	Public Service Commission
SCM	Supply Chain Management
SOEs	State-Owned Enterprise
Stats SA	Statistics South Africa
RSA	Republic of South Africa

CHAPTER ONE: INTRODUCTION AND OVERVIEW OF THE STUDY

1.1 Introduction

Chapter one is an introduction that presents an overview of this thesis and a brief introduction of the study. The topic of the study is exploring the causes of the delays in public infrastructure development in the province of KwaZulu-Natal. The aim of the study is to investigate the root causes of the delays in the infrastructure projects, resulting in the service delivery backlog. This thesis presents findings from the qualitative research that was conducted.

The first chapter of this thesis contains the background of the study, in which the reasons for choosing the topic are stated. It also contains the research problem, purpose of the study, the method of research, and outlines the chapters of the thesis.

1.2 Background of the study

The Constitution of South Africa (RSA, 1996) clearly states that the South African Government is primarily responsible for infrastructure development in the country. There are government plans and legislative binding laws that government has passed and adopted to ensure that there is public infrastructure development in South Africa. These plans and laws ensure that all three spheres of government – national, provincial and local drive the implementation of public infrastructure development plans. In the Constitution of South Africa (RSA, 1996), public infrastructure refers to the infrastructure facilities, systems, and structures that are developed, owned, and operated by the government. It includes all infrastructure facilities that are open to the general public for use. These include transportation, water and sewerage, power and energy, telecommunications, education, health, recreation, government institutions and more.

Watermeyer and Phillips (2020) pointed out that the provision of public physical infrastructure plays an important role in the country's development. The public physical infrastructure is crucial for a country's economic and social development as it helps improve its people's quality of life. Familoni (2004) stated that economic and social infrastructure play a crucial role in the development of nations, whether it is developed or a developing country. They provide the basic

foundation on which the superstructure of development and growth can be erected. The economy and infrastructure also contributes to the country's socio-economic development.

In 2011, the South African Government developed the National Development Plan (NDP). The NDP (RSA, 2011), aims to eliminate poverty and reduce inequality by 2030. It states that South Africa can realise these goals by drawing on the energies of its people, growing an inclusive economy, building capabilities, enhancing the capacity of the state, and promoting leadership and partnerships throughout society. The NDP also states that by 2030, South Africa should have developed a more efficient and competitive infrastructure to facilitate economic activity that is conducive to growth, job creation and the well-being of the people of the republic.

To ensure realisation of the NDP goals, the South African Government developed and adopted a National Infrastructure Plan 2050. The South African Government also passed the Infrastructure Development Act 23 of 2014 (RSA, 2014) to ensure that the development goals of the state are promoted. The NDP came into being as, after 17 years of democracy, in 2011, there were immense challenges in South Africa of poverty, unemployment, and inequality. The NDP (RSA, 2011) identified structural problems in the economy and pointed to opportunities in specific sectors and markets as job drivers. The first job driver that was identified was infrastructure, which laid the basis of higher growth, inclusivity and job creation.

According to Hänel (2019), KwaZulu-Natal infrastructure challenges started way back during the apartheid era where there was unjust provision of infrastructure amongst certain groups of people in certain parts of the province and the country. Post-apartheid there were means by government to address the legacy of apartheid, however there was a huge backlog of the infrastructure development needed to bring about change and redress the legacy of apartheid. KwaZulu-Natal still has inadequate infrastructure development which contribute to number of challenges such as poverty, inequality and low economic growth. Without infrastructure development in the province, these challenges will only worsen.

According to the National Planning Commission (RSA, 2022), South Africa has a relatively good core network of national economic infrastructure. The challenge is to maintain and expand its electricity, water, transport and communications infrastructure in order to support economic growth and social development goals. Deloitte (2022) stated that inadequate infrastructure remains a major obstacle towards Africa achieving its full economic growth potential.

1.3 Research Problem/Statement of the Problem

The South African government has put in place plans and budgets for infrastructure development projects. However, this has not been enough as there are numerous challenges facing the infrastructure development projects, leading to massive backlogs. In the 2022 State of the Nation address (RSA, 2022), President Cyril Ramaphosa acknowledged that there was an immense backlog of infrastructural development in the country. The President further mentioned that even if government spends all it can on infrastructure development, the backlog remains so immense that it would take billions of rands and decades more to fill it without a contribution from the private sector.

According to the National Planning Commission (RSA, 2022), government has invested billions of rands in infrastructure development since the inception of the NDP; however, this is insufficient as there are backlogs. The National Planning Commission (NPC) reported with concern that the state does not have the institutional or financial capability to implement the investment plans needed to finance infrastructure to the required scale. Current investment levels are insufficient, and maintenance programmes are lagging behind. Given the government's limited finances, private funding will need to be sourced for some of these investments.

Despite government funding the development of infrastructure with billions of rands, the National Planning Commission (NPC) reported that many South Africans in poor rural and peri-urban communities struggle to access basic social and economic infrastructure. Cogta (RSA, 2016), reported on the state of infrastructure in South Africa and noted that there was a backlog of infrastructure.

In its report on the survey of the South African economy, the Organisation for Economic Cooperation and Development (2020) reported that public infrastructure investment has declined, contributing to lower growth, and the quality of infrastructure is deteriorating.

Shivambu and Thwala, (2019) indicated that the South African public sector is experiencing many delays in delivering projects in time, while on the other hand, there is much rollover of the government budget spending, and other areas are spending a great deal of money budgeted for construction on remedial work of completed projects.

Adugna (2015) reported that the cost overruns and time overruns (delays) have been critical problems of many projects around the world in general, and in South Africa in particular. In his study, he investigated the causes of delays and cost overrun in eThekweni Municipal Area of KwaZulu-Natal.

1.4 Purpose of the study

There has been outcry on the deteriorating state of the province and the country's provision of public infrastructure for more than a decade. This has been accompanied by concerns around government's failure to catch up with the backlog on infrastructure so as to ensure that the province is well structured and enhances social and economic growth. The main purpose of this research study is to document some progress and challenges encountered in public infrastructure development and maintenance. The study aims to determine the level of the infrastructural backlog.

It is crucial to identify challenges on public infrastructure development as public infrastructure is the backbone of the economic development. Public infrastructure investment is believed to be one of the key factors in addressing socio-economic challenges that the province has which is high unemployment, inequality and poverty. Minimising the delays on public infrastructure development will ensure fast economic growth that will have a positive impact on the alleviating of unemployment and poverty in the province.

1.5 Empirical Literature Review

a. Social and economic infrastructure

The Constitution of South Africa (RSA, 1996) provides that all spheres of government and all organs of state must secure the well-being of the people of the republic. This is done by ensuring that government creates adequate and efficient infrastructure for the country to function efficiently. Familoni (2004) defines infrastructures as the basic essential services that should be put in place to enable development to occur. Socio-economic development can be facilitated and accelerated by the presence of social and economic infrastructures. Familoni's (2004) paper concluded that economic and social infrastructure play a crucial role in the development of nations, whether

developed or still developing. Social and economic infrastructure includes housing, water, electricity, sanitation, roads, schools, health and welfare infrastructure, telecommunications and more.

According to a report from the Department of Environmental Affairs (RSA, 2015), South African government spending historically prioritized economic infrastructure over social infrastructure, aiming to create job opportunities. However, it became evident through experience that this approach was flawed. Neglecting social infrastructure left significant portions of the population below the minimum living standards and hindered their ability to actively engage in and contribute to economic development. The underperformance of infrastructure initiatives in stimulating economic growth has resulted in persistently high backlogs in social infrastructure. Consequently, these shortcomings have fuelled ongoing protests demanding improved service delivery nationwide.

In addition to the disproportionate emphasis on economic infrastructure, the provision of social infrastructure has faced numerous challenges. These challenges include corruption, political interference, and deficiencies in funding, expertise, and human resources. While these issues significantly affect the implementation and sustainability of social infrastructure initiatives, resolving them involves intricate measures that extend beyond the scope of the Department's guidelines.

b. Delays on infrastructure projects

Khumalo, Choga and Munapo's (2017) study revealed that there were a number of delays in the government development projects under the Independent Development Trust (IDT). These included planning, time overruns and cost overruns, project management, ethical issues, loss of funding due to projects not being implemented within a set timeframe, costs for rehabilitation where development has proceeded illegally, and more.

Ntuli and Allopi (2014) indicated that delays in infrastructure projects can also be attributed to the lack of experience and skill in the construction industry in KwaZulu-Natal. Their study revealed that skills shortage in the construction section and underlined the need for continuous training of the contractors' employees. They recommended that the South African government, in conjunction

with all stakeholders, should develop and implement contractor programmes to address the lack of technical and management skills in the construction sector.

According to Ntuli and Allopi (2014), a sustainable construction industry is critical to the economy of South Africa. They reported that in 1999, the construction industry contributed approximately 35% of the total gross domestic fixed investment and employed 230,000 employees. According to Ntuli and Allopi (2014) civil engineering contractors encounter serious challenges in order to sustain their businesses, especially in a weak economic climate. A certain level of construction experience, expertise and training are required to manage a sustainable construction company.

Wegrich, Hammerschmid and Kostka (2017) highlighted that the provision of public infrastructure remains government obligation. The authors indicated that government across the globe are struggling with getting the governance of infrastructure right. The provision of high-quality infrastructure has become more complex as this require proper planning, financing, contracting and building which government often lack. Therefore, government rely more on the private sector for the provision of public infrastructure as this does not only involves the provision of brick-and-mortar assets. It includes the development of complex and advance infrastructure system and technology.

Wegrich, Hammerschmid and Kostka (2017) stated a number of factors that contributed to infrastructure project delays. However, some of the challenges of the delays on infrastructure projects and the difficulties of infrastructure governance often lies with the political structure. Politicians do not give infrastructure provision enough attention and there are often tension and clashes between the logic and time frame of political decision making.

1.6 Theoretical or Conceptual Framework

The theory that supports the study is the principal-agent theory. Miller (2005, cited in Maggetti and Papadopoulos, 2018) described principal-agent theory as the contract-based relationship or interaction between the principal and the agent. In this framework, the principal is regarded as the people or the structure in a position of authority of a business. The agent acts on behalf of the principal; it handles the business of the principal. The principal legally appoints the agent to acts on its behalf, hence it is a contract-based interaction. Therefore, the principal-agent theory

examines and describes the relationship that exists between the principal and the agent. There are a number of dynamics that exist in this relationship which often compromise the work that the principal has legally outsourced to an agent.

The principal-agent theoretical framework provides the basis of this study as the study explores the challenges of the infrastructure within government departments that the departments had outsourced. The study explores the relationship between the main department (principal) that has outsourced infrastructure projects and an agent to which the projects were outsourced. The agent in the study is the Department of Public Works. There are supporting theories under the principal-agent theory that examines the contract-based relationship between the principal and agent. These are agency theory and principal-agent problem theory. These will be referred to as they assist to explore the relationship and problems that exist between the government department and agencies used for infrastructure projects.

According to Welz (2020), principal-agent theory is concerned with the delegation of authority and the problems associated with such delegation. This led to the principal-agent problem theory related to the conflict of interests and priorities that arise between the principal and the agent.

1.7 Significance and contribution of the study

The study contributes to the body of knowledge required by the relevant stakeholders responsible for the province of KwaZulu-Natal infrastructural development. As mentioned above, there is not much literature and few studies conducted on the challenges and the delays of infrastructural projects within the province of KwaZulu-Natal. Most studies have focused on the specific departments, municipalities or areas within the province. It is crucial that there is an overall picture of the province in terms of its infrastructural development challenges.

Once these challenges causing the delays in infrastructure development has been identified and recommendations proposed by the study, they will assist government departments in addressing them.

1.8 Research objectives

The aim of the study is to explore the causes of the delays in infrastructure development in the KwaZulu-Natal province.

Objectives of the study are:

- a) To identify the main causes of project delays.
- b) To identify the effects of project delays.
- c) To obtain the different views of the three main participants in the provincial government development projects.
- d) To recommend mitigation measures that minimise cost overrun and delay in future projects.

1.9 Research questions

The key research questions are the following:

- a) What are the main causes of project delays?
- b) What are the effects of the project delays?
- c) What are the views of the three main participants of government development infrastructure projects?
- d) What would be the recommend mitigation measures that minimise cost overrun and delay in future projects?

1.10 Research methodology

The study was primarily qualitative in nature. The researcher used case study interviews where questionnaires were administered. The KwaZulu-Natal Department of Public Works was chosen as it is responsible for the public infrastructure. One of the key outcomes of the Department of Public Works infrastructure programme is to ensure that the construction and maintenance projects of social sector facilities are completed on time and within the budget. Recruitment of participants was done through the Department of Public Works.

Participants of the study consisted of ten Department of Public Works officials and six selected project teams having five participants in each team. Department officials were those officials that were under the Head of Project Management Unit which are the Chief Construction Project

Manager, Construction Project Manager, Chief Engineer, Engineers, Quantity Surveyors, Artisan Foreman, Director of Monitoring and Evaluation, Duty Directors and Programme Manager. Project Managers of the selected projects were also participants of the study.

Non-probability sampling was utilised whereby the researcher selected projects that she was interested in, choosing from the list populated by the Department. In total, six projects were selected. Projects that were selected were from the 2017/18 financial year up to the 2022/23 financial year. The first selection were two projects within the province that went well in terms of the construction, where the projects were completed on time and within the budget allocated. The second selection were two projects within the province that had challenges and could not be completed on time. The third selection were two projects that had not been completed in more than five years or where construction has stopped.

Department officials and project managers of selected projects were targeted participants of the study. Other participants were the Independent Development Trust, which is a government infrastructure entity pertaining to quantity surveyors, mechanical engineers, architects, civil / structural engineers etc.

Inclusive and exclusive criteria of the study included factors such as the number of years of employment with the department for officials that would participate in the study. Those officials with less than five years employment by the department were excluded from the study. Only officials employed for more than five years were chosen as participants of the study. Officials selected were mostly managers, such as chief directors and directors within the Department of Public Works. All project managers of the projects selected for the study were included in the study regardless of their experience in the field.

Secondary data collection of the study included reports that are publicly available from the Auditor General, Public Service Commission, KZN Legislature, and the Department's Annual Performance Plans and Annual Reports.

1.11 Ethical consideration

Ethical clearance was obtained from the University of KwaZulu-Natal's (UKZN) Ethics Committee. This was to ensure the study, as it was using human subjects, did not violate the rights

of the subjects or endanger them or their livelihoods in any way. The researcher obtained informed consent from the Department of Public Works as the main participant, and consent forms from the individual participants of the study. Each participant was made aware of the nature and purpose of the study and was encouraged to participate. Participants were alerted of their rights to discontinue participating in the research study at any time.

1.12 Limitation

The limitation of the study was the sample size. The study was conducted at a broad scale, which was the provincial level. There was a huge sample to choose from. However, the study focused on six projects within the province. However, department had about 10 projects for the construction of new buildings and 200 for refurbishment of old buildings per financial year. The study obtained a brief report of all the Department's projects and only zoomed in on the six projects.

1.13 Outline of thesis

This thesis has five chapters.

1.13.1 Chapter one begins the thesis by stating the topic of the thesis and background information.

1.13.2 Chapter two is the literature review, where there is deliberation of the relevant literature around the topic of the delays in government infrastructure projects.

1.13.3 Chapter three provides the research methodology of the study.

1.13.4 Chapter four presents the data collection and the findings of the study.

1.13.5 Chapter five presents the conclusions and recommendations.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Creswell and Creswell (2018) define literature review as an overview of other studies that are closely related to the study being undertaken. The purpose of a literature review is to provide the researcher with thorough knowledge and understanding on the study to be conducted. This chapter presents literature on the KwaZulu-Natal government's development infrastructure delays. There are two main types of infrastructure; these include social infrastructure and economic infrastructure.

2.2 Social infrastructure

Public or social infrastructure refers to the facilities that are open for the public to use. These facilities are developed and owned by the government. In this study, the word social infrastructure is utilised. Social infrastructure is “the construction and maintenance of facilities that support social services. These can include healthcare (medical facilities and ancillary infrastructure), education (schools, universities, and student accommodation), and housing” (PIDG, 2022). These structures are the backbone of societies as they enable communities to function and operate normally. Social infrastructure includes housing, water, electricity, sanitation, roads, schools, health and welfare infrastructure. Without these, communities are unable to function.

The Constitution of South Africa (RSA, 1996) provides that all spheres of government and all organs of state must secure the well-being of the people of the republic. This is done by ensuring that government creates an adequate and efficient infrastructure for the country to function efficiently. The South African government has developed numerous laws that have been passed by legislation as Acts that guide government on how they are going to go about developing and maintaining social infrastructure.

In 2011, South Africa officially released the National Development Plan (NDP) 2030 as a long-term guide for the government in reaching its goal on eliminating poverty and inequality. According to the NDP (RSA, 2011), social infrastructure is the backbone of the plan as it is crucial

in the improvement of the quality of public service and critical in achieving transformation. There was a need for this intervention in the form of the NDP, as there were number of backlogs in the South African infrastructure.

The 2011 KZN Provincial Growth and Development Plan (PGDP) reported that although there has been considerable progress in providing essential services such as water, electricity, sanitation, roads, housing, and primary healthcare, there are still substantial backlogs requiring attention. Further, it is essential to significantly improve the quality of services, particularly those offered by local municipalities. According to the OECD Economic Surveys South Africa (2020), South African infrastructure development has stalled, causing major delays and negatively impacting the country's economy.

2.3 Economic infrastructure

According to the National Development Plan (RSA, 2011), economic infrastructure refers to the physical structures and systems that support and stimulate economic development. This includes assets like roads, highways, railways, airports, seaports, electricity grids, telecommunications networks, and water supply and sanitation facilities. The NDP emphasises that South Africa needs to maintain and expand on this infrastructure in order to support economic growth and the country's social development goals. While acknowledging that South Africa has a relatively good core network of national economic infrastructure, the NDP recognises the challenge to maintain and expand this infrastructure. The NDP also outlines the concerns the state has neither the institutional nor financial capability to implement the investment plan needed to finance infrastructure projects to the required scale. It reports that government is indeed lagging behind and needs to source more investment.

The NDP indicates that by 2030, South Africa will have an energy sector that will promote economic growth and development, social equity and environmental sustainability. Further, it is envisaged that water will be effectively managed, and the services derived from it will support a strong economy. The transport sector will bridge the geographic divide, affordably supporting economic development and promoting a low-carbon economy. Advancements in information and communication technology (ICT) will drive the formation of a dynamic and interconnected

information society. This will help to establish a thriving and prosperous knowledge-based economy that is accessible to all.

2.4 Implementation of South African infrastructure

As clearly stated in the Constitution of South Africa (RSA, 1996), the South African government is primarily responsible for infrastructure development of the country. The South African government has developed the National Development Plan (RSA, 2011) with the aim to eliminate poverty and reduce inequality by 2030. South Africa can achieve these objectives by harnessing the potential of its people, growing an economy that includes everyone, developing skills and abilities, strengthening government capabilities and capacity, and promoting leadership and collaborations across all sectors of society. The NDP also states that by 2030, South Africa should have developed a more efficient and competitive infrastructure to support economic activities that promote growth and the generation of employment opportunities. .

The National Development Plan (NDP) includes 5 pillars or strategic development areas:

- Economic diversification & job creation.
- Poverty & vulnerability reduction.
- Reducing developmental inequalities.
- Enhancing human development.
- Creating a conducive governance environment for a diversified economy.

To ensure the realisation of the NDP goals, the South African Government developed and adopted a National Infrastructure Plan 2050 (RSA, 2022) in 2012, which was eventually gazetted in February 2022. The goal of the National Infrastructure Plan 2050 (NIP 2050) is to provide a foundation for achieving the NDP's vision of inclusive growth. The NIP 2050 intends to transform the economic landscape while generating substantial employment opportunities and improving the provision of basic services. The NIP 2050, prepared by Infrastructure South Africa (ISA), has a strategic vision and plan that links primary NDP objectives to practical and actionable steps together with intermediate outcomes.

According to NIP 2050 (RSA, 2022), in 2012, 18 years into our democracy, major challenges of poverty, unemployment and inequality persisted. The South African government's New Growth Plan, launched in 2010, prioritised employment and economic growth. It identified key sectors,

known as "jobs drivers," to create five million new jobs by 2020, with infrastructure as the main focus. The government planned to invest R827 billion over three years, starting in the 2013/14 fiscal year, in building and upgrading infrastructure, to promote higher growth, inclusivity and job creation.

Cabinet then established the Presidential Infrastructure Coordinating Committee (PICC) for the purpose of addressing these challenges and goals. It was to:

- Coordinate, integrate and accelerate implementation;
- Create a unified National Infrastructure Plan that will be closely monitored and centrally driven;
- Identify who is responsible and hold them to account;
- Establish a 20-year planning framework that extends beyond a single administration to prevent interruptions in infrastructure development.

Between the years of 2009 and 2014, government and public agencies invested more than R1 trillion in infrastructure, including energy, road, rail, ports, public transport, bulk water and sanitation, hospitals, basic and higher education infrastructure and innovative projects.

The purpose of the Infrastructure Development Act 23 of 2014 (RSA, 2014) is to ensure that the development goals of the South African state are promoted by:

- Providing for the facilitation and co-ordination of public infrastructure development, particularly that having significant economic or social importance to the country;
- Ensuring that infrastructure development is prioritised in terms of planning, approval and implementation;
- Ensuring that the development goals of the state are promoted through infrastructure development;
- Improving the management of such infrastructure during all phases of the process, including planning, approval, implementation and operations; and
- Providing for related incidental matters.

As highlighted in the points above, the Act emphasises the key role that public infrastructure development has in economic and social growth. Thus, not only is infrastructure development to

be prioritised in terms of planning, approval and implementation, the management of such infrastructure is to be prioritised and improved during all phases of the project life-cycle, including planning, approval, implementation and operations. The necessity of effective public infrastructure development, through all phases of planning, implementation and management, is crucial, given the central role assigned to infrastructure as a driver of economic growth in the country.

The department in the South African government that is responsible for infrastructure coordination is the National and Provincial Department of Public Works and Infrastructure (DPWI). The Department integrates and accelerates all public infrastructure development, and sets the long-term vision for infrastructure delivery. According to the Parliamentary report (RSA, 2020), the Department was renamed by the President in 2019 from the Department of Public Works to the Department of Public Works and Infrastructure as it had to assume the infrastructure coordination responsibility. The responsibility for the Department and Minister of Public Works and Infrastructure is clearly stated in the Infrastructure Development Act 23 of 2014.

According to the Parliamentary report (RSA, 2020), effective 01 April 2020, the function of the Presidential Infrastructure Coordinating Commission (PICC) would be transferred from the Minister of Economic Development to the Minister of Public Works and Infrastructure. As the government was mandated to grow the economy through integrated planning and investment, the aim of this move was to improve both the coordination and efficiency in implementation of this mandate. Reportedly, the Infrastructure Development Coordination receives R60.8 million in 2020/21 financial year. While this is an increase of R800 000 above the R60.0 million allocated for 2019/20, in real terms, it is a decrease of 2.9 per cent.

Thus the responsibility of facilitating and coordinating the implementation of the National Infrastructure Plan (NIP) is transferred to the Department of Public Works and Infrastructure, together with the transfer of the PICC, such that it now assumes the coordinating and oversight role of all public infrastructure. This is meant to better coordinate, integrate and harmonise infrastructure planning and implementation across all spheres of government, state-owned enterprises (SOEs), public entities and social partners of the Department.

The Independent Development Trust (IDT) is a government-established organisation in South Africa, classified as a Schedule 2 public entity under the Public Finance Management Act (PFMA). Its primary role is to assist the government in managing programs and delivering infrastructure.

When government agencies face capacity issues, they would hire the IDT and provide budgets and instructions for constructing infrastructure assets, including schools, hospitals, clinics, and welfare centres. Although IDT must adhere to stringent government processes, it benefits from some flexibility due to its status as a public entity. Regional IDT offices are found in all South African provinces. In KwaZulu-Natal, they are housed in Cogta offices; they form a directorate unit in Cogta.

2.5 Theoretical framework

As indicated in chapter one, the theory that supports the study is the principal-agent theory. Miller (2005, cited in Maggetti and Papadopoulos, 2018) described principal-agent theory as a theory that addresses the contract-based relationship or interaction between the principal and the agent. In the framework, the principal is regarded as the people or the structure in a position of authority of a business. The agent acts on behalf of the principal; it handles the business of the principal. The principal legally appoints the agent to act on its behalf, thus it is a contract-based interaction. Therefore, the principal-agent theory examines and describes the relationship that exists between the principal and the agent. There are a number of dynamics that exist in this relationship which often compromise the work that the principal has legally outsourced to an agent.

The principal-agent theoretical framework provides the theoretical basis of this study as the study explores the challenges of the infrastructure projects within government departments that the department has outsourced. The study explores the relationship between the main department (principal) that outsourced infrastructure projects and an agent to which they were outsourced. The agent in the study is the Department of Public Works. There are supporting theories under the principal-agent theory that examine the contract-based relationship between the principal and agent. These are agency theory and principal-agent problem theory. These are referred to as they assist to explore the relationship and problems that exist between the government department and agencies used for infrastructure projects.

As Welz (2020) explains, principal-agent theory considers the delegation of authority and the problems associated with such delegation. This led to the principal-agent problem theory which addresses conflict of interests and priorities that arise between the principal and the agent.

2.6 Empirical literature review

According to Health (2020), an empirical literature review, also referred to as a systematic literature review, considers previous empirical studies to address a specific research query. An empirical article outlines the methodologies and results of an original previously conducted research study. On the other hand, a review article, also known as a "literature review," analyses past research studies related to a specific subject. Below are studies conducted by other researchers and their findings on matters related to social and economic development infrastructure and their impact on society.

2.6.1 Social and economic infrastructure

The Department of Environmental Affairs (RSA, 2015) published a book on the national infrastructure guidelines. The purpose was to provide guidelines on the implementation of social infrastructure and the environmental impact assessment thereafter. The Department of Environmental Affairs (RSA, 2015) reported that since 1994, the South African government has been involved in numerous social infrastructure programmes to improve the provision of basic services and address the inequalities created in the past during the apartheid system. The guidelines touched on all the components of the environment including social, economic, cultural and biophysical aspects.

In its guidelines, the Department states that the Constitution of South Africa imposes the obligation to provide social infrastructure on the State. Thus the State, as indicated in Chapter 2 of the Constitution of South Africa, is obliged to take reasonable measures, using available resources, to achieve the progressive realisation of everyone's right to have access to the following:

- Healthcare services;
- Sufficient food and water;
- Adequate housing;
- Social security.

Further, as stipulated in the Constitution of South Africa, every person is guaranteed the right to an environment that is not harmful to their health or well-being.

The Department reported that in 2012, the national and provincial budget votes showed an increase in the allocation of the national budget to infrastructure, to support a massive push to address the infrastructure shortfall that had occurred over the past eight years. The increase in social infrastructure projects triggered the Environmental Impact Assessment (EIA). The guideline is aimed at those who are involved in the delivery of social infrastructure, and is intended to assist in achieving the scale of social infrastructure delivery needed in the country.

The Department has determined social infrastructure to be critical in the development and sustainability of communities. Broadly speaking, social infrastructure encompasses the following: it is developed at a household or community level; it is intended for the delivery of basic services; and it has a direct and/or indirect impact on the quality of life. Such infrastructure includes basic municipal services such as housing, water supply, sanitation, electricity, refuse and waste disposal, roads and transport, health infrastructure, sports facilities, schools, and welfare infrastructure. All of these are necessary for social development and are essential structures in the well-being of a community. Many of these types of social infrastructure would also be economic infrastructure as well, such as electricity and roads. Therefore, social infrastructure directly impacts on economic infrastructure. Economic infrastructure refers to that part of an economy's capital stock that produces services to facilitate economic production and serves as inputs to production or is consumed by households.

The Department of Environmental Affairs (RSA, 2015) has reported that historically, with the aim of generating employment, the priority for South African government expenditure has been on economic infrastructure rather than on social infrastructure. However, experience shows that this was a misguided approach. As a result of neglect of social infrastructure, large portions of the population have remained below the minimum living level, which is the minimum financial requirements of members of a household to maintain an acceptable living standard – above the poverty line – and their capacity to effectively participate in and contribute to economic growth has been diminished.

The Department of Environmental Affairs (RSA, 2015) indicated that various infrastructure programmes have failed to generate economic growth at the projected rates; as a result, social infrastructure backlogs have remained high, fuelling on-going service delivery protests across the country. But it is not only the skewed focus on economic infrastructure that has undermined social

infrastructure delivery. It has been hampered by issues such as corruption, political interference and lack of funding, skills and human resource capacity. These are serious issues that have major implications for the implementation and sustainability of social infrastructure projects. However, the measures required to address them are complex and beyond the scope of the Department's guidelines.

2.6.2 Infrastructure development programmes

The Constitution of South Africa (RSA, 1996) clearly states that the South African government is primarily responsible for infrastructure development of the country. Chapter 2 of the South African Constitution, Sections 26, 27 and 28, clearly state that everyone has the right to shelter, basic care and social services. It is in light of this Bill of Rights that the South African government must ensure that it develops infrastructure for its citizens.

As indicated in the previous section, the Department of Environmental Affairs (RSA, 2015) reported that in 2012, the national and provincial budget votes showed an increase in the allocation of the national budget to infrastructure to support a massive push to address the infrastructure shortfall that had occurred over the past eight years.

Ilori (2004) elaborated on the role of Nigerian government in the development of basic infrastructure. He described infrastructure as encompassing various activities, basic structures and facilities necessary for a country to function efficiently. Government's primary role and responsibility, he continued, is to ensure, in cooperation with the private sector, the establishment of adequate and efficient infrastructure to bring about a positive and internationally competitive environment for economic activities. Such essential infrastructure includes energy, roads, telecommunications, water supply, railways, health, education and financial services. Further, the provision of public utilities and services does not necessarily mean that they should be owned and operated by the state – they can be constructed and operated by a private concern while the state approves the plan for a particular project, provides finance and other necessary constructional facilities, and regulates its operations.

According to Ilori (2004), Nigeria's government's focus, in terms of economic development, must be on creating an enabling environment for the private sector to thrive. This is in contrast to

engaging in and directly managing the production of private goods and services. The provision of investment in infrastructure and in people by way of education and healthcare (to the minimum international requirements) is emphasised as crucial for the economy to achieve its set goals. Ilori (2004) underlines that government should direct oil revenue gains to financing the provision of such infrastructure.

In his doctoral dissertation, Zhang (2010) recommended a multiple infrastructural model for the USA. In light of the extreme events befalling the USA over the previous decade, including the 9/11 terror attacks, the 2003 Northeast power blackout, and the 2005 hurricanes, there was an urgent need to understand the security, engineering and economic implications of the civil infrastructure systems and their interdependencies. Challenges arising from the capacity requirements of rapid urbanisation and the renewal of aging infrastructure further underlined the urgency to consolidate such understanding. This motivated the creation of a new generation of models that are able to incorporate multiple infrastructure systems into a single framework, capture their interdependencies, and conduct decision-making analysis, to enhance infrastructure systems for greater efficiency, effectiveness, robustness, and resilience.

In Zhang's (2010) dissertation, he proposes a generalised modelling framework that combines a multilayer network concept with a market-based economic approach to capture the interdependencies among the different civil infrastructure systems with disparate physical and operational characteristics. The objectives and requirements of his dissertation were within the context of infrastructure interdependencies analysis. These included building a generalised modelling framework, modelling the interdependencies (models that can realistically formulate the various types and degrees of infrastructure interdependencies), addressing dynamics and implications for decision-making, and developing efficient solutions and approaches.

Zhang's (2010) study discusses the multi-layered infrastructure network framework while responding to key problems and issues. It provides an advanced overview of how to apply the computable general equilibrium theory and its spatial extension to formulate an infrastructure interdependencies equilibrium analysis. Further, it presents the connection between the (S)CGE model and the MIN framework, as well as the individual infrastructure systems. Importantly, Zhang's (2010) case study provides insights, in a real-world context, into the implications of infrastructure interdependencies to individual systems.

Magweva (2020) conducted a study for his PhD on the significance of infrastructure investments in emerging markets to institutional investors. His thesis assessed the economic and financial features inherent in infrastructure investments to determine whether institutional investors, seeking new investment opportunities, can find benefit from such features in emerging markets, where there is a substantial infrastructure gap and the infrastructure market is still developing. The aim of the study was to evaluate the ability of infrastructure investments in selected emerging markets to enhance portfolio performance. It also sought to determine the ability of infrastructure investment in selected emerging markets to diversify portfolio risk.

The thesis elaborated on the financial investment on markets. Previously, the traditional social and economic infrastructures such as roadways, railways, communications etc., have been funded by the government or by large corporations, without direct investment from the general public. The only way to invest was to purchase shares from the infrastructure company or through a mutual fund. Now there is a third option, which is the Infrastructure Investment Trust (InvITs). InvIT is a business trust. Registered with the market regulator, it owns, operates, and manages operational infrastructure assets. This innovative vehicle enables developers to monetise revenue-generating real estate and infrastructure assets, while providing investors or unit holders with the opportunity to invest in these assets without direct ownership over them. Consequently, it enables direct investment of small amounts of money from possible individual or institutional investors in infrastructure, and they earn a small portion of the income as a return. Investing in these assets assists in developing and maintaining the country's infrastructure, and the public's involvement as individual or institutional investors is crucial.

Magweva's (2020) study indicates that investing in unlisted or private infrastructure securities has the potential to enhance portfolio returns and mitigate portfolio risk. The significance of infrastructure investment to institutional investors thus primarily lies in enhancing portfolio returns and minimising portfolio risk. The findings indicate that the risk-return characteristics of listed or exchange-traded infrastructure investments closely resemble those of real estate and overall emerging equity market returns in emerging markets. This suggests then that investors can hold listed and private infrastructure assets in the same portfolio without sacrificing portfolio performance. Further, for companies in the infrastructure sector (along with real property and

general equity) in developing economies, the implication is that they should be prepared to absorb an additional risk premium as lenders are exposed to significant and persistent volatility.

It is recommended that investors allocate a significant part of their capital to unlisted infrastructure in order to enhance their portfolio performance and reduce portfolio diversifiable risk.

2.6.3 Impact of social and economic infrastructure

According to Familoni (2004), infrastructure refers to basic essential services that should be put in place to enable development to occur. The presence of social and economic infrastructure can facilitate and accelerate socio-economic development. In contrast, without these facilities and services, development will be very difficult and similar to a very scarce commodity that can only be secured at a considerable cost. Familoni's paper (2004) examines some of the theoretical discussions and analyses of socio-economic infrastructure.

Familoni (2004) concludes that economic and social infrastructure are critical in the development of nations, regardless of their level of development. Such infrastructure provides the basic foundation on which further development and growth can occur. If the foundation is weak or fragile, it is unlikely that any structure could be built on it or that any development progress could be achieved – it will simply remain an aspiration. However, if the foundation is very strong, any structure built on it, whether simple or complex, has the potential to provide continuous and stable services into future. When the economic and social infrastructural foundation is strong, development is not only achievable, but it is also continuous, stable, of high quality and with measurable impact.

Infrastructure development contributes to the country's socio-economic development. Education plays crucial role in developing countries' economies. Adequate infrastructure in educational institutions enables learning to take place and the imparting of the necessary skills to enter the workplace and assist in growing the economy. Remote and rural areas are under-developed, therefore communities in these areas live in poor socio-economic conditions, and there are no interactions between society and the economy. The scarce physical resources – the limited infrastructure in the rural areas – results in low productivity and little growth of the economy.

Infrastructure enables trade, drives businesses, connects workers with places of actual or potential employment, fosters growth and opportunities for struggling communities, and safeguards the country from the increasing unpredictability of the natural environment. Additionally, it sustains the workforce by generating millions of jobs each year in the construction and maintenance sectors. Most importantly, it is indispensable for achieving the national development goals.

Wang (2007) investigated how varying distributions of political power and productivity among diverse social groups influence coalition formation, as well as how different endogenous social infrastructures impact growth rate and consumption distribution, the two key indicators of macroeconomic performance.

Wang (2007) offers a theoretical examination of how the endogenous or internal formation of a coalition structure among diverse social groups can influence long term economic growth and consumption inequality. It underscores the significance of the distribution of political power and labour productivity in shaping the formation and dynamics of social coalition structures. The dynamics of political power distribution translates into the dynamics of social coalition structures, and consequently the dynamics of economic growth and inequality. Wang (2007) asserts that understanding the macroeconomic performance of different developing countries requires a thorough understanding of the specific social infrastructure within those economies, particularly the social conflicts among various interest groups. Wang's (2007) paper illustrates why the ruling group might relegate political rights to other groups in order to advance its own interests, with the effect of potentially maximising the economic growth rate. The paper also shows how even slight changes in productivity distribution among different social groups can lead to significant shifts in social structure, which can also potentially influence the attitudes of different social groups towards the adoption of new technologies.

According to Snelson and Collins (2021), social infrastructure has a significant role in supporting the 'levelling-up' agenda in local areas. This infrastructure supports and creates institutions and physical spaces that foster personal relationships, civic engagement, and social networks, thereby promoting stronger, more cohesive and healthier societies. Snelson and Collins (2021) published a report for Frontier Economics' consultants, commissioned by a local trust as it sought to consolidate existing evidence to provide an independent evaluation of the economic rationale for

investing in social infrastructure. Its aim was to quantify the potential magnitude of the economic, social and fiscal benefits resulting from such investments.

Snelson and Collins (2021) highlighted concerns regarding underinvestment in social infrastructure in disadvantaged areas in London. They noted that there has been some acknowledgement of the importance of investing in social infrastructure to improve economic, social and fiscal outcomes in these areas, and that the Covid-19 pandemic underscored the crucial role that social infrastructure plays in supporting local communities. Their study focused on the disadvantaged 'left behind' areas and examined the impact of the lack of social infrastructure on people living in these areas. The analysis revealed significant opportunities for well-targeted interventions to improve social infrastructure, which are crucial for improving health, education, participation in the formal economy, employment and life expectancy. Compared to the national average, these left-behind areas have a higher percentage (over 13% more) of working-age people without qualifications, and a lower percentage (15% fewer) with higher level qualifications, such as NVQ4 equivalent or above. There is also a greater proportion of economically inactive individuals who desire employment, especially in the most deprived areas. Residents of these areas are more likely to experience long-term health issues and have fewer skills compared to the national average. Life expectancy is notably lower for both men and women, by around four years for men and three years for women, and a considerable portion of the population experiences limiting long-term illnesses or chronic disabilities (almost one in four people, 24%), a figure that is 6.5% higher than the national average. A range of barriers and challenges would have to be overcome to help get those seeking jobs into employment.

In their study, Gnade, Blaauw and Greyling (2017) analysed how investment in basic and social infrastructure influences economic growth and social development. They confirmed that these types of infrastructure impact urban and rural areas differently in terms of economic growth and social development, and that there is a strong positive relationship between infrastructure investment and economic growth. To address the disparity in economic growth and social development between urban and rural municipalities, the researchers recommended that the government should review its plans for delivering basic and social infrastructure.

2.6.4 Delays in infrastructure projects

According to Islam and Trigunarsyah (2017), every infrastructure construction project is designed with a predetermined timetable, budgeted expenses, and expected quality. A construction project is deemed successful when it has been completed on time, within budget, and meets the required standard of quality. However, there may be delays at the feasibility stage of the project that continue to the end of the construction project if there is a lack of proper management. A number of factors cause construction projects to be delayed and not completed within the predefined schedule as stipulated in the contract for the construction.

The Department of Environmental Affairs (RSA, 2015) elaborated on the risks, costs and timeframes associated with social infrastructure projects. Considering the tight timeframes for planning and executing social infrastructure projects, the primary risks and costs stem from delays resulting from failure to secure the necessary authorisations in time to implement the projects, and to complete them within the set timeframes. According to the Department, these risks and costs could include:

- Loss of funding – when projects fail to meet predetermined timelines for implementation. This may lead to projects being halted mid-project, resulting in negative environmental impacts due to a lack of the required management measures.
- Penalties – paid to contractors, due to delays in the commencement of work or where work is interrupted or stopped mid-process.
- Risk of fines – where development proceeds without the necessary authorisations. This, however, is complicated by the Intergovernmental Relations Framework Act, which seeks to minimise legal disputes between government spheres and departments. It mandates a rigorous and thorough process before resorting to legal action, often resulting in limited action ever enforced.
- Rehabilitation costs – these arise when development proceeds illegally.
- Duplication of consulting fees.

The Department (RSA, 2015) reported that eliminating the loss of funding and avoiding the payment of unnecessary costs and penalties hinges on appropriate and thorough consideration of the possible authorisations required for the proposed project during the planning stage. Moreover,

consideration of the timeframes ensures that budgets allocated to social infrastructure projects are utilised within the correct funding cycle.

Khumalo, Choga and Munapo (2017) elaborated on the challenges associated with infrastructure delivery, specifically, the challenges faced by the Independent Development Trust (IDT) in infrastructure delivery for the provincial government of KwaZulu-Natal. The main focus of the study was to identify the underlying reasons behind delays and budgetary overruns, their repercussions on service delivery backlogs and the socio-economic impact. The study involved professionals and stakeholders in the built environment, including specialists and professionals in the fields of engineering, construction management, civil and general building. A self-administered questionnaire was disseminated among participants, comprising project managers, quantity surveyors, engineers, architects and project managers and other professionals working with IDT.

Khumalo, Choga and Munapo's (2017) research confirmed that there were major shortcomings in the infrastructure delivery model of the South African government. Key issues identified included delays in payments, inadequate or poor planning, and declining levels of professional integrity, ethics and standards exercised by professionals in the construction sector, among others. Based on the research findings, the study made a number of recommendations. Evidently, a new approach is needed in terms of the infrastructure delivery model, to address under-development and the triple challenges of poverty, unemployment and slow economic growth.

As indicated, the main participants of Khumalo, Choga and Munapo's (2017) study were project managers, quantity surveyors, engineers, architects and project managers working with IDT. The research findings of study highlighted the following:

- Time delays and cost overruns

Ninety-five percent of the respondents agreed on the importance of streamlining the project approval processes. Only 50% of the professionals surveyed believed that budget allocation should be determined solely by the rate at which the budget funds are expended. This suggests that professionals recognise and understand the complexity of the issue, acknowledging that overspending is not the sole root cause of the problem.

- Planning and value added by professionals

Professionals agreed that there was poor planning on the side of the client – the government – that caused major delays. They recommended that the client must increase professional fees to reduce delays.

- Project management

Nearly 52% of professionals indicated their concerns about not being involved in the project's planning phases, where they could contribute certain tools and techniques to facilitate efficient project management from planning to delivery stages.

- Socio-economic impact

A total of 87% of professionals felt that on-time payment of consultants or contractors is either important or extremely imperative to minimise delays.

- Ethical issues

There was 94% agreement that the use of highly skilled professionals by the clients was extremely important in minimising delays. However, the research noted that 59% of the participations did not refute the claim that there is a growing trend whereby professionals deploy inexperienced staff to government projects.

Ntuli and Allopi (2014) indicated that delays in infrastructure projects can also be attributed to the lack of experience and skill in the construction industry in KwaZulu-Natal. Ntuli and Allopi (2014) conducted a study with the aim to investigate the challenges faced by civil engineering contractors whilst making their enterprises sustainable. The results showed that there is a lack of skilled workers in the construction industry, underlining the importance of ongoing training for employees of contractors. They recommended that the South African government, together with all stakeholders, should develop and implement programmes for contractors to address the deficiency of technical and management skills in the construction sector.

Ntuli and Allopi (2014) emphasised the importance of a sustainable construction sector to South Africa's economy. They highlighted that in 1999, the construction industry contributed approximately 35% of the total gross domestic fixed investment and employed 230,000

employees. The authors pointed out that civil engineering contractors face serious challenges in maintaining their businesses, particularly during periods of economic downturn, or in a weak economic climate. They underscored the necessity of having a certain level of construction experience, expertise and training to manage a sustainable construction company. The main challenges and recommendations highlighted were as follows:

- Development of human resources
- Lack of understanding of the tendering process
- Delayed payments affecting business cash flow
- Corruption within the industry
- Contractors' incomplete grasp and understanding of procurement policies
- Insufficient knowledge to develop business plans
- Securing of work
- Inadequate understanding of the CIDB's role in the industry
- Lack of operational and managerial skills amongst contractors
- Underpricing
- Lack of understanding of general contract conditions
- Encourage established contractors to subcontract work to smaller contractors through partnership
- Improve transparency in the circulation of tender opportunities particularly for invited tenders
- Establish a forum or platform where they can share experiences.

According to Ntuli and Allopi (2014), the South African government has prioritised transformation of the sector to facilitate the participation of emerging and small contractors. However, this initiative lacks proper regulation as most of these contractors lack the necessary experience and skills to manage sustainable construction businesses. Compounding this issue is the insufficient investment in skills development across all levels in the sector, despite ample funding being available from the Construction Education and Training Authority (CETA). Specific shortcomings include insufficient recognition of prior learning and workplace training.

Delays in the construction of the infrastructure projects is one of the most recurring issues in construction projects worldwide. In their research study on the factors that caused delays in

infrastructure projects in India, Edison and Singla (2020) discovered that there were 73 factors identified. Their study utilised an exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) to scale these 73 factors down to six. These were: contractor related factors; consultant related factors; external factors; labour related factors; material related factors; and design related factors. These were ranked in order of importance, with the contractor related factors as the first, to the design related factors as the last factor.

The objective of Edison and Singla's (2020) study was to develop a validated measurement scale for factors that cause delays in infrastructure projects. As indicated, the study confirms that delays in infrastructure projects happen due to six main factors. Each of these six factors comprises a number of other factors. Under the contractor related factors (CON), contributing factors included poor site management, poor supervision, ineffective planning and more. The material related factors (MT), included factors such as shortage of materials, delays in the delivery of the materials, delays in the production of the materials designed, and more. Their study contributed to knowledge by proposing a refined and validated scale which can be a useful measure in all infrastructure projects.

Islam and Trigunarsyah (2017) conducted a content analysis study which reviewed delays in construction projects in developing countries such as South and Southeast Asia, the Middle East, and Africa. They identified that indeed construction delays were one of the main constraints to achieving project objectives in developing countries. A number of parties involved in the construction industry created numerous problems, and as a result, the industry is considered to be a high-risk trade sector.

Islam and Trigunarsyah (2017) classified the causes of the delays in the construction industry into 8 major groups. Of an initial total of 53 frequent causes of delays, these were grouped into the 8 categories identified as significant in developing countries. The delays identified were all attributed to the contractors that had been awarded the tender for the construction project. These included financial issues like contractors facing cash flow problems and owners delaying payments. Managerial issues such as poor site management also play a role. Additionally, contractor-related factors like inadequate planning and scheduling, as well as owner-related factors like changing the project scope during construction, are significant contributors to delays in project timelines all over the developing world.

According to Islam and Trigunarsyah (2017), these delays in construction projects caused by the construction company have serious effects on project objectives, including the timeline and costs of the project. It also creates claims, disputes, litigation, and arbitration among project stakeholders, who may abandon such projects. The study recommended that owners of construction companies ensure that there is sufficient cash flow throughout the project cycle. The owners of such companies must also improve the competency of their project management, and ensure timely procurement of equipment, materials and labour in effective and efficient ways. These are some suggestions for reducing delay.

Studies confirm that the African continent has its fair share of challenges in infrastructure development. A study conducted by Thusi and Mlambo (2023) on the infrastructure development crisis on the African continent and its root causes indicates that the infrastructure challenges have negative effects on the continent. The study indicates that infrastructure development on the continent is very poor, and this affects the economy of the continent and its countries. Further, trade between countries and within the region is also heavily impacted by poor infrastructure investment in the continent, consequently putting limits on economic prospects within the region. Poor infrastructure development results in the lack of foreign investment and business, and these are needed as they boost the economies of the countries in Africa. This is a vicious circle; when there is lack of infrastructure development in the countries of the continent, there is lack of foreign investment, and a stagnant economy. Consequently, the African continent has the highest number of people living in poverty and/or unemployed, as well as poor education and health care systems.

Thusi and Mlambo (2023) indicate that infrastructure development in Africa is lacking, and this is alarming. There are a number of factors that have resulted in inadequate infrastructure development in the continent. These include the lack of funding to prioritise infrastructure development, weaknesses in infrastructure planning and project preparation, corruption, lack of bankable projects in Africa, among others. According to the authors' recommendations, the countries in Africa must improve their infrastructure development so as to stimulate economic growth and attract investments.

2.7 Conclusion

The literature has reviewed how crucial the development of social and economic infrastructure is to the livelihoods of South Africans and the development of the economy, yet there are numerous backlogs on these projects. A number of reasons account for delays of these development infrastructure projects, such as poor planning, delays of payments, and lack of skills, among others. There are negative impacts of the delays of the construction of the development infrastructure, including the low socio-economic development of the country. Most studies emphasise that the South African government must improve the delivery model of infrastructure projects.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

Gupta and Gupta (2022) describe research methodology as a combination of all the approaches, methods and techniques used by the researcher in conducting a research study. Graue (2015) states that there are six steps in qualitative research. The researcher must first have a general research question then select a relevant site of study, collect relevant data from the site, interpret the data collected, conceptualise the data, and lastly, write the findings and the conclusion of the study.

According to Gupta and Gupta (2022), the research methodology chapter explains the behaviour and methods used in selecting and constructing the research techniques. It is a discussion of the data collection and data analysis methods used for the study. The crucial part of this chapter is the justifications behind the choices of the researcher's methods in collecting and analysing the data of the study.

Therefore, the aim of this chapter is to outline the research methodology applied in conducting this study.

3.2 Research Paradigm

The interpretive paradigm was adopted for this study, and qualitative research methods such as interviews which were applied as tools of data collection. According to Rahi (2017), the term paradigm describes the set of beliefs shared by the scientist on how problems are to be understood. The research paradigm forms a philosophical foundation of the study. The rationale for the choice of the interpretive paradigm was based on the fact that knowledge is constructed through interactions between a researcher and the research subject by experience and conversations.

Rahi (2017) states that the interpretivist paradigm holds that true knowledge can only be obtained by deep interpretation of a subject. In this study, therefore, in order to understand the causes of the delays in the development infrastructural projects in KwaZulu-Natal, the researcher had to conduct interviews with Department of Works. The researcher needed to gather different perspectives on the topic so as to gain understanding/knowledge on the factors causing these delays. The researcher

had to interpret the data collected and the interpretation was also shaped by the researcher's own experiences and background on the topic.

3.3 Qualitative Research

Hennink, Hutter and Bailey (2020) define qualitative research as an approach that allows the researcher to examine peoples' experiences in detail using set of methods such as in-depth interviews, focus group discussions, observations and more. It is used to gain understanding from multiple perspectives. Qualitative research methods are used to answer questions about experience, meaning and perspective, most often from the standpoint of the participant. This method is usually used by researchers who have adopted an interpretive paradigm for their studies.

For this study, semi-structured and in-depth interviews were conducted to collect data using a set of questionnaires administered to Department of Public Works officials and selected project teams. Questionnaires had a set of open-ended questions, which the researcher followed up with probing questions to explore further response on the topic of the study.

3.4 Target population

Target population refers to the sample from which participants of the study have been drawn. The researcher chose to conduct the study with the KwaZulu-Natal Department of Public Works as it is responsible for government infrastructure development and government property management. Participants in the study consisted of ten Department of Public Works officials and six selected project teams having five participants in each team.

3.5 Sampling

According to Godwill (2015), sampling is the process of selecting participants of a study from a targeted population and reducing this targeted population to a finite number. This is done by using a sampling design to make it practically feasible for the researcher to collect data. The target population can be finite or infinite, therefore it is crucial for the researcher to get a fixed number that is known, as a sample of the population. The researcher can select participants from the

targeted population by choosing them randomly, which is called probability sampling design. Conversely, the researcher can have a criteria for selecting or sampling the population, which is called a non-probability sampling design.

Non-probability sampling was utilised in this study whereby the researcher selected projects that was relevant to the study, choosing from the list populated by the Department. Researcher had detailed information of all the departments projects from 2017/18 financial year and had chosen only the projects that were relevant to the study. Therefore, non-probability was suitable for sampling instead of probability sampling. The study employed the purposive/judgement sampling technique. Sharma (2017) defined the purposive sampling technique as a sampling technique that relies on the judgement of the researcher when it comes to the selection of the population of the study.

Projects selected were from the 2017/18 financial year up to the 2022/23 financial year. The first selection comprised two projects within the province that went well in terms of the construction, where the projects were completed on time within the budget allocated with minimal challenges. The second selection comprised two projects within the province that had challenges and could not be completed on time. The third selection comprised two projects that had not been completed in more than five years or construction had stopped.

Project managers of these projects were the participants of the study and they were also interviewed. Six projects were selected, as stated above, where project managers and their teams were interviewed. Department officials were also interviewed first before the project managers. Recruitment was done through the Department of Public Works as it was managing these projects.

According to Sharma (2017), the purposive sampling technique has its disadvantages as it can be highly prone to researcher bias. The purposive sampling technique has its disadvantages, in that it can be highly prone to researcher bias as it is based on the judgement of the researcher. This is in contrast to probability sampling probability sampling techniques that are designed to reduce such bias. However, this judgemental subjective component of purposive sampling is only a major disadvantage when such judgements are ill-conceived or poorly considered; that is, where judgements have not been based on clear criteria, whether a theoretical framework, expert elicitation or some other accepted criteria.

Table 1: Department of Public Works Officials – Participants

Department of Public Works officials	Total
Senior Manager	1
Chief Construction Project Manager	1
Construction Project Manager	1
Chief Engineer	1
Quantity Surveyor	1
Director of Monitoring and Evaluation	1

Table 2: Participants from the Projects

Participants from the projects	Two successful projects	Two projects with numerous challenges	Two projects that had stopped
Project Manager	2	2	2
Department of Public Works Client (e.g., Department of Education)	2	2	2

Department of Public Works officials (Table 1) were crucial participants of the study as they are responsible for carrying out the mandate of the Department, which is infrastructure development and property management of government immovable assets. Department officials were able to give reasons for the delays of the province’s infrastructure development projects, clarity on the causes of these delays, and possible the mitigation measures to minimise cost overrun and delays in future projects.

Project managers of the six selected projects (Table 2) were in a position to provide clarity on the successes of the projects and the challenges encountered during the construction of these projects. Other government departments that were clients of the Department of Public Works, for which the department was developing the infrastructure for, could also provide clarity as they were involved in the projects.

3.6 Description of data collection

Data collection is the procedure of gathering data or information from the study participants. Godwill (2015) describes data collection as an important aspect of research as it provides the researcher with information of the study that can be analysed to be meaningful. There are two types of data – primary data and secondary data. Godwill (2015) distinguishes between primary data and secondary data. Primary data is information collected afresh for the first time from a first-hand source, meaning the researcher has collected the data him/herself, and the data collected has not been published yet. Secondary data is information that has already been collected by someone else other than the primary user, and the information has been published; the researcher then collects such information that has been published and uses it for the study.

The study utilises both primary data and secondary data. The researcher collected primary data from the participants of the study in form of in-depth interviews. The researcher also collected secondary data from different sources, such as reports from the Auditor General, Public Service Commission, KZN Legislature, and the Department's Annual Performance Plans and Annual Reports.

Primary data for the study was collected through interviews with the participants of the study. The researcher used semi-structured in-depth interviews to collect data using a set of questionnaires that were administered with Department of Public Works officials and selected project teams. The questionnaires had a set of open-ended questions, and the researcher followed them up with probing questions to explore further responses on the topic of the study.

The researcher obtained consent from the participants that were interviewed. The consent form included the participants giving the researcher permission to record the interviews. Therefore, where consent was given to record the interviews, the researcher recorded the interviews. The researcher took notes and recorded the interviews; these were utilised when analysing the interview transcripts.

3.7 Data analysis

Data is collected so as to acquire more information on the topic of the study and the researcher must analyse the data collected to make a meaningful interpretation of the data. Graue (2015)

describes data analysis as a process of describing, classifying and interconnecting phenomena with the researcher's concepts. The aim is also to uncover emerging themes, patterns, concepts, insights, and understandings. The researcher analyses data to gain meaningful insights from raw data and to make meaningful interpretations. Data analysis is a very important part of the research process.

Data analysis is a process whereby the researcher must reduce the information collected from different sources without losing the meaning and offer an explanation or interpretation of the data collected. In qualitative data analysis, the researcher pays attention to the spoken language. Graue (2015) states that there are rules in the analysis of quantitative data, however there are no such explicit rules for qualitative data analysis. Even though there are no explicit rules in analysing quantitative data, there are some general approaches to follow that assist researchers to apply a more systematic strategy to the study. This indicates that there are different approaches to qualitative data analysis, including triangulation, theoretical propositions, grounded theory, and content analysis.

There are different processes used to reduce vast amounts of data collected, which include thematic content analysis and narrative analysis. The researcher, therefore, must choose the suitable approach for categorising and interpreting the data collected.

According to Lester, Cho and Lochmiller (2020), thematic analysis focuses on finding common patterns in the data and labelling recurring topics and concepts, then grouping them into broad themes. In thematic analysis, the researcher will first prepare and organize the data for analysis. The researcher must turn data into transcript, then identify patterns, systematically code the data, derive themes from the data, and craft the narrative from these themes.

Lester, Cho and Lochmiller (2020) further elaborate on the different phases of thematic data analysis: the researcher must first prepare and organise the data for analysis, then transcribe the data, become familiar with the data and explore it, code the data, develop themes, and analyse the data. Data transcription involves transferring data from audio into written form and transforming spoken words into written form. Data coding involves the process of assigning numerical or categorical codes to data items; coded data can be analysed using statistical software such as NVivo.

Data collected for this study was analysed using the thematic data analysis method. This was used with both primary and secondary data. The primary data consisted of interviews with Department officials and the secondary data consisted of the data from reports of government institutions.

3.8 Ethical considerations

In upholding the ethical principles governing social research, the researcher obtained an ethical clearance certificate from the UKZN research ethics committee before collecting data. Gatekeepers' permission was also granted by the KwaZulu-Natal Department of Public Works to interview the identified Department officials and project managers. Ethical principles such as informed consent, confidentiality and anonymity, avoidance of harm, and use of pseudonyms were observed.

3.9 Limitations of the study

The limitation of the study was the sample size. The study was conducted at a broad scale, which was the provincial level. There was a huge sample to choose from. However, the study focused on six projects within the province whereas the Department had about 10 projects on construction of new buildings and 200 projects on refurbishment of old buildings per financial year. The study obtained a brief report of all the Department's projects and only zoomed in on the six projects.

3.10 Conclusion

This chapter focused on the research methodology used in this study. It describes the methods adopted in this research, including the research paradigm, data collection methods, target population, sample and sampling strategies. The chapter further discussed the data analysis procedures, ethical considerations and limitations of the study. The following chapter provides a presentation of the data, analysis of the data, and interpretation of the research findings.

CHAPTER FOUR: DATA ANALYSIS AND FINDINGS

4.1 Introduction

This chapter presents the data collected through interviews and through the secondary data analyses from different sources. It also presents the analysis of data and the findings. The study sought to explore the causes of delays in public infrastructure development in the province of KwaZulu-Natal. It has investigated the root causes of delays of the infrastructure projects that consequently result in service delivery backlogs. The backlogs prohibit the province and the country from achieving the NDP goals to eliminate poverty and reduce inequality by the year 2030. Therefore, the objectives of the study are to identify the main causes of project delays and identify and recommend possible measures to minimise these delays.

The objectives of the study are:

- a. To identify the main causes of project delays;
- b. To identify the effects of project delays;
- c. To obtain the different views of the three main participants in the provincial government development projects;
- d. To recommend mitigation measures that minimise cost overrun and delay in future projects.

The researcher chose to conduct the study with the KwaZulu-Natal Department of Public Works as it is responsible for government infrastructure development and government property management. Participants of the study consisted of Department of Public Works officials and selected project teams. The researcher also collected secondary data from different sources such as reports from the Auditor General, Public Service Commission, and KZN Legislature, as well as the Department's Annual Performance Plans and Annual Reports.

4.2 Data analysis

The study employed a qualitative research paradigm, where data was collected through interviews. According to Sutton and Austin (2015), in qualitative data analysis, the researcher seeks to convey the participants' point of view on the research topic. The role of the researcher in qualitative research is to attempt to access the thoughts and feelings of the study participants. Therefore, the researcher studies and analyses the data to reflect the respondents' thoughts, feelings, attitudes or views about the research topic. This is subjective data that is expressed in words and these words serves as the unit of analysis, whereby the researcher examines the subjective data to understand how related or relevant it is to the research problem.

The data was collected from a wide range of sources of information and the analysis was based on the patterns or themes that emerged from the participants. Having four research questions and interviewing 13 participants and sat in three meetings on department infrastructure, there was a total of about 60 answers from them, and this is considered to be a wide base of information to analyse. The research then discusses codes, themes or categories that emerged from the words, phrases and sentences collected from interviews. The research used thematic analysis where qualitative data was collected then coded, and themes that emerged are presented in the findings.

4.3 Participants of the study

The study was conducted mainly with the KwaZulu-Natal Department of Public Works as the Department is a custodian of government property and all state immovable assets. The Department is also responsible for infrastructure development in the province. The Department manages, coordinates and monitors infrastructure programmes in respect of major clients such as Health, Education, and other departments and implementing agents. Therefore, the researcher interviewed four senior managers from the KZN Department of Public Works. This included two infrastructure directors from KZN Department of Public Works Head Office, one chief construction project manager from head office, and one district director.

A total of six projects of the Department of Public Works were selected for the study, therefore six project managers of these projects who were permanently employed by the Department were interviewed. The researcher was part of the monthly progress meetings of the construction of J G

Zuma Secondary School where a number of stakeholders were interviewed, such as the Community Liaison Officer, the contracted project manager, the engineer, and Department of Education officials.

Department of Public Works projects are from other departments, which are department clients, such as Education, Health and other departments. It was important to interview major departments; these included the Department of Education and the Premier's Offices as the coordinating office. The researcher interviewed the following people from other departments:

- Deputy Director Infrastructure Department of Education
- Director Reporting, Office of the Premier
- Coordinator of Economic Cluster from the Office of the Premier, and
- Supply Chain Management Specialist from Treasury.

4.4 KwaZulu-Natal Infrastructure

For the purpose of the study, it was crucial to gather information on the state of the province's infrastructure. This was done by gathering information on the historical background of the province's infrastructure development and the state of the province's infrastructure. This information was collected through the KwaZulu-Natal Office of the Premier reports, and interviews with the senior officials responsible for the economic cluster that deals with the provincial infrastructure development. A number of province status reports were analysed and reviewed to gather the state of the province's infrastructure. The Office of the Premier is responsible for the coordinated and integrated service delivery within the provincial government.

As the custodian of the provincial infrastructure, the KZN Department of Public Works is responsible for the development of the provincial infrastructure master plan. The infrastructure master plan is the comprehensive technical report that provides information on current infrastructure and on future infrastructure development plans. This must be circulated to the Office of the Premier as the coordinating office. However, both the officials from the Office of the Premier and of the Department of Public Works reported that they were not in possession of the infrastructure master plan.

The Infrastructure Master Plan is with the KZN Office of the Premier, Department of Public Works doesn't use it as it depends on the client departments for projects. (DoPW Senior Manager 1)

Unable to obtain the province master plan, researcher relied on reports that provided background information and current status of the provincial infrastructure.

The history of KwaZulu-Natal infrastructure challenges started way back during the apartheid era where there was unjust provision of infrastructure amongst certain groups of people in certain parts of the province and the country. Hänel (2019) investigated the effects of the unjust geographical legacy of apartheid, where people were still experiencing the legacy of apartheid. He reported that residential segregation formed under apartheid left the unjust provision of the country's infrastructure.

Post-apartheid, the South African democratic government had taken to address the legacy of apartheid inequality in all society's structures. However, in the twenty-year review conducted after the country celebrated its 20 years into democracy in 2014, much literature revealed that despite the government's efforts to undo the wrong of apartheid, the situation on the ground was not improving as much as it was supposed to improve. There was a huge backlog of the infrastructure development needed to bring about change and redress the legacy of apartheid. In 2014, the then KwaZulu-Natal Premier Senzo Mchunu acknowledged the infrastructure backlog and established the Infrastructure Co-ordinating Commission to assist speed-up in the delivery of basic services in the province.

During the past years, South Africa as well as the province of KwaZulu-Natal have experienced a number of challenges that have negatively impacted on the economy of the province and have led to a stagnant economy, with the resultant decrease of government funds and the decline in government infrastructure investment. The KZN Socio-Economic Review and Outlook 2022/23 detailed a number of contributing factors leading to the province's stagnant economy, challenges with eradication of poverty, unemployment and equality, challenges with infrastructure development required to support NPD goals. These included the Great Recession in 2008 which was the economic global financial crisis, the Covid-19 global pandemic, the 2021 unrest and the KZN 2022 floods.

According to Steytler and Powell (2010), the 2008 Great Recession, which affected the world, also had negative impacts in South Africa. There was declining revenue, growth in public debt, millions of jobs were lost, and the national government had to reprioritise government expenditure. Government faced an operating deficit as there were insufficient funds to pay operating costs; cash expenses exceeded cash receipts. Therefore, there were budget cuts across government expenditure. When government faces a deficit, funds are reprioritised; government investment in infrastructure is also affected as there will be less funds available to invest in infrastructure development.

National government expenditure affects provincial budgets as there is an intergovernmental financial relationship where provincial government and local government are entitled to an equitable share of revenue raised nationally, to enable them to provide basic services and perform the functions allocated to them. Therefore, when national government was affected by the 2008 recession so were the provincial and the local governments.

Government department budget cuts during the 2008 recession affected infrastructure investment in other economic and social sectors. The African Bank Group (2012) reported that there was an increase in infrastructure investment between 2005 and 2009. That was after the 2004 announcement of the president of the Federation of International Football Association's (FIFA), Joseph Sepp Blatter, that South Africa would host the 2010 Soccer World Cup. However, it must be noted that the hike in infrastructure investment between 2005 and 2009 was geared towards building infrastructure to support the FIFA World Cup. This included building five new football stadiums and renovating five old football stadiums.

Arndt et al. (2020) reported that Covid-19 had a negative impact on the South African economy as there was a national lockdown in response to the pandemic, to curb the spread of the virus. There was shrinkage of the South African economy due to Covid-19. Arndt et al. (2020) further state that the shrinking of economy was a result of the forced reduction of production during the national lockdown and other restrictions on business operations, the impact on demand as households were locked down, the effect of disrupted global production and supply chains on South African exports, and the effect of uncertainty on business investment.

The 2021 unrest was a wave of civil unrest that occurred in South Africa's KwaZulu-Natal and Gauteng provinces from 9 to 18 July 2021. South Africa experienced violent protests and socio-

political unrest characterised by widespread looting of shops and businesses, as well as burning and destruction of public facilities and private properties. This had a negative effect on the province's fiscal revenue and economy as 40,000 businesses and 50,000 traders were affected overall in KwaZulu-Natal, while stock worth R1.5 billion was lost and 150,000 jobs were stated to be at risk.

The province of KwaZulu-Natal experienced disastrous floods and landslides caused by heavy rainfall from 11 to 13 April 2022. There were 435 lives lost, over 40 000 people were displaced, and over 12 000 houses were completely destroyed. The 2022 KZN floods severely damaged critical infrastructure in the province, which included roads, health centres, schools, businesses, communications, electrical systems, and more. This was the worst catastrophic natural disaster yet recorded in the province. The most hard-hit areas were in and around Durban.

The National Planning Commission Review of Economic Progress (2020) stated that the delivery of public sector infrastructure in South Africa required to support the National Development Plan (NDP) objectives was below what was needed, given that the NDP aims to eliminate poverty and reduce inequality by 2030. Infrastructure development plays a key role in ensuring fast economic growth and alleviation of poverty.

The province of KwaZulu-Natal is among the top three provinces in South Africa stricken by poverty, and people living in rural areas are especially affected. The previously disadvantaged areas such as townships and rural areas do not have the same adequate infrastructure as developed communities due to high social inequality. There is inadequate access to basic services, particularly housing, poor access to roads, electricity, water and sanitation, and a lack of good quality social services such as education, health and ambulances. Therefore, without the necessary infrastructure, the province and the country will not be able to realise the NDP goals. The KZN Socio-economic Review 2022/23 indicated that a key driving factor for multidimensional poverty among all age groups is the poor state of social infrastructure in the province.

The National Planning Commission (NPC, 2020) reported that many South Africans struggle to access basic social and economic infrastructure due to the massive infrastructure backlog in the country, despite government funding the development of infrastructure with billions of rands.

According to the KZN Socio-Economic Review and Outlook 2022/23, there was significant progress made prior to the economic crisis of 2008 in addressing poverty, unemployment and inequities in the province through infrastructure development, given that it plays a key role in ensuring fast economic growth and alleviating poverty. A number of factors delayed infrastructure development in the province as discussed above.

In addition to the factors mentioned in the KZN Socio-Economic Review 2022/23, below are the views of the participants of the study on the factors that contribute to the delays in public infrastructure development in the province of KwaZulu-Natal.

4.5 Emerging themes

The content and thematic analysis that was performed on the interview manuscripts yielded the fourteen themes as indicate in Table 3 below. These are the factors that contribute to the delays in public infrastructure development in the province of KwaZulu-Natal. It must be noted that some themes overlap.

Frequency	External interference	Lack of monitoring	Time overruns	Shortage of resources	Indecisive and slow decision making	Scope and design changes	Contractors poor performance	Project manager poor performance	Consultants' poor performance	Shortage of skilled human resources	Planning processes	Non-payment of client departments	Procurement processes	Budget cuts	Government priorities	Participants
13	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	DoPW Senior Manager 1
10	✓		✓	✓		✓	✓		✓			✓	✓	✓	✓	DoPW Senior Manager 2
7	✓				✓			✓				✓	✓	✓	✓	DoPW Senior Manager 3
10	✓		✓	✓		✓	✓		✓		✓			✓	✓	DoPW Senior Manager 4
12	✓			✓		✓	✓	✓	✓	✓	✓		✓	✓	✓	DoE Deputy Infr Manager
7	✓		✓							✓	✓			✓	✓	OTP
5	✓	✓	✓											✓	✓	OTP
10	✓	✓	✓	✓		✓	✓	✓		✓	✓		✓	✓	✓	Treasury
6	✓	✓	✓			✓						✓	✓			DoPW PM 1
9	✓		✓	✓	✓	✓			✓			✓	✓	✓	✓	DoPW PM2
9	✓		✓	✓	✓	✓	✓					✓	✓	✓		DoPW PM3
6	✓		✓		✓	✓	✓					✓				DoPW PM4
7	✓		✓			✓	✓		✓			✓	✓			DoPW PM5
11	✓		✓	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓	DoPW PM6
6	✓	✓	✓	✓		✓				✓						Contracted DoPW PM7
5	✓		✓			✓						✓				Contractor PM
4	✓	✓			✓					✓						CLO
	16	6	12	9	8	13	8	4	6	7	5	11	10	11	12	Total

Table 3: Factors contributing to delays in public infrastructure development in KZN

The factor most frequently mentioned by the participants of the study was external interference. Out of 17 participants of the study, a total of 16 participants identified external interference as the factor most causing delays in the government infrastructure projects. The second factor was scope and design changes, with 13 participants identifying it as the cause of delays in construction projects.

The least factor identified was project managers. Out of 17 participants, only 4 identified project managers as the cause of the delays. However, this was expected as half of the participants of the study were project managers.

4.5.1 Procurement Processes

The South African government has a number of policies and regulations for infrastructure delivery and procurement management. These include the Infrastructure Delivery Management System (IDMS), Standard for Infrastructure Procurement and Delivery Management (SIPDM), Framework for Infrastructure Delivery and Procurement Management (FIDPM), and more. These are the guidelines and regulations for the procurement of infrastructure in South Africa. These regulations clearly guide government officials in the planning, budgeting, procurement, delivery, maintenance, operation, monitoring and evaluation of government infrastructure.

The IDMS (RSA, 2012) details different stages of infrastructure delivery, which are:

- Infrastructure Planning System: this is the planning of infrastructure at the national, provincial and local level.
- Infrastructure Gateway System (IGS): this provides the work flow for the delivery of projects.
- Construction Procurement System (CPS): the procurement planning processes
- Programme and project management system
- Operations and maintenance system

The interviewed senior officials from the Department of Public Works and the KwaZulu-Natal Treasury all reported that the red tape in the regulation of infrastructure delivery and management was one of the main causes of the delays of infrastructure projects in the province. The red tape, which is often referred to as the conformity to formal rules or standards that are claimed to be excessive, rigid or redundant, or to bureaucracy, was claimed to hinder or prevent action or decision-making. They stated that these regulations were developed to curb corruption and create a smooth flowing paper trail for easy reference and transparency, however the regulations had become a source of frustration in infrastructure delivery.

The lengthy processes of the Supply Chain Management regulations delays procurement processes as each step of the process is given an excessive amount of time to be completed; before you know it in six months' time project funds haven't been used or committed and

during the mid-term budget review those project funds might be moved somewhere else, and project will delay further. (DoPW Senior Manager 3)

There had been challenges with the lack of documentation of information and therefore no traces. The intention is to follow the approach and regulations accordingly to curb irregularities, documenting every little step and decisions taken at each gate/step. Documentation is crucial as it is part of internal controls to improve the audit trail and transparency.

4.5.2 Project Management

The KwaZulu-Natal Department of Public Works has employed project managers to manage its projects. When they are employed, they are required to have a minimum of six years of experience as project managers. Their job is mainly to oversee the Department's construction projects.

The backbone of any successful project is, and will always be, its project manager (PM). The project manager is responsible for leading, staffing, and managing all aspects of the project. This includes the work of the entire project team and the work performed by all administrative, engineering, and construction disciplines. It is the project manager who is charged with the responsibility to deliver a project successfully, and to deliver value to the public who funded it. (PMSJ, 2015).

It was reported that most of the Department's project management have about six to fifteen projects, depending on the Department projects in that particular period. In addition to that, the Department will also employ a contracted project manager for a certain project. If the project is a 35-month project, therefore the project manager will have a contract of 35 months.

When interviewed on the factors and causes that contribute to the delays of infrastructure development in the province, project managers stated other factors which excluded themselves as contributing to the delays. However, some senior officials and departmental reports did indicate that project managers do contribute to the delays in the departmental construction projects.

Some project managers have personal interest in the project resulting in some processes not followed properly and that usually causes delays on the project. (DoPW Senior Manager1)

Some top officials in the KZN Department of Public Works indicated that project managers were overloaded with projects, resulting in them failing to properly manage these projects to successful completion. It was reported that ideally, project managers should have about five projects. However, at some point project managers have about fifteen projects that they oversee. Being overloaded with work leads to a number of negative consequences such as employees being less productive and lower job satisfaction.

The 2022/23 Audit general findings on the construction of iLembe office and Vryheid offices stated that in both construction projects, the poor management of construction by the project manager was the result of challenges in the projects. The contract of the contractors who constructed the iLembe District Offices was terminated after a 133% time period had lapsed yet the contractor had only completed 20% of the work on site. This was an indication that the project manager of this project failed to perform his/her duties. The manager should have followed the necessary procedures when it was clear that the contractor was not performing. The contract clearly states what forms the breach of contract, such as poor performance of the contractor, and what necessary steps are to be followed. This indicates that some project managers are not competent to do their work properly as this situation could have been avoided.

The lack competency of project managers to execute their duties has been cited vociferously as one of the main reasons why the government projects are failing. Mnembe (2022) states that one of the reasons for service delivery challenges across government departments is the lack of proper and effective project management. That is the lack of capacity of officials to manage government projects. The KZN Department of Public Works did acknowledge the fact that some project managers do lack the skills to execute their jobs properly and stated that in the Department, those project managers will be capacitated.

4.5.3 Time overruns

Adugna (2015) describes time overruns as a term used when a construction project fails to be completed in the contractual or agreed period, which can sometimes be called construction delays. The main focus of the study is the causes of the delays in these construction projects in the province, resulting in the backlog in infrastructure development projects that in turn leads to the province and the country failing to meet the NDP goals of poverty alleviation.

Adugna (2015) also states that time overruns and cost overruns go together, as the construction project that exceeds and goes beyond its contractual agreed period will accumulate more costs that were not budgeted for.

Time overruns of construction projects in the province were amongst the major causes of the delays in the delivery of development in the province. There were number of causes that led to time overruns on construction projects of the KZN Department of Public Works. These included: land acquisition, poor contract performance, weather, shortage of resources, external factors such as community distraction and business forum interruption, design and scope changes, lack of monitoring, and more. All these factors are discussed below as they all formed themes of the study.

The KZN Department of Public Works construction project with the longest time overrun was the construction of its offices. It was reported that the Department was constructing its Southern Region Offices based in Pietermaritzburg. The project was initially an 18-month project that commenced in 2012, however it was completed in 2022. There were two contractors who failed in performance, leading to the contract being terminated and a third contractor completing the project.

The project manager of the third contractor, which was RGZ, the contractor that completed the project, stated that when they took over the project there were a number of challenges.

A lot had been damaged in most part of the incomplete new structure as thieves had stripped most part of the building as the project was abandoned many times. (RGZ Contractor Project Manager)

A number of Department of Public Works construction projects were delayed and not completed on time due to the Covid-19 pandemic where there was a total shutdown during the level 5 of lockdown. When there were lower levels of lockdown, there were restrictions that led to time overruns on projects.

Construction was delayed and not completed on time due to the Covid -19 restrictions where the contactor was operating with 60% of work force on site and further delayed by business forums demanding to be subcontracted. (DoPW Project Manager 5)

4.5.4 Monitoring

Monitoring is very crucial in construction projects as it ensures that everything is going as planned and it is within the budget allocated to the project. It allows the project managers and all the stakeholders involved in the project to ensure that any distraction causing delays is dealt with promptly. Department of Public Works officials indicated that the project manager visits the construction site every week, and there are monthly meetings on site where all the stakeholders are invited and progress reports are presented and engaged with as part of monitoring.

Project are closely monitored by evaluating progress of work on a monthly basis as well as all site progress and technical site meeting are minuted and reviewed. (DoPW Senior Manager 4)

However, in most of the projects, it was evident that proper monitoring was lacking as some projects had challenges. The Auditor General reports always highlight that in government sector leadership, senior management and officials have failed to develop, implement and monitor effective systems and processes of internal control, including corrective action, and thereafter lack of accountability. This has been the continuous finding that indicates that government structures are not providing proper monitoring within its systems, including the project, from planning stages to the implementation stages.

Lack of proper monitoring and evaluation is a major challenge within the public sector resulting in a number of challenges that could have been avoided where prompt decision could have been implemented should there be proper monitoring. A number of audit queries are a result of the lack of monitoring. (Senior Manager Treasury)

4.5.5 Project funds

In each of the State of Nation addresses by South African Presidents, as well as the Finance Ministers, it has been announced that the South African government has set aside over R300 billion for infrastructure development in the country. They have also indicated that there are private sector projects to the value of no less than R100 billion. In her 2023 State of the Province address, the KZN Premier stated that there was an infrastructure investment of R129 billion for the 2023/24 financial year. In her 2023/24 budget speech, the KZN MEC for Finance announced that the total

infrastructure budget for the province over the Medium-Term Expenditure Framework (MTEF) from 2023/24 to 2025/26 was R19.5 billion, R18.1 billion and R18.8 billion. In 2022/23 it was R18.6 billion. The MEC stated that the KZN Department of Education Infrastructure grant increased to R379 million in 2023/24; in 2022/23 it was R250.9 million.

This is an indication that the South African government has set aside funds for infrastructure. However, due to the backlog in infrastructure, this has not been enough as there are also challenges with the infrastructure projects. Despite all these funds allocated to infrastructure improvement projects there are challenges faced with the infrastructure budget. This includes budget cuts, and virements during the mid-year review. Department officials reported that after the client department has given the project to the Department of Public Works, if, in six months, no funds have been committed (used), those funds will be moved somewhere else.

Department officials also indicated that when there are to be virements in public sector accounts due to a number of reasons at that time, infrastructure funds are the first to be moved or cut (budget cuts). This is an indication that funds allocated to infrastructure development in the province are not always utilised as planned, leaving a vacuum in the infrastructure development projects.

All government departments are struggling financially as there are budget cuts now and again, therefore infrastructure projects are put on hold and departments having to reprioritise infrastructure projects. (DoE Senior Manager)

There are number of crises that the country and the province have encountered where the infrastructure budget had to be cut so that those funds could be allocated to solving the crisis. Examples include the Covid-19 pandemic where emergency funds were needed for pandemic support, the 2021 unrest, and the 2022 floods as discussed earlier.

4.5.6 Scope change

Literature review defined the scope of work in construction as the list of construction obligations, as well as work activities that all contractors, subcontractors, and suppliers are obligated to do. This is all written out in an agreement or contract, which is then called the scope of work. It also includes the project overview, deliverable objectives with timelines, how the project will be

managed, and more. This is a guide to assist the construction team on what is expected in that particular project. The scope elaborates on how the project goals can be met. The scope of work is usually in a form of a document that includes timelines and milestones of the project.

This is done during the planning stage of the construction project. When the department client has given the Department of Public Work a project to do, both departments then draft the project scope. The Department official stated that the planning time takes most of the time, even before the project could be approved. Even when the project has been approved, there will be numerous times where there is a change in the scope of the project. For example, while drafting the scope of work, the team may notice that the scheduled delivery of a task conflicts with an ongoing separate task. Changes are then made to the timeline and the scope of work adjusted accordingly. Sometimes during the planning stage, a new MEC is appointed, and s/he will change the plan and give another direction as to what is going to be constructed. A complete change of the scope of work then needs to be done by the client departments.

Scope changes cause delays in construction as it take time to draft the scope and sometimes when the scope has been completed, the project will be cancelled or changes completely due a number of reasons from the client department such as budget cuts. (DoPW PM2)

4.5.7 Design changes during construction

A design change is defined as any change in the design or construction of a project after the contract has been awarded and signed. The changes can be made by the client department, contractor and/or Department of Public Work when the need arises. These changes must be formalised and there are processes that must be followed to formalise the changes of the design while construction continues.

Most of the time there are delays in taking the decision to change the design of the construction project. It can take up to two months for the change of design to be completed on paper. (DoPW PM 1)

It was reported that the design changes cause delays in the project schedule, as changes require re-estimation of the work statement as well as extra demands for equipment, materials, labour, and

more. When changes are made, the financial implications of these changes must be considered as departments are mostly guided by the availability of funds allocated to that specific project.

It was noted that there were projects that exceeded the allocated project budget due to the change of design, and in some cases, these were not properly documented; this then becomes an audit query. Therefore, an intelligent project manager should ensure that all changes are made timeously and accordingly to avoid audit queries and budget overruns.

4.5.8 Contractor performance

A construction project is deemed successful when it has been completed on time, within budget, and meets the required standard of quality. One of the causes of the delays of government construction projects is that they are not completed on time. One of the causes of projects failing to be completed within their contractual agreed period and the stipulated budget is poor contractor performance.

Studies indicate that small- to medium-sized contractors in the South African construction industry are faced with challenges, such as poor management of cash flows, poor access to credit, not having enough capital to drive the project from their own coffers, challenges in obtaining finance, poor planning, challenges with getting competent staff, poor administrative capabilities, lack of experience and poor education, lack of management skills in general, and the influence of the client, such as imposing unrealistic deadlines.

Department officials who were participants of the study indicated that most contractors fail to declare everything during the bidding process. At the beginning of the bidding process, some contractors will not have the necessary resources, such as human resources, and they will not start the project on time if they are awarded the tender as they will be trying to source human resources as well as financial resources, equipment and material. This delays the project, and some will eventually fail, dismally, to carry on with the project due to lack of resources.

In this study, there are three KZN Department of Public Works projects that were delayed due to contract termination as a result of contract poor performance. These projects are Southern Region Offices, Owen Sithole Agriculture College, and iLembe District Offices.

In its 2022/23 annual report, the KZN Department of Public Works reported that it had strategically planned to address the issue of underperformance of contractors by introducing a fortnightly meeting to discuss only problematic projects, chaired by the DDG IMTS. It intended to reiterate guidelines to provide guidance in terms of termination of projects, completion of contracts and non-performing service providers. Financial performance needs to be scrutinised on a quarterly basis, with remedial action implemented promptly to avoid under expenditure. Close monitoring and strict adherence to contracts is planned, by putting in place a mentoring system and regular training for younger and inexperienced professionals.

4.5.9 Shortage of project resources

Shortage of project resources in this study refers to the resources required by the contractor awarded the tender to do the construction project. As discussed above in the contractors' performance, it was clearly indicated that the most common factor that leads to contractors failing to complete the construction projects was the lack of resources. This includes financial resources, human resources, equipment and materials.

Department officials interviewed indicated that they had investigated the reasons why there were shortages of project resources. Most contractors had reported that the KZN Department of Public Works had failed to pay contractors on time resulting in contractors being unable to carry out the necessary requirements of the project. The Department of Public Works also reported that the client departments were not transferring funds on time. The Department of Public Works relies on the client departments to pay on time so as to pay contractors on time. In its 2022/23 annual report, the Department of Public Works reported that an amount of R211,20 million was not paid by client departments despite invoices being sent to client departments monthly. The debts of client departments had escalated to R655.5 million as of 31 December 2021, an amount calculated as from the 2019/20 financial year. This therefore affects the financial capacity of contractors to carry out the projects smoothly as they do not have the financial muscle to do so.

Small construction companies awarded the tender often struggle to complete projects on time due to lack of financial power, some fail completely resulting in contract terminated.

(DoPW PM 6)

Black Economic Empowerment (BEE), a policy that aims to facilitate broader participation in the economy by black people, is complied with. It is a form of affirmative action that intends to redress the inequalities created by apartheid. Department officials stated that this was enforced by ensuring that everyone is included in the bidding process; therefore, the requirements will be flexible so the tender will be awarded to small- or medium-sized contractors, of whom some do not have the financial capacity to carry the project through. Further, they stated that the regulations stipulate that the cheapest quote must be considered during the bidding process.

4.5.10 External interference

There are number of forms of external interference that impact on and cause delays of construction projects. These include the state of the weather, where there would be unfavourable weather conditions that will delay the project. Project managers reported that bad weather conditions such as heavy rain and floods were at the top of the list of the external causes.

Change of climate especially in KZN where we see a number of floods has resulted in the delays of construction projects completed on time. Heavy rain damages property and in construction the company has to wait for days for the site to dry up before construction could resume. In some cases, projects are damaged by floods before they could be completed. (DoPW PM 4)

Second on the list are the business forums, which are often called construction mafias due to the nature of their disruption of government construction projects. Business forums disrupt construction as they usually demand to be included in the construction in the form of subcontracting, and some demand a certain percentage of the construction without doing any work. This delays construction as construction stops until the matter is resolved. The Department of Public Works saw a rise in the number of construction disturbances by the business forums from 2016. In some instances, there are violent disturbances. Projects visited by the researcher that were disturbed by business forums were Menzi High School and Siphumelele Primary School. The construction of these schools were a year behind schedule due to the distraction by business forums.

In some cases, we are confronted by armed dangerous people demanding work on site whether be subcontracted or given certain percentage of the budget of the construction. We have no choice but to stop construction until the matter is resolved or otherwise we will be in trouble. (DoPW PM 3)

Community land issues, where some community members claim that the land where there is construction belongs to them, also delays construction as the land ownership must be resolved. However, DoPW does involve community and all the stakeholders from the planning stage of the project.

4.5.11 Government priorities

Government priorities often change due to budget constraints or change of political heads. When there is a fiscal deficit and government has to redirect funds, there are budget cuts. Sometimes the government must address an emergency such as Covid-19 or natural disasters. Thus, government plans and priorities changes to accommodate the budget at hand. In 2020 when the country and the province were struck by the Covid-19 pandemic, the focus was on addressing the scourge and putting in place preventative measures, thus a huge amount of government funds was redirected into addressing the fight against Covid-19.

A new MEC sometimes changes the construction plans when they are at the planning stage and gives another direction as to what is to be constructed. That is a complete change of the scope of work to be done by client departments. There is a great deal of time and funds put into the planning of the construction project of the department before it is implemented. When there is a change and those plans have been to be cancelled, that is regarded as wasteful expenditure.

4.5.12 Poor state of assets register

In 2020, the KZN Office of the Premier reported that the development of an Integrated Infrastructure Master Plan for the Province was underway, and it was being developed with all the infrastructure related authorities. However, the researcher could not get the provincial infrastructure master plan from either the Office of the Premier as the coordinating office, or the KZN Department of Public Works. Therefore, a conclusion was drawn that the Provincial

Government did not have the asset register and therefore did not have clear indication what was required for the province to have adequate infrastructure.

The unavailability of the province infrastructure master plan was concerning as these two offices are custodians of the provincial infrastructure and should have an understanding of what the province has and what it requires. Indeed, there are reports that give an indication of where the province's infrastructure is at; this information should be easily available at the two offices, yet it is not.

The poor state of the assets register dates way back to 1994 when there was a split of the four provinces into nine provinces and the homelands states were incorporated into the nine provinces. The government had to catalogue its assets in all these newly formed provinces which had incorporated homelands. It has been reported that the government has not been able to catalogue all its assets.

According to Treasury (2021), the availability of public sector assets, particularly infrastructure assets, is a key enabler of economic growth, social upliftment, and cohesion. Asset management is a fast-evolving multi-disciplinary set of practices that aims to deliver value from assets, as defined by stakeholders. Stakeholder requirements for assets and asset management are multi-faceted and ever more demanding.

Treasury regulations state that all government departments are required to measure or value the assets under their control. The PFMA and the relevant accounting standards such as the Modified Cash Standard and GRAP require that assets are measured, and asset values are reported in Annual Financial Statements. Therefore, Department of Public Works must consolidate all these provincial or national assets and draft the provincial infrastructure master plan.

Despite the absence of the proper assets register, the national and provincial government are aware of the challenges faced by the country and province on the lack of proper infrastructure to support the NDP goals. This information on the infrastructure crisis is usually provided by a number of research institutes, community survey institutes, government programmes, commissions' reports and more.

4.5.13 Skills shortage

For a construction project to be successful, it requires technical human resources such as architects, engineers, surveyors and more. Each technical staff person has a crucial role in the project. When a construction company is awarded a construction tender, the company brings its own technical staff. The Department of Public Works has its permanent technical staff that will supervise the construction company's technical staff.

One of the senior managers of the Department of Public Works reported that the Department does not have enough profession/technical staff for each project, rather, it outsources most of the technical staff as per project needs.

Department of Public Works has permanently employed engineers however they are not hands on the projects they only manage outsourced engineers. (DoPW Senior Manager 1)

The DoPW stated that the reason for outsourcing technical staff was to cut the cost, as having a number of technical staff will be costly as at some points there would not be any projects for them and they would be paid for doing nothing, hence the DoPW outsources them as per project needs.

The skills shortages in the construction teams indicated that there is no shortage of manpower, but there is a shortage of qualified or skilled tradespeople, such as electricians, plumbers, welders, fitters and carpenters whose professions are more technical and require formal training and certification. The level of supply of skilled tradespeople is attributed to the lack of high-quality basic education, the state of the economy, compulsory certification of tradespeople, and an ageing workforce. (Windapo 2016).

4.5.14 Corruption

Despite study participants not mentioning anything about corruption within the Department as the cause of delays in infrastructure development in the province, studies indicate that the poor state of infrastructure in the country and in the province is mostly a result of corruption. Mantzaris and Pillay (2019) indicate that South Africa is perceived as a corrupt country, and even the government has developed numerous anti-corruption strategies to fight corruption. Corruption discourages

investment, limits economic growth, and alters the composition of government spending, which ultimately hinders the development and upliftment of the country and the province of KwaZulu-Natal.

Corruption creates fiscal distortion and fiscal deficits, leading to funds being redirected and allocated to other functions as well as budget cuts, as there are not adequate fiscal resources to carry out some government projects.

Gumede (2022) states that South African infrastructure is on the verge of collapsing as the country is facing government systems failure. Gumede states that most government projects are gifted to dodgy companies under the umbrella of black economic empowerment which he regards as corruption. He further points out that most of these companies lack the necessary skills to carry out the projects. These companies build flimsy infrastructure and some fail to perform, resulting in contract termination. The practice of cadre deployment in government departments which lack the necessary technical skills and have poorly managed public assets, has now snowballed into the breakdown of the entire public infrastructure, causing a government system failure.

A number of KwaZulu-Natal Department of Public Works projects have delayed due to contractors failing to perform. The Southern Region Offices in Pietermaritzburg were completed after ten years instead of 18-months due to contractors failing to complete the project. Department officials who were participants of the study reported that most contractors fail to declare everything during the bidding process. At the beginning of the bidding process, some contractors will not have necessary resources, such as human resources, and they will not start the project on time if they are awarded the tender as they will be trying to source human resources as well as financial resources, equipment and materials. This delays the project, and some will eventually fail to carry out the project due to lack of resources. This is an example of what most regards as corruption, as they indicate that some contractors are gifted these tenders.

Collusive bidding is another form of corruption within government infrastructure development that also creates challenges. This is where there is an informal agreement between the contractors themselves to defeat the competitive bidding process so as to be awarded a construction tender. This causes a number of challenges as the agreements made negatively impact the construction project and cause delays, or the project is of poor quality when it is completed.

Other corruption that has been picked up by the Auditor General is that of government officials doing business with the government departments. The Department of Public Works often miss this and award construction tenders to companies linked to government officials.

4.6 Content analyses

The study focused on the provincial infrastructure development and the cause of delays in these projects. The Constitution of South Africa (RSA, 1996) clearly states that the South African Government is primarily responsible for infrastructure development of the country. The study was conducted with the KwaZulu-Natal Department of Public Works. Primary data was collected from the Department as it is responsible for infrastructure development in the province, and it is the custodian of the government property and all state immovable assets. Primary data was collected through interviews with the officials of the government department who were part of government infrastructure development.

The limitation of the study was that it was conducted on a broad scale, at the provincial level. However, the sample size of the study was small as the researcher only chose six projects in the province, and the project managers and the senior managers of these projects were interviewed. There was an element of subjectivity from the department's officials as they were the people involved in the government infrastructure development projects. In the quest to gather objective views and judgement, there was a need to also collect secondary data from reports of reputable government institutions such as the Auditor General of South Africa (AGSA), Treasury, Parliamentary Public Service Commission (PSC) and more. These institutions' reports are objective and reliable, and provided more objective views and judgment on the issues of infrastructure development challenges. Therefore, content analysis was used to analyse the secondary qualitative data.

Data collected for this study was analysed using the thematic data analysis method on both primary and secondary data. The primary data was interviews with department officials and the secondary data was the data from reports of government institutions.

The Auditor General, Treasury and Provincial Legislature conduct oversight over government departments and produce quarterly and annual reports. Government departments' annual reports

have a section where the AG reports on the performance of the particular government department. In these annual reports of various government departments, the Auditor General examines the department's performance. In the KZN Department of Public Works' 2022/2023 financial year, the AG report was as follows:

Some of the pressures facing Public Works stem from client departments failing to provide adequate project scopes, adequate budget for projects already committed, interruptions of projects on site by business forums and community unrests, delays in project readiness from client departments and non-performance of service providers resulting in cancellation of projects mid-implementation. It is acknowledged that the department needs to improve its approach to planning and project management to deliver quality infrastructure on time and at reasonable cost. The loss of trust in the department's capabilities poses a serious threat to the department's delivery on its mandate, reputational damage for the department and conflict with contractors.

Public sector infrastructure delivery involves many different implementing spheres of government, including national, provincial and local, as well as their agencies and entities, such as the large state-owned enterprises. In the year 2022, AGSA conducted a study on the conditional grant allocated to municipalities for infrastructure development. AGSA identified a number of factors that led to project delays. This included poor planning, poor project management, underspending, commissioning, cost overruns, more.

After analysing reports on provincial government departments' performance, the following were emerging themes:

4.6.1 Deviation from prescribed procurement regulations

Government departments often receive an audit query for not following procurement regulations. Any deviation must be approved by Treasury. However, government departments deviate from standard bidding processes of infrastructure projects or procuring goods or services. This often leads to most construction tender bidding processes being delayed as there would be disputes resulting in the bidding process being cancelled. When the bidding process is cancelled, this causes

delays of the construction project and the whole process must start afresh. Sometimes the department will cancel the construction completely.

4.6.2 Underspending and inappropriate spending

Government departments are allocated funds for infrastructure development projects. Some of these funds are in the form of conditional grants from the national government to the provincial government and municipality. These funds have conditions attached to them, and they must not be used for any purpose other than those initially intended. When the Department of Education receives a conditional grant for building schools, the departments cannot shift these funds for building schools into paying salaries. Therefore, it is easier to trace these funds and easier to identify when they have not been utilised for building schools.

Treasury reported that underspending of these conditional grants on infrastructure was mainly a result of poor planning from the departments. There were delays in appointing contractors and inadequate contract management. The underspending of these key infrastructure grants shows that the affected government departments have failed to deliver on the promises they made to their residents.

The National Parliament reviewed reasons for underspending of the government budget in 2023. A number of factors contributed to the KwaZulu-Natal province's underspending. These factors included supply chain management problems, delays in project completion and implementation, non-processing of payments, and more. The most concerning areas of underspending according to the National Parliament 2023 report, were on infrastructure where there were delays in project completion.

Underspending in current payments was largely driven by goods and services. Whereas underspending in buildings and other fixed structures and machinery and equipment were more prevalent in payments for capital assets.

4.6.3 Poor project management

Government department evaluations on its construction projects by state Chapter 9 and Chapter 10 institutions indicate that there is an alarming crisis in the area of poor project management. This includes ineffective planning and poor execution of infrastructure projects. Poor management results in projects not completed on time and accumulating costs.

The Auditor General report on the KZN Department of Public Works' construction and upgrade of its administration building that was completed over 14 years was due to poor project management. The first contractor was terminated due to poor performance, then the department failed to issue a notice of termination to the second contractor in 14 days before the date of their termination. Therefore, the second contractor took the department to court. The third contractor was appointed, and at the end of 2021/22 financial year, the building was completed.

4.6.4 Poor build quality

Government departments fail to identify quality defects during construction resulting in poor infrastructure project when completed. This results in cost overruns as some projects have to be redone to correct the defaults, or the project might require maintenance sooner than later due to poor quality. Studies have indicated that the main challenges for the government, that then lead to poor standards of completed projects, are the result of corruption and the appointment of incapable contractors.

4.6.5 Commissioning and utilisation

Commissioning is the final phase in the completion of the project where the contractor commissions the completed project to the client department for occupation and use. It was noted that there were delays during this stage. An example is in the AG report on the KZN Department of Public Works' 2022/23 annual report. The contractor completed a project in 2021. However, as from 7 December 2021, the contractor was on site fixing snags. Up to 4 April 2023, the contractor was still on-site fixing snags in the upgrade of department's Vryheid District Offices.

4.7 Views of the three main participants of the provincial government development projects

The Constitution of South Africa (RSA, 1996) clearly states that South African government is primarily responsible for infrastructure development of the country. South Africa has an intergovernmental system that is based on the principle of cooperation between the three spheres of government – local, provincial and national. While responsibility for certain functions is allocated to a specific sphere, many other functions are shared among the three spheres. The three spheres of government have a constitutional mandate to develop infrastructure.

The three main participants in the provincial government development projects are evaluated and reviewed by the KZN Provincial Planning Commission (KZN PPC). It ensure coherence in policy development and planning across the Provincial Government and strengthening performance monitoring and evaluation to assess the pace required to deliver on the desired outcomes. When the KZN PPC reviews the provincial growth and development strategy, it reviews the provincial catalytic projects. The projects are aligned with the National Development Plan, Provincial Growth and Development Strategy, and District Development Model.

The study did not gather information on all the three spheres of government responsible for provincial infrastructure development. However, the research conducted an analysis of the reviewed reports produced by the KZN PPC as the body responsible for monitoring and evaluating the provincial growth and development strategies, which included infrastructure development.

In its 2012 review, the KZN PPC acknowledged that historically in the province there has been under-investment in basic infrastructure such as the roads, transportation, water provision, sanitation etc. This has undermined the growth of this province and hence there was still a high percentage of poverty and unemployment. The recommendations the KZN PPC made in 2012 included the need to invest in both operational infrastructure (water, sanitation, roads etc) and connectivity (information technology, mobility) infrastructure.

From 2012 there has been annual investments of billions of rands in the provincial infrastructure development. This came in a form of national projects, provincial projects and local government projects. However, the National Planning Commission's (2020) review of the country's progress towards achieving the NDP 2030 vision indicated a number of challenges that led to slow progress toward attaining the vision for 2030. These challenges included the disappointing infrastructure

spending undertaken by state-owned entities, the public sector infrastructure budget declining, underspending of the infrastructure budget, the poor quality of infrastructure developed, and more.

In its report, the NPC (2020) stated that the South African Institution of Civil Engineering (SAICE) Infrastructure Report Card for 2006, 2011 and, 2017 scores the overall quality of public infrastructure at C- to D+. The D rating means that the infrastructure is not coping with normal demand and is poorly maintained, with risks of any incidents having severe impacts on operations. In the SAICE report cited in the NPC report (2020), there were those that were rated at E, and which were at the risk of failure, including bulk water services, water supply, waste collection and disposal, municipal roads, passenger railways, and health facilities (hospitals and clinic).

In its 2021 review, the KZN Provincial Planning Commission indicated that in 2021 there was still a serious backlog in infrastructure development and service delivery in the province. This included the shortage of water and sanitation provision, the slow, random and uncoordinated human settlement delivery, overburden of the road network, and underutilisation of rail transportation,

In the year 2022, the Auditor General SA conducted a study on the conditional grant allocated to municipalities for infrastructure development. AGSA identified a number of factors that led to project delays. These included poor planning, poor project management, underspending, commissioning, cost overruns, and more. These challenges were a consequence of dysfunctional municipalities, council and administrative instability, financial mismanagement, lack of accountability, and more.

4.8 Chapter summary

Chapter four provided an overview of the research results, data analysis and findings. The findings were presented in terms of the themes that emerged. The most general project delay-causing factors were identified, and suitable mitigations were recommended in this study.

The literature indicated that delays in construction projects have negative implications on the economy as the construction industry is one of the largest contributors to the GDP of several countries. This result of service delivery backlogs and these delays also prohibits the province and the country from achieving the NDP goals to eliminate poverty and reduce inequality by the year 2030.

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the findings, conclusions and recommendations based on the data analysed in chapter four. The study's main objectives were to identify the main causes of the delays of the developmental projects in the province of KwaZulu-Natal and to recommend mitigation measures to minimise these delays. The study was conducted with the KZN Department of Public Works as it is the custodian of government property and all state immovable assets in the province.

Participants of the study that were interviewed consisted mainly of KwaZulu-Natal Department of Public Works officials. There were also a few officials from other government departments that were interviewed as they were working with the KZN Department of Public Works infrastructure projects. These included the KZN Department of Education, the Office of the Premier, and Treasury. The study also collected secondary data from different sources such as reports from the Auditor General, Public Service Commission, KZN Legislature, as well as the Department's Annual Performance Plans and Annual Reports.

5.2 Summary of research

Historically, KwaZulu-Natal province has had challenges with the lack of adequate social and economic infrastructure. There is a massive backlog on access to basic housing, schools, health facilities, and roads as well as lack of access to bulk services such as water, sewerage and electricity. The provincial and national governments had put together plans and budgets for infrastructure development projects. However, this has not been enough as there have been numerous challenges facing the infrastructure development projects in the province, resulting in failure to catch up with the massive backlog and, in turn, the increasing backlog.

The study focused on the infrastructure development projects that the provincial government had planned; however, there were delays in the implementation and completion of these projects. Projects are considered delayed when their stipulated completion duration has not been achieved. Participants of the study were fully involved with the Department's infrastructure development

projects and had more than six years of experience within the Department's infrastructure. This was an indication that the participants had a wealth of knowledge and could supply the necessary information on the questions posed during the interviews and the discussions. What follows is a summary of the findings under each of the objectives set out in chapter one of this dissertation.

5.2.1 Main causes of project delays

There are many factors that cause the delays in the construction of the infrastructure projects. From the interviews conducted with the KZN Department of Public Works officials and analysis of reports from independent state institutions, the study yielded eighteen emerging themes. These were factors that contributed to the delays in public infrastructure development in the province of KwaZulu-Natal. The contributing factors were:

- Government priorities
- Procurement processes
- Deviation from prescribed procurement regulations
- Poor project management
- Time overruns
- Lack of monitoring
- Project funds
- Underspending and inappropriate spending
- Scope change
- Design change during construction
- Contractor performance
- Shortage of resources
- External factors such as weather, business forums
- Poor state assets register
- Skills shortage
- Corruption
- Poor build quality
- Commissioning and utilisation

These factors indicate the root causes of the infrastructure project delays in the province of KwaZulu-Natal. These factors lead to other negative factors such as time and cost overruns of the projects, which also leads to more challenges that will increase the infrastructure backlog in the province.

Out of the 17 participants of the study, Figure 1 below provides a summary of their responses on the factors causing delays in government infrastructure projects.

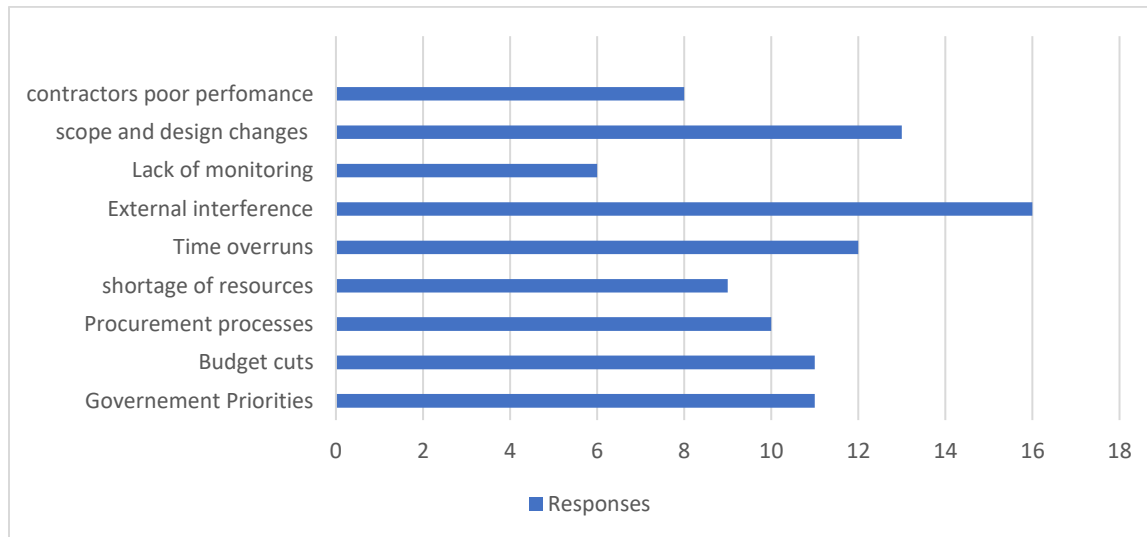


Figure 1: Summary of participant responses on factors causing delays in government infrastructure projects.

5.2.2 The effects of project delays

The delays in the construction of the development projects in the province has had a negative effect on the provincial and the country as a whole. Studies indicate that the infrastructure development backlog remains so immense that it will take years and years to catch up with the backlog. The huge backlog requires huge investment from government, and private sector catalytic social and economic infrastructure projects.

Infrastructure development plays a key role in ensuring fast economic growth, therefore there is an impact on alleviating unemployment and poverty. Good infrastructure facilitates the movement of goods, services, information, and people. It also ensures that the well-being of the people in the province is taken care of. When people have access to basic human services, their lives are improved. When there is good public infrastructure, people have easy access to human settlements,

bulk service such as water and sanitation, access to electricity, roads, education and health services, telecommunications and more. These ensure the well-being of the people and in turn make their lives easier, and, importantly, the province's and country's economies are boosted.

In her speech on the 2022/23 audit outcome, Ms Tsakani Maluleke (Auditor-General), stated that the delay in delivery of infrastructure projects affects service delivery. She further stated that government officials and the public continue to use government properties that are in poor condition. This has a negative impact on service delivery by government institutions, it lowers the effectiveness of the working environment, and it puts the safety of officials and the public at risk.

The province of KwaZulu-Natal and the country have had challenges with maintaining healthy, steady economic growth due to a number of factors. One of the main causes of the stagnant economic growth in the province and the country is the failure to maintain and build new infrastructure. Stats SA (2020) indicated that around 52% of KZN's population was considered poor based on the Lower Bound Poverty Line. In 2022, Stats SA (2022) reported that the official unemployment rate in the province during the fourth quarter of 2022 was 31.4%. This had been the highest jobless rate since the start of the 2008 Great Recession where millions of jobs were lost due to the global economic financial crisis. The high poverty and unemployment rate in the province has a direct link on the province's poor infrastructure. The province's poor infrastructure is a serious obstacle in the development of its communities and results in the inability to change people's lives for the better. Therefore, the delays in the government developmental projects further deepen the poverty and unemployment crisis that the province is facing.

Studies indicate that when there is inadequate infrastructure in the province or in the country, the chain of production is disrupted. This disruption hinders development, which causes an economic deficit and, in turn, brings low standards of living to the citizens. Good and proper road and transportation infrastructure, electricity and telecommunications connect markets, and facilitate production and trade. These proper and well-maintained infrastructures create economic opportunities for work, which boosts the economy and improves people's lives. When the provincial and national economy has been boosted, government and private sector are in a position to invest more in the infrastructure.

The negative effect of the delays in public infrastructure development results in the province's and the country's inability to achieve the National Development Plan goals, which are the alleviation

of poverty, unemployment, and inequality. It has been proven that proper public infrastructure provides the basis of higher growth, inclusivity and job creation. This will reduce poverty, unemployment and inequality.

When the infrastructure construction projects are delayed due various reasons, the delays lead to time and cost overruns. The study reveals that when there are delays in construction projects, where the construction project exceeds and go beyond its contractual agreed period, it accumulates costs and the need for more funds that were not budgeted for. In some cases, it will be difficult to secure funds required to complete the project, and this results in time overruns as it will take more time for the project to be completed.

5.2.3 Recommendations for mitigation measures that minimise delays in future projects

This research has established that the construction industry in South Africa and around the world is engulfed by persistent and extensive delays. Acknowledging this, some delays are unacceptable and can be prevented. It is thus recommended that the provincial government must try to minimise and manage project delays.

The research has established that some of the government department red tape in the supply chain that causes delays must be eliminated. This includes the time that it takes the client department to submit job requests to the Department of Public Works, as theses job requests are submitted in a short space of time whereas planning takes huge amount of time. Regulations should allow less time spent in planning, that is, less days on documentation, as some documentation requires 21 days.

The research noted that the lack of capacity and limited knowledge about supply chain management processes in the public sector affects the effectiveness and efficiency of procurement processes, leading to poor governance. Therefore, it is recommended that capacitation of officials within the public sector be required.

The findings of the research suggest that there were delays in identifying some of the projects that had challenges which yielded more challenges that lead to reactions rather than solutions. Proactive planning and timeous identification of potential delay risks is required by the project managers. Therefore, project managers must be capacitated as some fail to properly manage

projects. Further, they must not be allocated more jobs to manage so that they will do justice to those projects they manage. Senior managers must change project managers when they see that the project manager is not performing well. They must not wait until there is severe damage.

It was noted that some of the project delays are caused by incapable contractors. Therefore, close and tight monitoring is required at all times so as to identify these challenges, and so that project managers can act quickly and accurately in response to these challenges. Tight and close monitoring ensures that the contractors adhere to the set milestones.

The concept of government affirmative action that intended to redress inequalities must be coupled with intensive guidance, support, and monitoring, to ensure that these small- to medium-sized contractors carry out these construction projects successfully. Government must find ways to replace the appointment of a contractor being based on the lowest bid price only. This has proven to be the biggest challenges as most small contractors are awarded huge projects and they are not able to complete these projects as they lack financial capacity. For the government departments to ensure that they catch up with the development project backlog, they must consider the appointment of experienced and reputable contractors and consultants. This will minimise the delays in construction projects. It has been proven that the appointment of inexperienced contractors and consultants are the causes of the construction failures, leading to these project backlogs, which lead to much bigger problems for the province.

Client departments must ensure that there is availability of project funding prior to the commencement of construction, to prevent the delayed payment of the projects as this further cripples small- to medium-sized contractors who require these funds for a smooth construction process.

5.3 Conclusion

For the province to achieve the National Development Goals 2030 to alleviate poverty, unemployment and reduce inequality, the government must focus on the development of infrastructure. It must also address factors that cause delays of these projects. Studies have acknowledged that delays affect construction projects in general. However, the acceptable delays are those that do not exceed six months of completion.

It is crucial that provincial government ensures the success of the planned infrastructure development projects and their implementation and completion within the allocated budget and time. Not only will the improved infrastructure create jobs and investment once completed, but the infrastructure development process itself will support local businesses and create local jobs and improve the wellbeing of the people of the province. Studies suggest that investment in infrastructure generates employment directly through the actual construction, operation and maintenance requirements and also indirectly through multiplier effects across the economy.

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APPENDICES

Appendix A: Ethical Clearance Letter



07 September 2023

Nondumiso Anita Mkhize (200401123)
School Of Man Info Tech & Gov
Westville Campus

Dear NA Mkhize,

Protocol reference number: HSSREC/00005803/2023

Project title: Exploring the causes of the delays in the public infrastructure development in the province of KwaZulu-Natal

Degree: Masters

Approval Notification – Expedited Application

This letter serves to notify you that your application received on 28 June 2023 in connection with the above, was reviewed by the Humanities and Social Sciences Research Ethics Committee (HSSREC) and the protocol has been granted FULL APPROVAL.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number. PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

This approval is valid until 07 September 2024.

To ensure uninterrupted approval of this study beyond the approval expiry date, a progress report must be submitted to the Research Office on the appropriate form 2 - 3 months before the expiry date. A close-out report to be submitted when study is finished.

HSSREC is registered with the South African National Health Research Ethics Council (REC-040414-040).

Yours sincerely,



Professor Dipane Hlalele (Chair)

/dd

Humanities and Social Sciences Research Ethics Committee

Postal Address: Private Bag X54001, Durban, 4000, South Africa

Telephone: +27 (0)31 260 8350/4557/3587 Email: hssrec@ukzn.ac.za Website: <http://research.ukzn.ac.za/Research-Ethics>

Founding Campuses:  Edgewood  Howard College  Medical School  Pietermaritzburg  Westville

INSPIRING GREATNESS

Appendix B: Permission to conduct research with KZN Department of Public Works



KWAZULU-NATAL PROVINCE

PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

Chief Directorate: Corporate Services
Private Bag X9041
PIETERMARITZBURG
3200
Tel: 033 260 4089
Fax: 086 510 3978
Enquiries: Cherity
Email: cherity.ngubane@kznworks.gov.za

LETTER

Ms Nondumiso Mkhize

██████████ Road
PIETERMARITZBURG
3200

Dear Ms Mkhize

This office has received your request via e-mail to conduct research in the Department of Public Works.

This office acknowledges your request and permission is granted to do your research in this department.

To start the project you are requested to contact Ms Cherity Ngubane at 033 260 4089 with the date so that necessary arrangements be done.



Services

Date: 14/04/2023

Appendix C: Informed Consent Letter

UNIRVESTIY OF KWAZULU-NATAL

SCHOOL OF MANAGEMENT, INFORMATION TECHONOLGY AND GOVERNANCE

Information Sheet and Consent to Participate in Research

Date:.....

Greeting.....

My name is Nondumiso Mkhize a student at University of KwaZulu-Natal under the School of Management, Information Technology and Governance. My contact details are as follows: 033 355 7099

You are being invited to consider participating in a study that involves research into the KZN Department of Public Works projects. The aim and purpose of this research is to explore the causes of the delays in the public infrastructural development in the province of KwaZulu-Natal. The study is expected to enroll about forty participants. This will consist of ten Department of Public works officials and six selected project teams having five participants in each team. Data collection of the study will be through one-on-one interviews where questionnaire will be administered. If you choose to enroll and remain in the study, the duration of your participation in interviews is estimated to be about 3 hours per interview and the study is expected to be completed in six months.

The study will not involve any risks and/or discomforts as it will be information on the work the participants do for the Department of Public Works. We hope that the study will contribute to the body of knowledge required by the relevant stakeholders responsible for the province of KwaZulu-Natal infrastructural development and bring about the improvement in the sector.

This study has been ethically reviewed and approved by the UKZN Humanities and Social Sciences Research Ethics Committee.

In the event of any problems or concerns/questions you may contact the researcher at 033 355 7099

Participation in this research is voluntary and participants may withdraw participation at any point. In the event of refusal/withdrawal of participation the participants will not incur penalty or loss of treatment or other benefit to which they are normally entitled to.

Necessary steps will be taken to protect confidentiality of personal information. Research information will be kept in a secure file with password.

CONSENT

I.....have been informed about the study entitled exploring the causes of the delays in the public infrastructural development in the province of KwaZulu-Natal by Nondumiso Mkhize.

I understand the purpose and procedures of the study is to explore the causes of the delays in the public infrastructure development in the province.

I have been given an opportunity to answer questions about the study and have had answers to my satisfaction.

I declare that my participation in this study is entirely voluntary and that I may withdraw at any time without affecting any of the benefits that I usually am entitled to.

I have been informed about any available compensation or medical treatment if injury occurs to me as a result of study-related procedures.

If I have any further questions/concerns or queries related to the study, I understand that I may contact the researcher at 033 355 7099

I hereby provide consent to:

Audio-record my interview / focus group discussion YES / NO

Signature of Participant

Date

**Signature of Witness
(Where applicable)**

Date

**Signature of Translator
(Where applicable)**

Date

Appendix D: Senior Managers Questionnaire

Questionnaire for KwaZulu-Natal Department of Public Works Senior Manager

Research Study: Exploring the causes of the delays in the public infrastructural development in the province of KwaZulu-Natal.

Purpose of the study: The research projects seek to understand better the provincial government development projects and specifically the causes of the delays in these projects. The data you provide can assist identify key challenges in these projects and reviewing government infrastructure model. Completing the questionnaire should take approximately 2 hours.

Documents: The following documents are required before the interview as they are not accessible on public platforms and the Researcher will be engaging on them.

- KZN Infrastructure Master Plan (KZN-IMP)
- KZN DoPW Procurement Policy in line with PPPFA
- Infrastructure Management Strategy
- List of Rehabilitation, Renovations & Refurbishment projects 2022/23 and 2023/24.

Personal information

Name :

Surname :

Gender :

Race :

Position at office :

Period :

KZN Infrastructure Master Plan (KZN-IMP)

How successful has the government department (DoPW in particular) in implementing the KZN-IMP?

.....

.....

.....

How far is the province in attaining the KZN Vision 2035 on the infrastructure development?
Elaborate on the successes and challenges in achieving Vision 2035.

.....

.....

.....

What are the main stakeholders in the implementation of the KZN-IMP? How is the relationship between them?

.....

.....

.....

Has the KZN-IMP integrated District Model?

.....

.....

.....

How Department of Public Works regulates municipalities public works as per constitution? Chapter 7 section 154 1 & 2. The Constitution gives concurrent functions to municipalities for municipal public works, with either national or provincial government able to regulate how they exercise these functions in line with applicable norms and standards.

.....

.....

.....

.....

How is the collaboration of the Department of Public Works with the Office of the Premier as the coordinating office (Infrastructure Nerve Centre)?

.....

.....

.....

KZN DoPW Procurement Policy in line with PPPFA

Elaborate on the KZN DoPW Procurement Policy which must be in line with the Preferential Procurement Policy Framework Act (PPPFA). Include the following points:

- Core principles of supply chain management, are they adhered to?
- Requirement to do business with KZN government.
- How can suppliers access KZN government tender information

- Tender/Bid process
- Standard bidding documents
- Assessing efficiency level of contractors
- Consequences of non-compliance of suppliers/contractors doing business with DoPW

Infrastructure Management Strategy

Does the DoPW have the Infrastructure Management Strategy? If yes how often is it review?

.....

Is there an update of immovable assets register? When was it updated?

.....

What is the DoPW asset management plan?

.....

.....

.....

What is the planning process of department infrastructural project?

.....

.....

.....

Take me through project management plan of a particular project.

.....

.....

.....

How does the DoPW involve client departments at planning and implementation processes?

.....

.....

.....

How are these projects monitored?

.....

.....

.....

How the department monitor and evaluate value for money for the funds used?

.....
.....
.....
What constitutes irregular project?

.....
.....
In the last five financial years how many projects were regarded as irregular?

.....
.....
In the last five financial years, how many projects that were completed on time?

.....
.....
What are the usual causes of delays of departmental projects?

.....
.....
How does the department conduct an audit of the infrastructure delivery, which processes are followed?

.....
.....
Project details

Researcher has identified five projects that the Department of Public Works have undertaken, and these will be visited. The following project identified were: Construction of iLembe District Office, construction of Vryheid sub-district offices, Mayville Conference Centre, KZN Entrepreneurial Development Centre, New Auditorium and Conference Centre in the Southern Region. Kindly give details of each project.

Name of project :

Project type :

Client :

Project scope :

Contract number :

Project stage :

Start date :

End date :

Progress on site :

Time lapsed :

Date advertised :

Handover of project site:

Project Value :

Project Expenditure :

Balance :

Project challenges:

.....

.....

.....

.....

Any funds not paid by Department?

.....

If yes, what are the causes of delays?

.....

Will the project be completed on time?.....

If no what will be the cause for non-completion on time

.....

.....

List of Rehabilitation, Renovations & Refurbishment projects during 2022/23 and 2023/24 financial years.

In the list provided which are the projects that were completed on time with minimal or not challenges?

.....

.....

.....

.....

.....

In your view what made these project a success?

.....

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.....

.....

In the list provided, which projects were not completed on time and had number of challenges?

.....

.....

.....

In your view, what were the major challenges and what caused these challenges?

.....

.....

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.....

What are mitigation measures that can minimize the delays in future projects?

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Elaborate on the departments' post implementation reviews on projects?

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What are maintenance strategies?

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Human Recourse

Does the DoPW has adequate human resource with necessary skills for infrastructure development? If no which skills are lacking and how is the DoPW dealing with the shortage and what are negative impact of the shortage?

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What type of professional skills does the department have and what are those professional skills that the department outsource?

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Appendix E: Project Manager Questionnaire

INTERVIEW SCHEDULE

Research Study: Exploring the causes of the delays in the public infrastructural development in the province of KwaZulu-Natal.

Purpose of the study: The research projects seek to understand better the provincial government development projects and specifically the causes of the delays in these projects. The data you provide can assist identify key challenges in these projects and reviewing government infrastructure model. Completing the questionnaire should take approximately 20 minutes.

Personal information

Department:.....

Role:.....

Years of experience:.....

Highest qualification:.....

To identify the main causes of project delays

1. Focusing on **ONE** public infrastructure project please provide information on the following:

- a) What was the project purpose?.....
- b) Who was/is the main client?.....
- c) Was it completed on time?.....
- d) Was it completed within budget?.....
- e) Were its required specifications/goals met (quality, features, etc.).....
.....

2. Please briefly discuss how **some or all** of the following have impacted the completion of the above project:

Permits/licensing issues: -----

Funding/financial-----

Technical/equipment/machinery-----

Skills/human resources-----

Project specification issues-----

Internal/team factors-----

Project leadership-----

Environmental factors-----

Project contractors/suppliers-----

Stakeholder conflict/Political/public opposition to the project-----

Timeframe adequacy/inadequacy-----

Accountability/ethics issues-----

Planning, monitoring, evaluation-----

Any other-----

3. How are/were the arising challenges managed and was this successful?

a) In your view, what are the main causes of infrastructure project delays?

b) What are the effects of infrastructural project delays on the provincial government?

c) Do the provinces infrastructure development plans and strategies support effective infrastructural project management? -----

4. Mitigation measures to minimize cost overrun and delay in future projects.

a) How best can project managers/public officials manage challenges and issues that cause project delays?

b) Are there any other issues on government infrastructural projects delay you would like to discuss?
