

**UNIVERSITY OF KWAZULU-NATAL**

**THE IMPACT THAT PROJECT COST AND PROJECT TIME OVERRUN HAS  
ON THE FINANCIAL PERFORMANCE OF THE OPERATING UNIT: A CASE  
STUDY OF THE ESKOM KWAZULU NATAL OPERATING UNIT**

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## **Declaration**

I Londiwe Khumalo declare that:

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Signed: \_\_\_\_\_

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## **Abstract**

High costs and poor time management is a common challenge faced by many organisations when executing projects. This result in project cost and project time overrun and in the end the organisation suffers great financial loss. Many organisations are focused on ensuring their projects are executed and completed within the allocated budget and set timelines. This study is aimed at establishing the factors that contribute to project cost and time overrun at Eskom KZN Operating Unit. Furthermore this study will look at the impact of project costs and time overrun on the financial performance of the Operating Unit. This process will assist the Unit by making recommendations on processes to be followed in order for projects to be completed within budget and on time. The research analysed the factors contributing to project cost and time overrun, provided an insight into the reasons behind it and explored possible ways to reduce it.

The data was obtained through a questionnaire that was emailed to a population of 140, all of whom are employees at Eskom KZN Operating Unit. According to 77.9% of the respondents, design changes during the execution phase were the largest contributing factor to project cost and time overrun in the Operating Unit. The results indicated that a project manager must have knowledge and skills on decision making, planning, communication, time management and project execution for a project to succeed. It is recommended that a project schedule is created from the time a project is raised and maintained till the project is closed. The project manager must ensure that each activity in the project is identified with its costing and duration.

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## CHAPTER ONE

### INTRODUCTION OF THE STUDY

#### 1.1 Introduction

Many organisations are working on delivering successful projects that are completed within the planned project costs and time that are of high quality. Poor cost and time management in projects is a common problem experienced by many organisations. The inability to complete projects on time and within budget continues to be a problem that many organisations face throughout the world (Ahmed et al. 2003). This is an indication that one of the major challenges in the construction of projects is project cost and time overrun. The magnitude of the delay differs from project to project; this also applies at Eskom KZN Operating Unit. According to Burke (2013), a project as a unique and temporary venture that is carried out in order to achieve the business's planned objectives, which could be defined in terms of outputs, outcomes or benefits.

Electricity contributes immensely to South Africa's economy hence Eskom has a role to play in the growth of the economy. Its Operating Unit aims to achieve some of its strategic goals by executing projects that involve creating new assets and maintaining existing assets however a number of projects that are yet to be executed or projects that are already in construction experience delays thus resulting in cost and time overrun. As a result of this, there are delays in the delivery of service to the people of KZN which also leads to the Operating Unit losing millions when they have to spend more on the projects that are already in execution phase. The researcher has chosen this case study for her dissertation in order to provide new knowledge on what causes cost and time overrun in projects at KZN Operating Unit. In doing so, this will benefit the Operating Unit, allowing it to carry out projects more efficiently and effectively. It will also assist the researcher to have a better understanding of the problems with project cost and project time overrun and in turn contribute in finding the right solution.

## **1.2 Background to the Study**

Eskom KZN Operating Unit has an obligation to provide electricity to the people of KZN. This must be done in an efficient and sustainable manner. KZN Operating Unit's strategic plan is to ensure that the customer's needs are met by the providing reliable electricity, this is achieved by building, operating and maintaining distribution assets.

The project execution department is responsible for the executing all projects in the province of KZN; that is creation of new assets and maintaining the existing assets. KZN alone has an energy demand of 6105MW which is 16.5% of national demand. There is still a number of the people in the north coast areas that do not have access to electricity. The project execution department has to carry out all projects that will ensure that Eskom KZN Operating Unit's strategic plan is met and the people have sustainable electricity.

There are a number of project controls in place at the KZN Operating Unit to ensure that the project is completed within the approved budget and on time, but various project tasks and activities are poorly managed and this has led to project cost and project time overrun in a number of projects. This increases the total cost of the project and also impacts the Operating Units' financial performance. Many projects that have been initiated at the Operating Unit have been delayed in terms of the completion date and have failed to meet completion deadlines while total project costs have escalated in some other projects. This has been an ongoing challenge and a trend in various projects. Some projects can go on for a number of years and the required period becomes longer than the period requested by the project initiator or the customer as a result the total project cost increases from the original budget.

A budget is allocated annually to the Operating Unit to execute a number of projects, however the planned projects are not completed in the required time and within the planned budget. This has led to an increase in total costs of the project as the Operating Unit is taking longer to complete projects and is spending more on projects. The outcome of this is that some projects cannot be carried out as planned as there are no funds to start the new projects. These delays have not only affected the Operating Unit's performance but the public's perception of it.

A project will over run in time and in cost for a number of reasons these include environmental issues to lengthy procurement processes. This also differs per project depending on the size of the project or where the project is situated; hence the researcher has chosen to analyse the impact of project cost and project time overrun on the financial performance of the Operating Unit. It is expected that this study will assist project managers and all the stakeholders involved in the project management process to better manage their projects and to correctly utilise the project controls that are in place. It will also help to ensure that projects are executed within set within the allocated budget and the set timeframes.

### **1.3 Focus for the Study**

This study will focus on the impact that project cost and project time overrun has on the financial performance of KZN's Operating Unit. It will look at the factors that contribute to project cost and project time overrun at the unit while making recommendations on processes to be followed in order for projects to be completed on time. The study is conducted at Eskom KZN's Operating Unit and the sample of the study is from its Project Management arm.

### **1.4 Problem Statement**

This research tries to find the factors that contribute to project cost and project time overrun in the KZN Operating Unit and the impact it has on the financial performance of the Operating Unit as there are a number of projects approved to be executed within a specified period of time at the KZN Operating Unit. These are eventually not completed on time and go over the budget. This result in high project costs and the funds that could have been used on other projects are used for these projects. There is a concern that the delay in the execution of projects and its increasing costs contributes to high spending by the Operating Unit annually and also affects the deliverables to be achieved.

## **1.5 Aim and Objectives**

This study was undertaken to determine the impact project cost and project time overrun has on the financial performance of the Operating Unit. The researcher will analyse the factors that contribute to; analyse the impact that project time and project cost overrun has on the financial performance of the Operating Unit; examine its costs to the Operating Unit and make recommendations of how project cost and project time overrun can be reduced.

The objectives of the study are:

1. To determine the factors that contribute to project cost and project time overrun at Eskom's KZN Operating Unit.
2. To determine the impact of project cost and project time overrun on the financial performance of the Operating Unit
3. To determine what can be done to reduce cost and time overrun on projects at the Operating Unit.
4. To make recommendations on processes to be followed that will result in the timeous delivery of projects.

## **1.6 Research Sub-Questions**

The research questions of the study are as follows:

1. What factors contribute to project cost and project time overrun?
2. To what extent does project cost and project time overrun impact the financial performance of the Operating Unit?
3. What can be done to reduce cost and time overrun on projects at the Operating Unit?
4. What strategies can be put in place to reduce projects that over run in costs and in time?

## **1.7 Limitations of the Study**

One of the limitations of this study is the small sample size of 140, some did not respond and some did not respond in a timely manner. This limited the ability to analyse the results of the population. In addition, the study focuses only on KZN's Operating Unit hence it will give a reflection of that Unit alone and not the other units of the business. It would have been beneficial to the researcher to compare the results from other operating units that also execute projects.

## **1.8 Layout of the Study**

The structure of the study is presented in five chapters as follows:

- Chapter 1 introduces the study, explains the background of the study, the problem statement, and outlines the research questions to be answered and the limitations of the study.
- Chapter 2 focuses on the literature reviewed. This chapter covers the factors that contribute to cost and time overrun in projects, the impact of time and cost overrun on financial performance, how cost and time overrun can be reduced in projects; and recommendations on processes to be followed.
- Chapter 3 discusses the research methodology and data collection techniques that were used in the study.
- Chapter 4 presents and discusses the results from the questionnaire administered by QuestionPro Software.
- Chapter 5 is the concluding remarks and recommendations to solve the research problem and recommendations for future studies.

## **1.9 Summary**

This chapter highlighted the motivation for the study in determining the impact that project time and project cost overrun has on the financial performance of the Operating Unit. This study will assist the Unit in implementing processes that can be followed to ensure that projects are delivered timeously. The chapter outlined the research questions which are in line with the research objectives, with the aim of understanding the influence project time and project cost overrun have on the financial performance of the Unit. The limitation of the study was addressed underlining some of the challenges encountered by this study, such as slow response rate and the scope of the topic. The next chapter will present the literature on project time and project cost overrun by other researchers.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

Projects over run in cost and in time for a number of reasons, it can be changes in the design; delay in receiving material; or the appointment of an unqualified contractor. This will also differ depending on the size of the project or where the project is located. Many projects at the Operating Unit over run in cost and in time, and as a result the cost of the total project increases and the Operating Unit loses revenue. This chapter will focus on relevant literature on the factors that contribute to project cost and project time overrun. The literature will also focus on the impact that project cost and project time overrun has on the financial performance of the Operating Unit, and recommendations that can be implemented to reduce cost and time overrun on projects.

#### **2.2 Factors contributing to time and cost overrun in projects**

According to Mukuka, Aigbavboa and Thwala (2015), construction schedule overruns are not uncommon on construction projects worldwide, and the South African industry has not escaped the challenges of failing to deliver projects on time and within budget. Raykar and Ghadge (2016) defined time overrun as the time required to complete the project work beyond the contract time. It often leads to disorder in workflow; budget overrun and contractual claims; while also reducing productivity.

Raykar and Ghadge (2016) defined cost overrun as the difference in cost between the final cost of a construction project at completion and the contract amount agreed by the owner and the contractor during the contract. In this case the changes during the cycle of a project often give rise to cost overrun due to cost increase, time schedule delays and benefit shortfalls (Raykar & Ghadge, 2016). Salunkhe and Patil (2014) mention contractors improper planning and scheduling, as well as their lack of experience, as the factors that affect the ability to make decisions, which could result in rework and financing problems. Incorrect drawings from consultants; late revision of the specifications; and less coordination with the contractor, also lead to project time overrun.

Naveenkumar & Prabhu (2016) posit that:

Delays are incidents that impact on the projects' progress and postpone the project activities. These delay incidents may include weather delays, unavailability of resources and design delays, etc. In general, project delays occur as a result of project activities that have both external and internal cause and effect relationship.

According to Raykar & Ghadge (2016), it is indicated that time and cost overrun has internal and external causes; the internal causes are caused by the employer, contractors and consultant. External causes are from the weather, labours and inflation. Singh (2010) states that any delay in the implementation of the project is a cause of cost overrun for the project.

According to Mansfield et al. (1994), six major factors were identified that cause delays and cost overruns in Nigerian construction projects, namely: finance and payment arrangements; poor contract management; shortages in materials; inaccurate estimation and overall price fluctuations. Mansfield et al. (1994) also found that design change; inadequate planning, unpredictable weather conditions and fluctuation in construction materials, are factors that influence time and cost overruns. In a study conducted by Adugna (2015) on the construction projects at eThekweni municipal area, the causes of time and cost overrun are financial and poor resource management (technical, human and materials).

Baloyi & Bekker (2011) state that time and cost overruns can be attributed to multiple factors for example, additional work requested by a client can result in a delay in ordering material which is subject to price increases or shortages. Ahmed et al. (2003) state that delays caused by the client, such as late submission of drawings and specifications, frequent change in orders and incorrect/inadequate site information, generate claims from both the main contractors, which many times entail lengthy court battles with huge financial repercussions. On the other hand, delays caused by contractors can generally be attributed to poor managerial skills and procedures not being followed, leading to errors and rework being done and delays. Lack of planning and a poor understanding of accounting and financial principles have led to many contractors' downfall.

Gaetsewe, Monyane and Emuze (2015) list the lack of technical skills and the appointment of unqualified contractors as the major causes of project time and cost overrun in the Northern Cape. There is also a lot of political interference in construction projects and that in turn, often leads to the appointment of unskilled and inexperienced contractors on projects. Such

appointments lead to poor planning, enormous design changes and poor design coordination by consultants, which in turn contribute to excessive revisions of pre-set completion dates. According to Wong and Vimonsatit (2012), the top ten causes that were identified in Western Australia are shortage of skills, financial difficulties, shortage of labour, unrealistic deadlines for project completion, unforeseen ground conditions, poor organisation of the contractor or consultant, poor communication, underestimation of completion time, low speed of decision and design errors that were made by engineers.

Kaming et al., (1997) thus note that “design changes, materials shortage and inadequate planning, were the most significant contributors to time delays on construction projects.” According to Amoatey et al. (2014), factors such as inadequate planning and inappropriate site supervision by the contractors, inadequate project handling experience of contractors, and delay in the payments for the work completed, directly affect the completion of the project and are contributing factors to time overrun.

In a survey conducted by Manavazhia and Adhikarib (2002), it was revealed that delays in delivery of material and equipment to construction sites often contributes to time overrun in construction projects, especially in developing countries. Amandin and Kule (2016) state that delay in payments, financial deficiencies for both the contractor and the client and material procurement, are some of the major causes of public delays. Thus Kaming et al (1997) note that:

A project may be delayed in part or whole, because of a seemingly endless list of variables. These include: inclement weather, inaccuracy of material estimates, inaccurate prediction of craftsmen’s production output (especially in developing countries, where outputs are yet to be standardized), inaccurate prediction of equipment production rates, materials shortages, equipment shortages, skills shortages, locational project restrictions, inadequate planning, poor labour productivity and design changes. Some of these variables may result in late project completion, whereas others may have no effect on construction time. However, all delays usually cost money.

Subramani, Sruthi and Kavitha (2014) conducted a study in construction projects and their findings indicate that slow decision making, poor schedule management and increase in material or machine prices, poor contract management, poor design or delay in providing design, rework due to errors, problems in land acquisition, wrong estimation or wrong

estimation methods, long periods between design and time of bidding/tendering, are the major causes of time and cost overrun.

According to Sweis (2013), the three factors that cause time overrun in the construction projects of Jordan are poor qualifications of consultants, engineers and staff that have been assigned to the project; poor planning and scheduling of the project by the contractor, and severe weather conditions.

According to Sambasivan and Soon (2007), ten most important causes of delay in the Malaysian construction industry were contractor's improper planning, contractors' poor site management, inadequate contractor experience, inadequate client's finance and payments for completed work, problems with subcontractors, shortage in material, labour supply, equipment availability and failure, lack of communication between parties and mistakes during the construction stages.

Baloyi & Bekker (2011) list poor estimates and material take - off and delay in payments, as the factors that contributed to cost overrun in the construction of most of the stadiums for the 2010 FIFA World Cup in South Africa. This is in line with the views by Kaming et al., (1997) who also state that according to contractors, cost overrun are mainly caused by inaccuracy of material take - off, increase in material costs and cost increase due to environmental restrictions. Linked to this, Le-Hoai et al. (2008) argue that the three top causes of cost overruns are material costs increases due to inflation, inaccurate quantity take-off and labour cost increase due to environment restrictions.

A study in Indonesia by Kaming et al. (1997) found that the most important factors that contribute to cost overruns are material cost increases caused by inflation, inaccurate estimating of materials and degree of project complexity. According to KPMG (2013), projects are currently facing huge cost overruns due to multiple reasons ranging from delayed approvals, scope creep and shortage of project professionals, to price escalations and contractual disputes. In a study on public sector construction projects, Ameh and Osegbo (2011) state that the main causes of cost overrun are fluctuations in material, fluctuation in labour and plant costs, delay in construction and inadequate planning before the project starts.

Azis et al. (2012) lists poor design and delays in design; unrealistic and imposed contract duration and requirements, mistakes during construction, late delivery of materials and equipment, lack of experience, relationship between management and labour, delay

preparation and approval of drawings, inadequate planning and scheduling, poor site management and supervision, as the factors leading to construction cost overrun in Malaysia. Ramabodu and Verster (2013) identified misinterpretation of the client’s brief, incomplete design at tender stage, procurement strategies and contractual claims such as contract instructions, as the factors that contribute to cost overruns in the Free State province of South Africa.

In KPMG (2013), the reasons for project time and cost overrun across a project life cycle are depicted in Table 2.1

*Table 2.1 Reasons for Time and Cost Overrun across a Project Life Cycle*

<b>Stages</b>	<b>External and Internal Issues</b>
Pre Planning	Delay in Regulatory Approvals
	Unavailability/Delay in availability of funds
	Land/Site Handover
Planning and Design	Lack of R&R Policies
	Ineffective Procurement Policies
	Design/Scope Change
	Delay in Regulatory Approvals
	Delay in Decision Making
	Inadequate Consultant Experience
Execution and Monitoring	Weak/ineffective project planning & monitoring
	Contractual Disputes
	Unavailability/Delay in Availability of Funds
	Delay in Delivery of Material
	Poor Schedule Management
	Inadequate Contractor Experience
	Lack of Strong R&R policies
	Delay land/site handover
Closure and Handover	Pre-commissioning teething troubles
	Contractual Disputes
	Defects to be cleared

Adapted from KPMG. (2013),

It is evident from Table 2.1 that design or scope change, delay in the delivery of material, unavailability of funds, poor schedule management and contractor's lack of experience are the common factors that contribute to the time and cost overrun in projects.

### **2.3 Impact of project time and cost overrun on Financial Performance**

The energy industry is a key sector in the development and economic growth of South Africa. However, the industry has been facing difficulties in terms of delivering construction projects within the approved time and cost. Any delays experienced by projects in the energy industry do not only affect the organisation, but also the end user of electricity; this also slows down the economy's growth rate.

For Mukuka et al., (2015), the "effects of schedule overruns are the consequences that will occur when the causes of schedule overruns are not identified and worked on effectively." Singh (2010) is of the view that delays and cost overruns have major implications, both economically and politically, and due to these delays in project implementation, people have to wait longer than necessary for the provision of public goods and services. The services that are provided by infrastructure projects lead to an increase in the capital output ratio for the entire economy. According to Mahomed (2015) construction delays can be referred to as a prolonged construction period beyond that which was estimated previously. These delays have been proven to be a potential source of risks in the construction industry. These various risks that are associated with projects delays are cost related where delay will generally lead to an overall increase in the cost of the project.

According to Kangari (1998), construction projects are mostly financed through borrowing and the increase in the project cost leads to the financial distress of many stakeholders such as the client, the financial institution and the construction company, which in the end threatens the financial sustainability of these stakeholders. Financial sustainability is defined as the likelihood that market participants can secure financial stability by minimizing external influence.

According to Mahomed (2015), when time overrun occurs, the project completion time will be extended beyond the date which was estimated. This leads to dissatisfaction by the owner or the clients. Lee (2008) believes that cost overruns are due to inefficient budgets and the national government's poor use of investments in state owned companies, all of which have a negative effect on the economy of the country. Amandin and Kule (2016) believe that the trend of cost overrun in construction projects has worsened over the years and has resulted in negative consequences such as project failure, reduction of profit margin and poor citizen trust in government funded projects.

Kaliba, Muya and Mumba (2009) state that if project costs or schedules exceed their planned targets, client satisfaction would be compromised; the funding profile would no longer match the budget requirement thereby resulting in further setbacks in the schedule. Sunjka and Jacob (2013) state that disputes due to schedule overruns can lead to court cases for resolution, especially when large penalties are involved. According to Gilchrist and Allouche (2005), time delays have a direct impact on sustainability and on existing infrastructure system.

Salunkhe and Patil (2014) observed that 57% of construction projects in India experience time overrun and this always led to increased expenditure for all parties. Another observation is the recurring problem of construction delays, which has a negative effect on project success in terms of time, cost and quality. On that basis, "when a construction delay occurs, there is no question that the owner suffers financially" (Divya and Ramya, 2015:50).

In a study conducted by Sambasivan and Soon (2007) in Malaysia, 17.3% of government projects were delayed for more than three months or abandoned in the year 2005. This had a negative impact on the GDP growth of Malaysia, as the construction sector contributes to 3.3% of the GDP. According to IMF (2015), the outcomes of time and cost overrun include government budget deficits and a loss of public confidence that the government cannot meet its commitments. It is therefore argued that:

when the project costs exceed the approved amount, technical default on debt financing is likely triggered. Equity sources may be required to provide more funding, other unfavourable debt arrangements may have to be made; and vendors' payment may be missed, etc" (RPMGLOBAL, 2015).

According to Gilchrist and Allouche (2005), time delays have a direct impact on sustainability since an increase in project delivery time is associated with traffic congestion, delays, disruption of economic activities, increased pollution, damage to ecosystems and an impact on existing infrastructure. This delay is not good for any economy as it has a negative impact not only on the economy, but on the environment as well.

Abhedhi (2011) states that any delays in a project are costly and will often result in disputes and claims. It results in loss of productivity; late completion of the project; third party claims and ultimately the abandoning of a project and termination of contracts. Haseeb et al. (2011) believe that the consequences of project delays are different for various parties. The general consequences are the loss of wealth, time and capacity. To the owner, delay means the loss of income and the unavailability of facilities, while to the contractor, delay means the loss of money for extra spending on equipment, materials, hiring of labour and loss of time.

According to Eskom (2015), it is losing millions and millions of rands due to projects that are not completed on time and within budget. This also prevents the business from embarking on new projects. The time and cost overrun on projects has a negative impact on all the parties including the client. This has also resulted in its delay in repaying the loans used to fund projects while also giving it a bad reputation, for not delivering on time.

In a study done by KPMG (2013), top management cited poor forecasting, poor risk identification and cost escalation as the three top reasons for reduced profit margins. This poses a financial risk to the client and the contractors, in addition to the impact exerted on the sustainability of the project. Sunjka and Jacob (2013:640) state that time and cost overrun in projects are costly and risky, while at the same time they have unwanted consequences on the success of a project in terms of time, quality and safety.

The impact is not only limited to the construction industry, but they influence the overall economy of the country. Polat, Okay and Eray (2014) believe that cost overruns negatively affect construction companies, especially if the company is micro-scaled, as it can lead to bankruptcy of a company, due to the company having limited capital and being more vulnerable to risks. According to Nega (2008), the effects of cost overrun are not confined to the construction industry, but are reflected in the state of the overall economy of a country. Time and cost overrun in construction projects prevent the planned increase in property and service production and this problem in turn negatively affects the rate of national growth.

Project cost overrun can cause a slower pay out and reduces an early return on the client's or project owner's investment. This can result in the decrease of the client's project annual return on investment.

Haseeb et al. (2011) state that in Pakistan, the country's economy was affected due to the time and cost overrun of large construction projects, as these large projects contribute to the development and progress of the country. There was loss of investment on the projects hence the country's economy was affected because the development and progress of the economy in Pakistan is dependent on these large construction projects. Haseeb et al. (2011) identified the effects of time and cost overrun in Pakistan construction industry as clash, claims, total desertion and slowing down the growth of the construction sector.

According to Mbachu and Nkado (2004), cost overruns have effects for the key stakeholders in particular, and on the construction industry in general. To clients, cost overrun implies added costs over and above the initial costs of the project, which results in less returns on investment. To the end user, the added costs are passed on as higher rental/lease costs. In the eyes of professionals, cost overrun implies the inability to deliver value for money and could well tarnish their reputations thus resulting in loss of confidence rested in them by the clients. To the contractor, it implies loss of profit for non-completion and defamation, which could threaten the chances of him/her getting further jobs if he/she is at fault.

To the construction industry, cost overruns could secure financing for the project but at higher costs due to added risks. Eshofonie (2008) identified four effects of cost overruns as company liability to insolvency and liability of the companies or firms to bad debt; under-utilization of manpower resources, plants and equipment; increased project cost due to extension of time; implying longer project duration and the fact that more resources will need to be allocated to the project and hence, an increase in the project costs. Sunjka and Jacob (2013) identified the effects of project delays in the Niger Delta Region of Nigeria, as represented in Table 2.2.

Table 2.2 Effects of Project Delays

<b>Effect</b>	<b>Description</b>
Time Overrun	When the stipulated completion time is pushed forward, the project is said to have experienced time overrun.
Budget Overrun	When the project is completed at costs higher than what was budgeted, it is said to experience a budget overrun.
Poor Quality of Completed Project	Inferior workmanship and/or poor quality of materials, can lead to issues with project quality.
Bad Public Relations	When projects are delayed, contractors, consultants and clients could put their public reputation at risk.
Litigation	Disputes can lead to court cases for resolutions, especially when large penalties are at stake.
Arbitration	The cost and time related to the engagement of professional arbitrators.
Disputes and Claims	Disputes and claims arise against the losses incurred through delays.
Total Abandonment	Delays in project execution can lead to total abandonment if causes of delays are not resolved timeously.
Loss of Profit	Delays in projects will lead to a loss of profit as no income will be generated by the asset as it is still under construction.

Adapted from Sunjka and Jacob. (2013)

## **2.4 Reducing time and cost overrun in projects**

Gutae (2015) posits that “planning is the most essential component of project management and the biggest weapon against cost overruns and delays”. According to Sambasivan and Soon (2007), planning and scheduling are very important in order to perform the project tasks on time, provide updates and to prevent delay. Effective communication among project stakeholders is also very crucial for project success.

Once a project has been initiated, a planning meeting will take place with all the stakeholders that are involved in the project. This is one of the requirements that are prescribed in the Project Control Manual at Eskom. The individuals that are involved in the project are introduced in relation to the scope of work to be carried out and the milestones of the project at this meeting. They will also agree on the start and completion dates of the milestones e.g. the design completion date and the construction start and end date. The constructability of the project is also discussed at this meeting and any risks that maybe encountered during construction are also raised.

Sambasivan and Soon (2007) believe that the problems with subcontractors can be minimized by carrying out an in-depth selection process of qualified subcontractors who consider not only cost, but also quality, safety and environmental aspects of the project. Enshassi et al. (2010) recommend that contactors be selected according to their previous experience, reputation and capabilities, in terms of labour, equipment and machinery. Subcontractors must be involved in the initial stages of the project through a balanced flow of information between them and the main contractor.

The main contractor is currently responsible for the sub-contractors at Eskom. In declaring that they will be subcontracting, main contractors will complete an Eskom subcontractor declaration form. The form will also be signed by an Eskom Project Manager where the intentions of the main contractor to subcontract are acknowledged. The subcontractor will be managed by the main contractor that is appointed by Eskom. The subcontractor will report to the main contractor regarding the progress of the project as all tasks and work will be issued by the former.

Raykar and Ghadge (2016) believe that the approval of the tender should not be determined by the lowest bids, but should also consider the experience, effectiveness and technical

knowledge of the contractor and the availability of enough resources to complete the project on time, as wrong selections may lead to a number of problems during construction. A study by Huang (2011) shows that the cheapest tenderers often have difficulties with completing the project on time and within budget. Accepting the lowest cost is a warning sign of problems in the completion of a project because very often, lowering the price means lowering the quality.

According to Mulla and Waghmare (2015), proper contract management is key to minimizing time and cost over-runs. The contract planning has to be closely linked to resource-based implementation planning of the projects. Contractors and suppliers should integrate their resources and timetable with project plans and must abide by them. Each contract's dates should be as per the work plan. There should be close follow-up and interaction. Existing penalties and incentives need to be considerably enhanced so that contractors are also committed to timely performance. Some of these include simple practices like ensuring that the time and cost implication of any design change are fully evaluated before being sanctioned.

The quantity surveyor is responsible for managing all the costs relating to the project at Eskom, which also involves overseeing the initial calculations to the final figures. Their role is to equally minimise the costs and maximise the quality of the project. The quantity surveyor will prepare the estimates and costs of the work to be done using the design together with the bill of quantities that has been provided by the engineer. During the progress of the project he/she will keep track of any deviations from the contract as these may result in an increase in costs; if there are any deviations that have resulted in the increase in costs, he/she will notify the engineer and the project manager.

Changes to the engineering and construction project can be expected when the processes commence, but the additional cost and delay in the scheduled dates must be understood by those requesting the change. Subsequently the consequences of a design change do not only involve the work package for which the change is requested, but other work packages and overhead functions of the project as well. The proper change control processes must be followed before a change in design is carried out.

Material management is the management system for coordinating and controlling all necessary efforts in ensuring that the correct quality and quantity of materials are properly specified in a timely manner, are obtained at a reasonable cost and are available at the point of use when required. To deal with the material issues effectively, it is highly recommended that a management group be formed specifically for logistical planning and that an appropriate management buyout system is also formed (Raykar & Ghadge, 2016)

Some of the existing procurement practices at Eskom also contribute to cost and time overrun of projects. Eskom has national contracts that are used by all the different operating units. The unit is required to acquire the services or products of a contractor or supplier as part of the national contract. This practice restricts the unit from independently choosing their preferred contractor or supplier depending on their needs. The main challenge arises when the supplier that is contracted to supply certain material is unable to deliver on time or there is a shortage in stock, therefore the Operating Unit cannot source the material from another supplier.

An effective materials management system has the ability to incorporate the entire material and supply chain work processes. Project teams will have online access to information during all project phases, from engineering through to the complete supply chain to onsite management. The business benefits of effective materials management include significant cost savings and increased procurement efficiency. The efficient use and management of material have an important influence on a company's profit and can delay project construction if it is not properly managed. It is important to have material systems in place that will assist in ensuring that materials are delivered on time, stock levels are well managed and the construction scheduled is not compromised.

SAP software is currently used to order material for projects at Eskom. The program gives the requester an indication of the quantity available and which warehouse and respective operating unit it can be found. SAP is also enabled to generate livestock materials to trigger the ordering of materials whenever more materials are needed. The internal control in relation to materials management is done through completing a despatch request form which must be signed for every material issued.

Having a risk register in place for the project at an early stage is very important (e.g. from the tender stage) to ensure proper identification, allocation and management of risks. It is also important in assigning cost and/or time implications to all identified risks on the risk register whenever possible, to ensure that it is open to all relevant members of the project team (Olawale and Sun, 2010). According to Gutae (2015), improper scheduling can cause wrong cost estimation and increase the idle times of some of the team members, thus the use of good scheduling tools or more advanced project scheduling tools can help the project team with scheduling.

There is a project scheduler assigned to every project at Eskom. The project scheduler provides support to the project team by putting up a schedule and tracking the progress of the project from initiation phase to finalisation phase. The scheduler is also responsible for updating the schedules and comparing the actual completed work to the baseline program. In line with this, feedback must be given to the project team on any differences that may have developed against the schedule.

Assaf et al. (1995) provides suggestions on how owners, contractors and consultants can minimize delays in the construction of projects. They note that owners must pay progress payments to the contractor on time, as late payment impairs the contractor's ability to finance the work; they must minimize change orders during construction; avoid delays in revising and approving of design; submit the design documents on time; and it is important that the owner checks for resources and capabilities before awarding the contract to the lowest bidder. Progress meeting with the contractor and consultant are very vital in order to reduce delays.

The current practise at the KZN Operating Unit is that the project team must meet monthly to discuss the progress of the project. All the stakeholders that are involved in the project must attend the meeting. At this meeting the milestones or challenges facing the project are also discussed and the risks to the project are also identified.

The contractors must ensure that they have labourers that are adequately skilled and motivated to perform the job they have been assigned to. There must also be communication amongst the team. The financial resources and cash flow of a contractor must be properly managed in order to avoid any disruptions to the project. The consultant must ensure that the designs are reviewed and approved timeously. The consultant must also be able to evaluate

the work done by the contractor to ensure the project is done as per the design and is of high quality.

According to Okeyo, Rambo and Odundo (2015), timely payments of contractors is likely to prevent cost and time overruns in Kenya, as these may have a significant effect, especially in low-income economies such as Southern African countries. The payment of contractors should be planned properly by initiating appropriate mitigating measures against potential risks, such as delayed disbursement of funds by external financiers; delayed approval of contractors' payment requests; political interference; as well as financial misappropriation by employers, among others. Any delays to the payment must also be communicated with the reasons to the contractor.

The quantity surveyor and the project manager are responsible for the payment of the contractor at Eskom. Once the contractor has completed the work, a clerk of works will check if it has been constructed according to Eskom's standards. A completion certificate together with the final invoice are signed by the contractor and also signed by the clerk of works and the project manager. These will be given to the quantity surveyor to verify that it is in line with the contract signed by the contractor before it's sent to finance to process the payment.

Azis et al. (2012) believe that frequent progress meetings will improve the performance and resolve the uncertainties faced during execution, thus arguing that it is best to arrange regular progress meetings to discuss project related issues in detail and re-plan if necessary. However, the meetings must not be too frequent because it will lead to time wasting. Senior officials and managers who are authorised to make decisions must be part of the meetings. Every organization must have a policy to document the progress of work, which can be properly assessed by arranging regular meetings.

Project review meetings are held once a month to discuss the progress of the project. Any challenges in the execution of the project are discussed and resolutions are also made in this meeting as all stakeholders are present. Eskom (2015) states that a feasibility study must be carried out in the very early stages of the project, especially for very complex projects, or when there are uncertainties regarding the project. These studies must be established whether the project is viable or not. The study would assist in the development of other project documentation such as the business case, project execution plan and strategic brief.

According to Alinaitwe, Apolot and Tindiwensi (2013), stakeholders in the construction industry are advised to minimise changes in work scopes, as this has the greatest impact on cost and time overruns. It is recommended that project management be improved, with more emphasis on collaborative relationships. This will essentially reduce payment delays by improving cash flow on the part of the client thus reducing overall project costs. Azis et al. (2012) posit that it is very important to share past experiences from other similar projects including challenges experienced and solutions in order to improve project performance from the planning stage to the handover of the project. In these same processes, experiences on positive milestones and achievements and how these were achieved should be shared. This can be used as learning curves on the current project.

All projects, once completed, must be analysed in detail, especially the projects that incurred extra costs. This must be performed by the team in order to identify the reasons for its failure. This process is known as post-mortem and it is a very effective and pertinent step in reaching organizations' goals. This should be done as part of the closing process and it is the responsibility of the Project Manager to document the results. This will certainly help prevent any cost overruns in future projects.

## **2.6 Recommendations on processes**

According to Roslan (2015), keeping construction projects within estimated costs and schedules requires sound strategies, good practices and careful judgment. There are however, steps that can be taken to minimise the causes and effects of time and cost overrun, the major one is using efficient project management tools and practices. Consequently, it is very important for organisations nowadays to evaluate their capital investment projects at the initiation stage while also understanding its economic implications and ensuring that the project is effectively managed. Mulla and Waghmare (2015) are of the view that an investment decision on whether a project should be raised must only be taken once a full investigation and data collection and proper analysis has been done. Project managers need to exercise extra caution when managing time and cost, as poor time and cost management might put the project at risk of not being completed on the scheduled time and with the

planned budget. It is therefore important for all the members of the project team to have time management skills, as time lost cannot be recovered or replaced.

Olawele and Sun (2010) state that in the construction industry, the aim of project control is to ensure that projects finish on time, stay within budget and meet its objectives. The project manager must ensure the controls are followed for the project to be completed on time and within the approved budget. According to Eshofonie (2008), project controls involves the data gathering, data management and analytical processes used to predict, understand and constructively influence the time and cost results of a project.

Project management procedures outline the resources that would be used to manage the project. It must include sections on how the team would manage issues, scope change, risk, quality, communication, and so on. It is important to be able to strictly manage the project and be proactive to ensure that the project team and all stakeholders have a common understanding of how the project would be managed. If common procedures have already been established by the organization, they must be utilized on the project.

The project manager is responsible for the success or failure of the project. He/she is also in charge of planning, procurement and execution of the project. The project managers at Eskom will co-ordinate all the aspects of the project i.e. scope, schedule, finance, risk, quality and resources. Project management is the responsibility of the project manager therefore he/she must ensure that procedures and processes are followed to ensure that the project is completed on time and at the approved cost.

The PMBOK (2004) states that the five major processes that take place in each project lifecycle are project definition or initiation, project planning process, execution of project, project monitoring and controlling, and closing of the project. These processes assist in ensuring that there is an effective flow during the project life cycle. It is very important that all individuals working on the project or with the organization use the same process for the same activities.

In the PMBOK Guide (2004) the relationship among process groups and knowledge areas are presented in Table 2.3

Table 2.3 Relationships among Process Groups and Knowledge Areas

Knowledge Areas	Project Management Process Groups					
		Initiating	Planning	Executing	Monitoring and Controlling	Closing
	Project Integration Management	<ul style="list-style-type: none"> <li>• Develop Project Charter,</li> <li>• Develop Preliminary Project Statement</li> </ul>	Develop Project Management Plan	Direct and Manage Project Execution	Monitor and Control Project Work	Close Project
	Project Scope Management		Scope Planning, Scope Definition and Create WBS		Scope Verification and Scope Control	
	Project Time Management		Activity Definition, Activity Sequencing, Activity Resource Estimating, Activity Duration Estimating, Schedule Development		Schedule Control	
	Project Cost Management		Cost Estimating and Cost Budgeting		Cost Control	

Adapted from PMBOK Guide. (2004)

According to Nokes and Kelly (2007), time is a unique feature in the project management environment. Project managers need to exercise extra caution when managing time, as poor time management could put the project at risk of not being completed at the scheduled time. It is therefore important for all the members of the team to have time management skills as time lost cannot be recovered or replaced. The PMBOK (2004) states that the processes that are involved in project time management include the following: defining the activities,

sequencing the activities, estimating the duration of activities, developing and controlling the schedule.

Eskom (2015), states that tracking progress in a project is very important for its success. The project manager has to constantly track the progress of the various tasks and have various controls in place to measure progress. This would provide early signal of projects cost overruns, while also giving opportunities to fix the issues. It is very important for all personnel to be trained on the job they do, as this might assist in achieving better results.

According to the PMBOK (2004), project cost management involves a number of processes that are adhered to, in order to ensure that the project is completed within the approved budget. These processes are resource planning, estimating costs, determining budgets and controlling costs. This involves knowing the financial and human resources of a project and it also requires that the project manager has an understanding of preparing and sticking to a budget, so that the project results will be good upon completion or closure. Cost and time management are linked, because in order to ensure that the project is completed within the allocated budget, it also has to be completed within the stipulated time.

Once a project delays in time for any reason it results in increasing costs as some resources in the project like a contractor can claim standing/idling time. The additional funds that the project requires result in the late initiation of other projects. The delay on Eskom projects has a negative impact on the economy of South Africa as Eskom is the largest energy provider in the country. This also reduces the confidence South Africans have in Eskom to deliver electricity constantly.

No projects are free from challenges as various factors and changing conditions can impact on its progress. It is important that the project manager adapts quickly and is proactive to changes. To ensure that projects do not delay or fail, it is important to have a contingency plan for each phase and milestone. Managers must also have mitigation plans in place that will assist in dealing with any challenges that are encountered in the different phases of projects.

## 2.7 Summary

The literature reviewed in this chapter has indicated that time overruns occur due to client actions like changes in design and drawings and the lengthy decision-making processes. It has also shown that the highest rates of overrun factors, which come from a contractor's actions, include poor site management, poor planning and not having enough experience on the job. Furthermore, the most common factors that account for cost overrun include inaccurate material estimations, late delivery of material and delay in payments.

The impact of time and cost overrun on an organisation and the economy of any country are negative, as that project does not add any value in contributing to the business. Instead it results in the business investing additional funds to the project, funds that could be invested in a new project. The chapter through a review of existing literature has also indicated that time and cost overrun in projects is a challenge encountered by many projects throughout the world and this has become a norm in project management. Most projects in the Operating Unit experience time and cost overrun, however, they differ at varying levels depending on the project and the causal factors.

Extensive research has been conducted in South Africa on project time and cost overrun, as well as the factors that contribute to these. However, there still seems to be a gap in the literature on their impact on the financial performance of businesses. On that note, the following chapter discusses the methodology employed in the study. The chapter highlights the recruitment of respondents, data-collection strategies, the research design and methods and finally, the analysis of the data.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

The previous chapter discussed the literature review that is relevant for this study. This chapter describes the research methods that have been used in this study and highlights their relevance. It also revisits the objectives of the study. In the main, the following issues are highlighted: the participants of the study, the method used to collect data and the various methods used to analyse the data. The study objectives have been defined to assist in developing the research instrument, as well as to help find answers to the research questions.

#### **3.2 Aim and objectives of the study**

The aim of this study is to determine the effect that project cost and project time overruns have on the financial performance of the KZN's Eskom Operating Unit. In addition, it intends to determine what can be done to reduce time and cost overrun on projects at the unit. Therefore, the objectives of the study are:

1. To determine the factors that contribute to project cost and project time overrun at KwaZulu Natal's Eskom Operating Unit.
2. To determine the impact of project cost and project time overrun on the financial performance of the Operating Unit
3. To determine what can be done to reduce cost and time overrun on projects at the Operating Unit.
4. To make recommendations on processes to be followed that will result in the timeous delivery of projects.

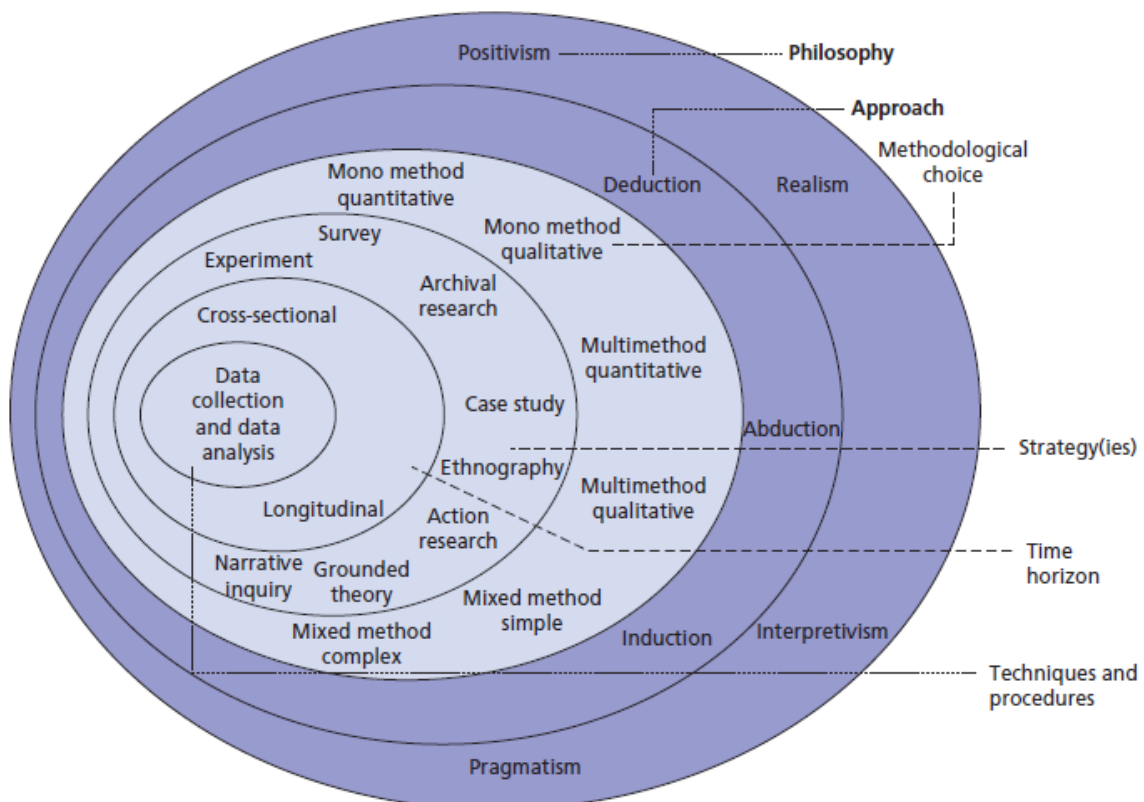
#### **3.3. Research design**

The research design is the blueprint for the study, which provides the general framework for the data collection process (Bryman, 2012). It is the plan which highlights the selection of the subjects for the study, the location of the study, as well as the data collection procedure in other words it is the strategic framework for the execution of the research strategy (Flick,

2011). Thus, the design can be descriptive, exploratory or explanatory. For this study, the descriptive design was deemed the most appropriate. A descriptive study is carried out when there is a need to describe the characteristics of a variable and it is either qualitative or quantitative in nature (Sekaran & Bougie, 2013). Hypothesis testing will be conducted when there is a need to establish cause-effect relationships between variables.

### 3.4 The research process

In line with the objectives of the study, it is mandatory to identify the most appropriate methods to answer the research questions. For this particular study, the researcher is going to describe the research process using Saunders et al's (2003; 2007) research onion. The onion describes the stages followed when developing the research process each layer of the onion is a description of a particular stage of the research process (Saunders et al., 2007). In view of that, the researcher viewed the different stages or concepts of the onion, with particular reference to this study. Figure 3.1 is an illustration of the research onion.



**Figure 3.1: The research process onion**

Adapted from: Saunders et al. (2003:83)

### **3.5. Research paradigm/philosophy**

The outermost layer of the onion is referred to as the research philosophy, also known as the research paradigm. Rocco, Bliss, Gallagher and Perez-Prado (2003:19) describe research paradigms as the set of assumptions, beliefs and worldviews which guide the research inquiry. It is those assumptions underlying the philosophy which justify how the research is going to be executed (Bryman, 2012; Flick, 2011). This means that the goals of the research determine the philosophy to be adopted. In other words, the chosen paradigm is influenced by the knowledge to be investigated in the research (May, 2011). As indicated in the onion, there are four main research paradigms: positivism, realism, interpretivism and pragmatism (Saunders et al, 2003). This particular study falls within positivism, which is described below.

#### **3.5.1. Positivism**

The main assumption of positivism is objectivity. As a research philosophy, the paradigm emphasises that it is only through observation that factual knowledge is gained. This means that through the objective approach, the findings of a study are quantifiable and observable (Collins, 2010). It is the quantifiable observation that results in statistical analysis. In addition:

*As a philosophy, positivism is in accordance with the empiricist view that knowledge stems from human experience. It has an atomistic, ontological view of the world as comprising discrete, observable elements and events that interact in an observable, determined and regular manner (Collins, 2010: 38).*

In view of the above, this study adopted the positivistic philosophy, keeping in mind that:

*If you assume a positivist approach to your study, then it is your belief that you are independent of your research and your research can be purely objective. Independent means that you maintain minimal interaction with your research participants when carrying out your research. Through being detached in this way, the hope is that you can be truly objective (Wilson, 2010:9).*

The above assertion implies that studies within positivism are based on facts, while they also assume that the world is objective and external.

### **3.6. Research approach: deduction**

The second layer of the research onion refers to the research approach, which can be deductive, abductive or inductive (Saunders et al, 2003). This study employed the deductive approach. The deductive approach is the most appropriate to the positivist philosophy, as it allows the formulation of hypothesis, as well as the statistical testing of the anticipated findings to an acceptable level of probability (Wiles et al, 2011).

### **3.7. Methodological choice: Quantitative approach**

The next layer of the onion is the methodological approach, which in the case of this study, is the quantitative approach. According to Blaikie (2010), consideration must be given to the form in which data will be collected and analysed. The two techniques that are common for data collection are the qualitative and quantitative approaches. According to Render, Stair and Hanna (2012), qualitative research is primarily subjective in approach, as it seeks to understand human behaviour and the reasons that direct such behaviour. It tends to use words and images for analysis and it is mainly used for small-scale research. Qualitative data are obtained through participant's observation and interviews, to mention a few.

Informed by the positivist philosophy, quantitative research is objective in approach, it is used to examine the cause and effect of relationships. It is presented in numerical form and analysed through the use of statistics. It is greatly suitable for large-scale research. In this study, descriptive quantitative research was utilised to understand the impact of cost and time overrun on the financial performance of the operating unit. It was utilised because it is more effective in communicating the research findings and it is easier for the readers to understand the data, as the data are presented in the form of graphs, tables and statistical measures.

### **3.8. Research strategies: case study and survey**

This is the fourth layer of the research onion, which refers to how the researcher plans to execute the research (Saunders et al., 2007). The approaches vary from action research, interviews, case study, experimental research, as well as the survey. For this particular study, the case study approach was adopted, with the use of the survey questionnaire. This strategy provides a focus for the study, as well as efforts to address the issues around the study, with

regards to how these issues impact upon the case study organisation. Case study research entails the evaluation of a single unit so as to establish its main features and draw generalisations (Bryman, 2012). Kumar (2011) states that a case study could be an individual, a group, a community, an instance, an episode, an event, a subgroup of a population, a town or a city. To be called a case study, it is important to treat the total study population as one entity.

In the same way, a survey is used to collect information from a selected group of people using standardised questionnaires or interviews. It obtains information from a sample of people who respond to a series of questions posed by the researcher (Bryman & Bell, 2011). In this study, the information was collected through a web-based questionnaire emailed to the participants.

The descriptive survey design was therefore selected because it provides the researcher with information that already exists and may uncover new facts and meaning. This design was selected to meet the objectives of the study that is to determine the factors that contribute to project cost and project time overrun; as well as the impact of project cost overrun and project time overrun on the financial performance of the operating unit.

### **3.9. Time horizon**

This refers to the time framework in which the study is expected to be completed (Saunders et al., 2007). There are two main types, namely the cross sectional and the longitudinal (Bryman, 2012). The former refers to one that is already established and where data are collected at a particular point during the study (Flick, 2011). This study is a cross sectional one, which investigated a certain phenomenon at a particular time. The longitudinal time horizon is whereby data are repeatedly collected over an extended period. This is often employed when the study aims to investigate an important element which changes over time (Saunders et al., 2007).

### **3.10. Research techniques**

The innermost layer of the research onion refers to the data collection techniques and procedures. These depend on the methodological approaches employed in the study (Bryman, 2012). It is this part of the study that significantly contributes to the overall validity and reliability of the study (Saunders et al., 2007). The data collected can be primary or secondary, the former being data collected from first hand sources, while the latter refers to the data that have been collected by other researchers. Prior to describing the data collection and analysis techniques, the following section highlights the population of the study, as well as the sampling technique that was employed in order to answer the research questions.

#### **3.10.1. Population and sampling**

Burns and Grove (2003) states that a population comprises all the elements (individuals, objects and events) that meet the sample criteria for inclusion in a study. For this study, the population consisted of all the employees from Eskom's Operating Unit project execution environment.

This study covered the project execution department of Eskom's Operating Unit. The project execution department is responsible for the execution of all the projects in the province, that is, the creation of new assets and the maintenance of the existing ones. The participants in this study were therefore the various employees from the project execution department, as well as the departments that work hand in hand with the project execution department. The participants had diverse knowledge and experience in working with projects. One of the requirements was that the participants must be working in the project environment. These employees included project engineers, quantity surveyors, project managers, project accountants, project cost controllers, project schedulers and project buyers.

There are two types of sampling design that could be used, namely probability and non-probability sampling (Blaikie, 2010). Probability sampling involves random sampling, where every individual has a chance of being selected. On the other hand, non-probability sampling does not give all individuals an equal chance of being selected (Sekaran & Bougie, 2013). Since the sample was chosen appropriately based on the fact that the researcher is also an employee at the same Operating Unit, non-probability sampling, using convenience

sampling, was suitable for this study. Convenience sampling was selected because the members of the population were conveniently available. From the population described above, a convenient sample of 140 was selected. Based on the population size of 140, a sample of 103 and a confidence level of 95% is appropriate (Sekaran & Bougie, 2013).

### **3.10.2. Data collection tool: the questionnaire**

Sekaran and Bougie (2013) cited that questionnaires allow a researcher to measure variables of interest. The respondents were geographically scattered around KwaZulu Natal, some were in Pietermaritzburg and Newcastle, and some were in Durban and Margate. Kumar (2011) indicates that a questionnaire is suitable for administering to geographically scattered respondents. Sekaran and Bougie (2013), state that a questionnaire allows the researcher to collect data from many respondents in a short period of time and in a cost-effective way.

The tool utilised to administer the questionnaire for this study was a software based research tool QuestionPro. It is an online, web based software survey which allows for convenient questionnaire administration. It also allows efficient and effective data analysis which includes data gathering, statistical measuring of the results and analysing the trends. The researcher selected to use the questionnaire because it was easier to collect data. The respondents could provide anonymous feedback on their experience, this encourages openness and honesty. Lastly the data can be processed by a software package SPSS.

The questionnaire had information introducing the researcher and it also highlighted the purpose of the research (Appendix 1). The questions were created such that the feedback received would help achieve the research objectives. The first few questions were on the demographic profiles of the respondents, such as gender, age and occupation of the respondents. These questions are common in most research questionnaire. Question eight inquired about the use of Process Control Manuals of Project Management when executing projects. This was to establish whether the respondents followed or referred to the manuals and procedures when executing projects in order to ensure that projects are completed in time and within the approved cost.

Further questions helped to determine the main causes of cost and time overruns. Some of the phrases in questions 9 and 13 were derived from the findings from the literature reviewed of Gaetsewe et al. (2015). The last few questions were intended to determine whether the

respondents understood the implications of time and cost overrun on the Operating Unit and what can be done to ensure that projects are successful.

The questionnaire was simple in order for respondents to complete on their own, hence, it was a self-administered questionnaire. The questions were short and easy to understand and were expressed in English, the language that is used by many in the Operating Unit. The questions were varied, with multiple-choice questions as well. The questionnaire was emailed to 140 staff members via a link to the online survey. All of the respondents had access to the internet, which made it possible for them to access the questionnaire.

### **3.11. Pretesting and validity**

#### **3.11.1. Pretesting**

According to Sekaran and Bougie (2013), the research instrument must be pre-tested to ensure that there are no errors with measurements. The questions must be understood by the respondents. It was very important that the questionnaire was pretested to ensure that it worked as intended and it would be understood by the respondents. This is important as the questionnaire is self-administered, hence, the respondents would not have assistance if they encounter problems with the questionnaire.

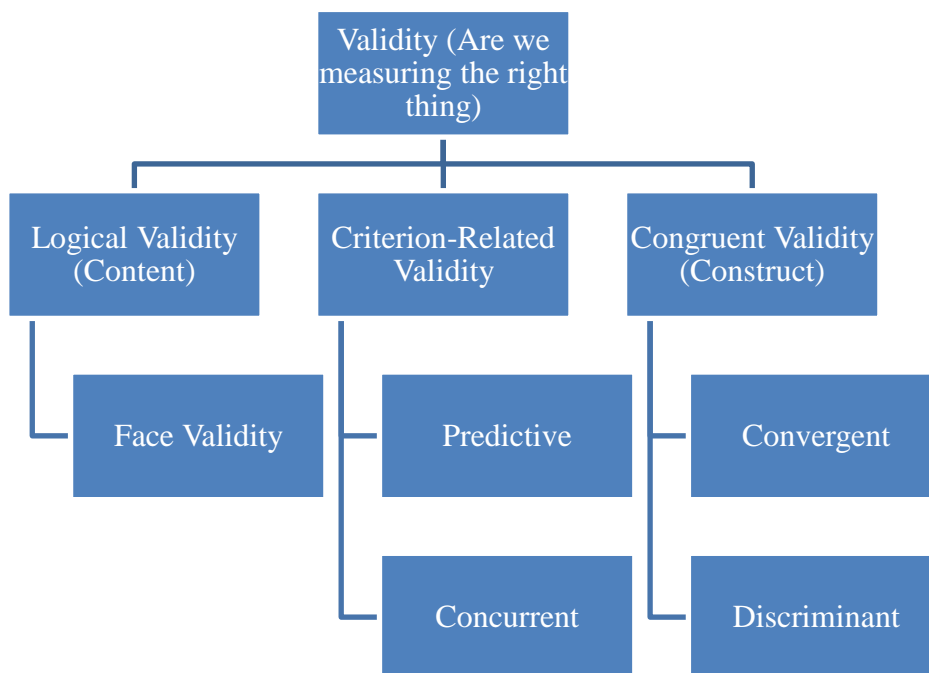
The pilot questionnaire was created and sent to 10 Eskom employees who were within the project management environment but were not part of the actual study. This was sent via a link to QuestionPro. The pilot test was necessary to ensure that:

- The questions meet the expectations of the study
- The questions do not have errors and it is correctly presented
- The respondents do not struggle in answering the questions
- The time allocated is sufficient

Only six respondents completed the questionnaire and then the testing of the data was done. The researcher then revised the questionnaire, based on the suggestions that were made by the participants in the pilot study. This included correcting language and grammatical issues, as well as re-phrasing some of the questions.

### 3.11.2. Validity

Kumar (2011), states that validity is the degree that the researcher has measured what he/she had intended to measure. This is the process which shows how well an instrument measures what it is supposed to measure. The data have to be checked to assess whether they have been entered correctly and that it reflects the research questions. According to Sekaran and Bougie (2013), internal validity tests may be grouped into different groups i.e. criterion-related validity, construct validity and content validity, as outlined in Figure 3.2



**Figure 3.2: Testing Values of Measures: Forms of Validity**

Adapted from Sekaran and Bougie (2013:226)

According to Sekaran and Bougie (2013) content validity shows how well the dimensions of the elements have been outlined. The feedback received from the pilot test was helpful, the respondents agreed that the questions were relevant to the study and that the alternative answers were also in line with the questions. The questions were also well expressed and clear to understand. The results of this survey were then compared with other similar, existing survey results for validation.

### **3.12. Data Analysis**

In order for data that has been collected to have meaning it must be analysed. The data collected was organised and analysed using a tool SPSS Version 24.0 from QuestionPro. The data was analysed using descriptive statistics which proved to be appropriate given the sample size. Some data was presented using frequency tables that show the percentage breakdown of respondents by age and gender. Pie diagrams and bar graphs were used to present some data, making it easier to analyse the data. Descriptive analysis was applied to provide evidence of the impact that project cost and project time overrun has on the financial performance of the operating unit. After each graph and table an interpretation of the analysis is presented in Chapter 4.

### **3.13. Ethical considerations**

Ethical considerations entail observing certain protocols during the period of the study, especially during data collection. Prior to collecting data from the participants of the study, the researcher applied for a gatekeeper's letter from the organisation in question, to which permission was granted to carry out the study. The researcher then communicated with the potential participants: briefing them about the objectives of the study. Those who agreed to participate in the study confirmed by signing the consent forms. After this important stage, the researcher was then granted permission by the university, in form of the ethical clearance certificate, to continue with the study. During data collection, participants were reminded of their rights, which included withdrawing from the study if they felt like doing so, without any negative consequences. They were also reminded that anonymity and confidentiality would always be maintained by the researcher. It was emphasised in the questionnaire that the respondents' participation to the survey was voluntary and the confidentiality of the respondents was assured.

### **3.14. Limitations of the study**

This study focused on one organisation. This means that the findings of the study cannot be generalised in other organisations of similar set up.

### **3.15. Summary**

The research methods used to achieve the research objectives of this study have been presented. Among other things, the following issues were discussed in this chapter: the research philosophy and design, the research approaches, population and sampling, data collection tools, as well as pre-testing and validity. In addition, data analysis, ethical considerations and the limitations of the study were described. The next chapter presents the findings of the study. The research results are analysed and presented combination with the research findings from other studies that were discussed in Chapter 2, that are associated to this study.

## CHAPTER FOUR

### PRESENTATION AND INTERPRETATION OF RESULTS

#### 4.1 Introduction

In line with the research objectives of this study, this chapter presents and discusses the findings of the study. The results are presented in tables, graphs, and narrative discussions. There is also a brief discussion of what each table and graph represents. The results are analysed in order to give a better understanding of the data that is presented. The research results are discussed together with findings from other relevant studies in order to make relationships and links with existing literature.

#### 4.2 Description of the Sample

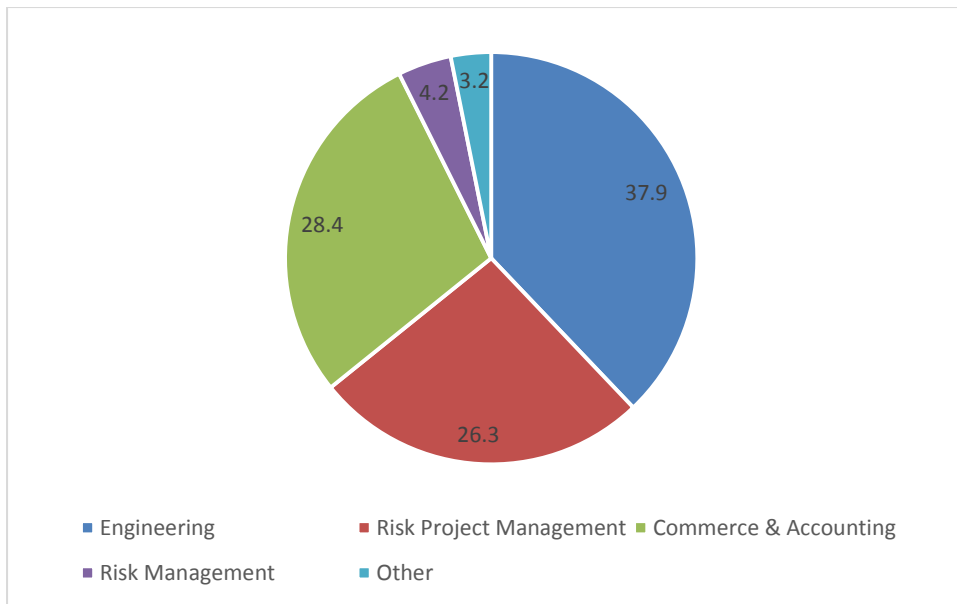
The questionnaire was emailed to a population of 140 all of whom are employees at Eskom KZN Operating Unit and are in the project execution environment. The questionnaire was viewed by 110 respondents and only 95 respondents completed the survey, this was a 67% response rate. A sample size of 103 and a confidence level of 95% is recommended for a population of 140 according to Sekaran and Bougie (2013), thus the sample size of 95 is an acceptable representation of the population for this study.

The demographic profile of the respondents is represented in Table 4.1

*Table 4.1 Demographic Profile of the Sample*

			Gender		Total
			Male	Female	
Age (years)	< 25	Count	0	1	1
		% within Age	0.0%	100.0%	100.0%
		% within Gender	0.0%	2.2%	1.1%
		% of Total	0.0%	1.1%	1.1%
	25 - 35	Count	23	27	50
		% within Age	46.0%	54.0%	100.0%
		% within Gender	46.0%	60.0%	52.6%
		% of Total	24.2%	28.4%	52.6%
	35 - 45	Count	20	16	36
		% within Age	55.6%	44.4%	100.0%
		% within Gender	40.0%	35.6%	37.9%
		% of Total	21.1%	16.8%	37.9%
	> 45	Count	7	1	8
		% within Age	87.5%	12.5%	100.0%
		% within Gender	14.0%	2.2%	8.4%
		% of Total	7.4%	1.1%	8.4%
Total	Count	50	45	95	
	% within Age	52.6%	47.4%	100.0%	
	% within Gender	100.0%	100.0%	100.0%	
	% of Total	52.6%	47.4%	100.0%	

Table 4.1 above illustrates the demographic profile of the respondents, with the majority being male, who made up 55.6% of the total sample size in the age category of 35 to 45 years. Within the category of males only, 40.0% were between the ages of 35 to 45 years. This category of males between the ages of 35 to 45 years formed 21.1% of the total sample. This is a true reflection of the current male-dominated project management environment at Eskom's KwaZulu Natal Operating Unit. The majority of respondents were between the ages of 35 to 45 years. With these respondents being older, an assumption can be made that they have been working for a number of years and have obtained various skills.



*Figure 4.1 Respondent's Field of Study*

Figure 4.1 above illustrates the respondents various fields of study with the majority (37.9%) who studied engineering, 28.4% studied commerce & accounting and 26.3% studied risk project management. Risk management and other fields had the least respondents of 4.2% and 3.3% respectively.

As most respondents have studied engineering which is Eskom's core business, this indicates that most of them have knowledge of the field of work and with additional experience some have become experts in their field of work. The second largest grouping of respondents have studied commerce and accounting studies therefore they have skills of analysing costs for the project and ensuring that the project is completed using the required financial standards and procedures. The third largest grouping of respondents studied risk project management and this group is responsible for planning and executing the objectives of a project. It is important that knowledge and training is obtained for the different fields of work, the same applies for project management. This will assist in ensuring that projects are executed successfully. Fugate, Kinicki and Ashforth (2004: 15-16) note that "the onus is with the individual to acquire the knowledge, skills, abilities and other characteristics valued by the current and prospective employers."

Many organizations have realized that in order to survive in a world which is changing very fast with new technologies, employee education is essential for most jobs and new forms of work which require a different combination of skills.

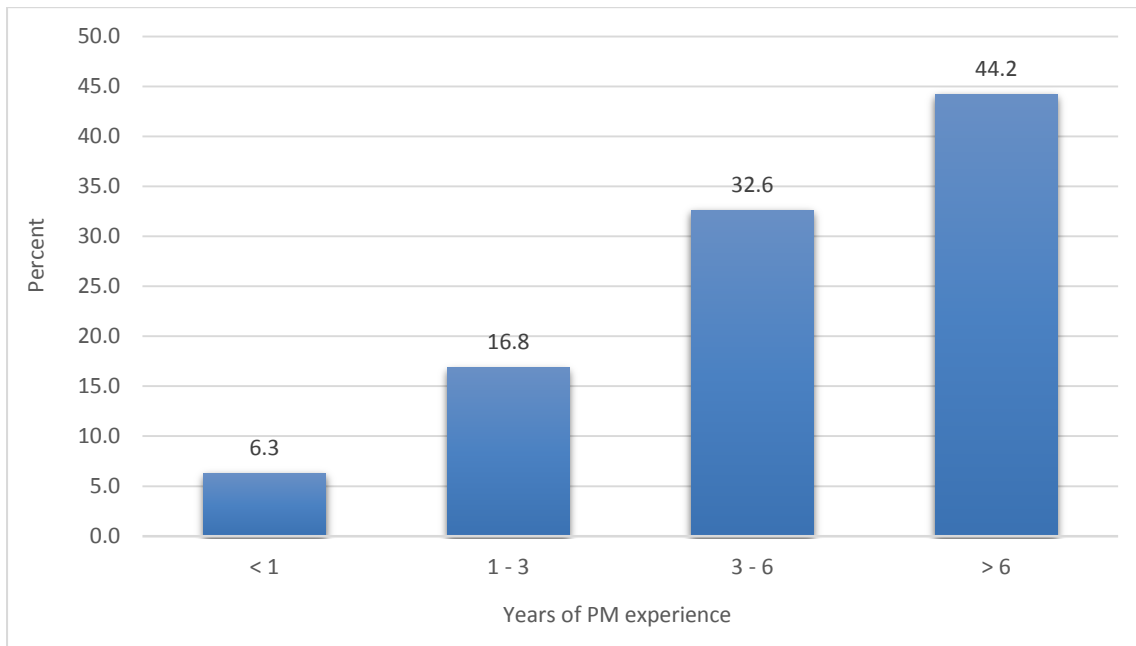
Table 4.2 Professional Profile of the Sample

			Please advise your specialist area of project management							Total
			Procurement Function	Risk Management	Quality Management	Time Management	Cost Management	Scope Management	Other	
What is your role within the project life cycle?	Design Engineer or Technician	Count	0	5	5	0	0	17	3	30
		% of Total	0.0%	5.3%	5.3%	0.0%	0.0%	17.9%	3.2%	31.7%
	Quantity Surveyor	Count	0	0	0	0	1	0	0	1
		% of Total	0.0%	0.0%	0.0%	0.0%	1.1%	0.0%	0.0%	1.1%
	Project Manager	Count	0	0	7	1	0	14	5	27
		% of Total	0.0%	0.0%	7.4%	1.1%	0.0%	14.7%	5.3%	28.5%
	Project Cost Controller	Count	1	0	0	0	29	1	0	31
		% of Total	1.1%	0.0%	0.0%	0.0%	30.5%	1.1%	0.0%	32.7%
	Project Scheduler	Count	0	0	0	6	0	0	0	6
		% of Total	0.0%	0.0%	0.0%	6.3%	0.0%	0.0%	0.0%	6.3%
	Total	Count	1	5	12	7	30	32	8	95
		% of Total	1.1%	5.3%	12.7%	7.4%	31.6%	33.7%	8.5%	100.3%

Table 4.2 above illustrates the professional profile of the sample. From the table, it can be deduced that the majority of respondents were Cost Management and Scope Management specialists (average of 32%). The roles of the respondents within the project lifecycle were predominantly Design Engineer or Technicians, Project Manager or Project Cost Controller.

The largest grouping of respondents (30.5%) consists of cost management specialists who are involved in the project cost control followed by scope management specialists who are involved in project design (17.9%) and project management (14.7%). The largest grouping is mainly made up of project accountants, project cost controllers and cost engineers. This group is responsible for ensuring that the costing of the project is correct and monetary spending is in line with what has been allocated to the project. The second and third largest

grouping is responsible for the scope, from designing the project to executing it within the approved time frame.



*Figure 4.2 Respondent's Years of Project Management Experience*

Figure 4.2 above illustrates respondents' years of project management experience. The majority of respondents (76.8%) had more than 3 years' experience in the project management environment. This is a useful fact as it indicates that responses are from experienced workers. This is also an indication that the respondents have knowledge of the work in the project management environment and are equipped to do the tasks that make up their job description. Next, 44.6% had more than 6 years' experience, which could mean that the respondent is competent in their field of work and have built a number of skills over the years in the project management environment.

According to Fugate et al., (2004: 20), it is important for the organisation to identify and develop internal talent and prevent the loss of important knowledge from their organisation. The respondents that have less than 3 years' work experience within the project management environment make up 23.1% of the total sample, thus they might still need training to better perform their tasks and others might still need supervision especially for critical tasks.

### 4.3 Factors that contribute to project time and project cost overrun

To determine the factors that contribute to project time and project cost overrun at Eskom, KwaZulu Natal Operating Unit

#### Illustration of the main factors of project cost and time overrun

It is very important to determine what contributes to project cost and time overrun as the factors are at the core of this study. Figure 4.3 illustrates the factors that contribute to project cost and time overrun, this is illustrated in percentages and the factors have been ranked from highest to lowest.

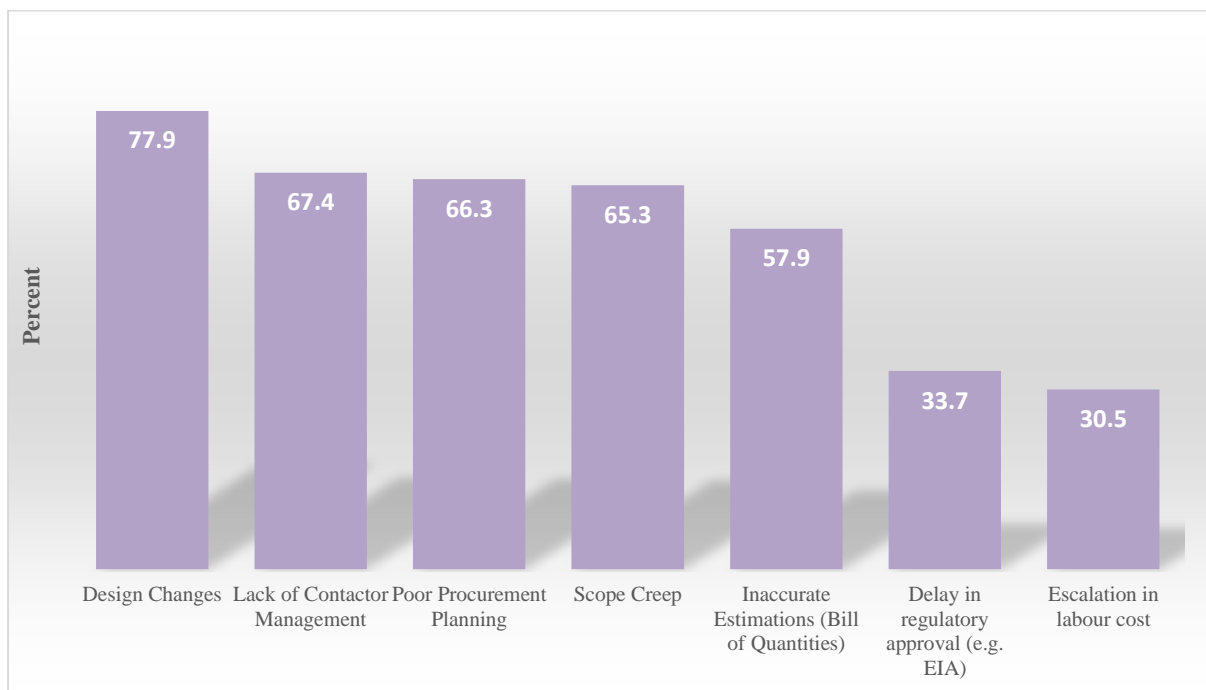


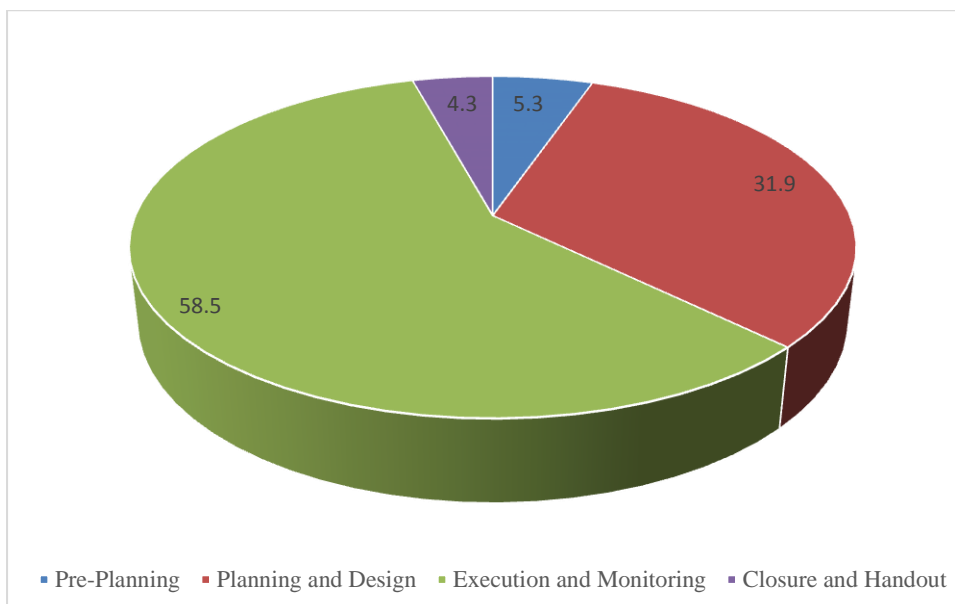
Figure 4.3 Factors that Contribute to Project Cost and Time Overrun

Based on the research results, 77.9% of the respondents stated that design changes were the key factors that contributed to project cost and time overrun, 67.4% of the respondents stated that lack of contractor management was also a major contributing factor. Azis et al. (2012: 2621) listed poor design and delays in design and approval of drawings, poor site management and poor supervision of contractors as some of the factors that contribute to project time and cost overrun.

The graph shows that 66.3% believe that poor procurement planning in the Operating Unit also leads to project cost and time overrun, while 65.3% identify scope creep that occurs while the project is in construction. In a 2013 study by KPMG, some of the reasons were from delayed approvals to scope creep and shortage of project professionals, to price escalations and contractual disputes. Of all the respondents, 57.9% state that inaccurate estimations also contributes to cost and time overrun, while 33.7% have indicated that delays in regulatory approvals play a role. Only 30.5% of the respondents believe that escalation in labour cost is a cause of project time and cost overrun.

In a study by Mansfield, Ugwu and Doran (1994: 258), poor contract management, inaccurate estimation and overall price fluctuations are some of the factors that contribute to project cost and time overrun. It is evident that the four major factors that contribute to project cost and time overrun at the Operating Unit also impact other projects that are executed around the world.

Figure 4.4 illustrates the project life cycle phase that contributes to project cost and time overrun



*Figure 4.4 Project Life Cycle Phases and Contributions to Project Cost and Time Overrun*

The two areas that respondents believe are contributing to cost and time overrun is Execution and Monitoring (58.5%) and Planning and Design (31.9%). The project will experience delays when it's at the design stage, the detailed design will not be received on the scheduled date and in some instances the detailed design will have to be corrected before execution can commence. This can be also be due to delays in existing environmental laws, land acquisition approvals or even community acceptance.

According to KPMG (2013), some of the reasons for project cost and time overrun are shortage of project professionals and delays in regulatory approvals. Delays in commenting on design documents and delayed inspection can also result in the delay of finalising the detailed design for the project. During execution of a project the project manager may encounter a number of challenges and these include unavailability of construction materials on site, delayed delivery of materials and unavailability of construction materials from the supplier.

According to Sanchez, Hampson and Mohamed (2005:14), unclear and inadequate details or mistakes and discrepancies in drawings and unclear interface in specifications will result in delays at execution phase. The design can be sent back to design phase for corrections to be made.

There are many other factors that result in cost and time overrun at the execution phase such as unskilled and scarce labour, delay in paying the contractor, work being redone due to errors during construction, poor communication and coordination among the project team and bad weather.

This shows that detailed planning is required before the execution of a project commences as a number of challenges can be encountered during the execution phase resulting in additional costs and time on the project. Sambasivan and Soon (2007: 517) stated that planning and scheduling are very important in order to perform the project tasks on time and provide regular updates to prevent delay.

#### 4.4 The impact of project cost and project time overrun on the financial performance of operating unit

To determine the impact that project cost and project time overrun has on the financial performance of the Operating Unit.

It is important to understand that when a project overruns in cost and time there are negative implications that the Operating Unit will suffer. The implications can be financial or dissatisfied customers. It is not only the Operating Unit that will be negatively affected by the overrun of cost and time but also Eskom as a whole and the economy of South Africa.

##### **Project time and cost overrun are costing the operating unit millions of Rand?**

To determine the impact that project cost and project time overrun has on the financial performance of the Operating Unit. The researcher came out with the below hypothesis to examine this research question.

##### **“Hypothesis 1”**

H<sub>0</sub>: “There is no significant difference that exists between project cost and project time overrun on the financial performance of operating unit

H<sub>1</sub>: “There is significant difference that exists between project cost and project time overrun on the financial performance of operating unit

*Table 4.3 Hypothesis 1 Results*

	Frequency	Percent	Chi Square p-value
No	1	1.1	0.001
Maybe	6	6.3	
Yes	88	92.6	
Total	95	100.0	

Chi-Square value=150.716<sup>e</sup> df=2

A Pearson's Chi-Square test analysing the project cost and project time overrun on the financial performance of operating unit yielded a chi-square value of 150.716. Since this value produced a significant difference at the 0 .001 level, the researcher rejected null hypothesis 1. This means the researcher accepted the alternative hypothesis which says that there is significant difference that exists between project cost and project time overrun on the financial performance of operating unit. This is also indicated by significant number of respondents (92.6%) agree that project cost and time overrun is costing the Operating Unit millions of rands. Only 1.1% of the respondents disagree that project cost and time overrun is costing the Operating Unit millions of rands, while 6.3% of respondents were not sure.

According to Eskom (2015), it is losing millions and millions of rands due to projects that are not completed on time and within budget. This also prevents it from embarking on new projects. The time and cost overrun on projects has a negative impact on all the parties including the client. This has also resulted in Eskom's delayed repayment of loans used to fund projects, also giving it a poor reputation for failing to deliver on time.

The Operating Unit is also incurring interest on all the projects that are not completed on time and on budget. Most of the projects at Eskom are funded by National Treasury hence there is interest payable. The amount of interest payable for projects in construction and the additional funding required to complete the project has resulted in decreased profits for Eskom over the years.

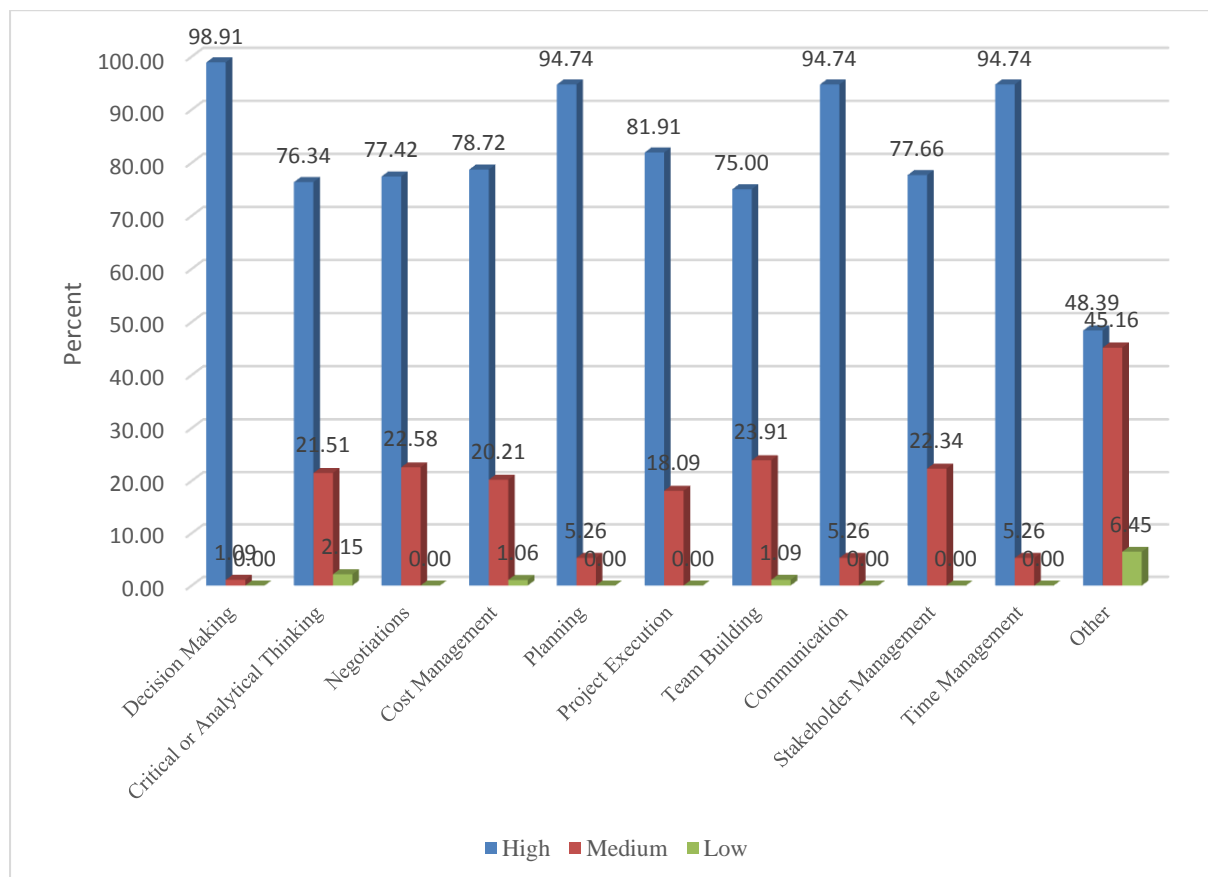
Amandin and Kule (2016: 23) stated that the trend of cost overrun in construction projects has worsened over the years and has resulted in negative consequences such as reduction of profit margin, and loss of belief by the citizens in government funded projects. This delay also results in wasteful expenditure that the Operating Unit must account for making the investors sceptical and cautious in investing in organisations that are unable to deliver on time and within cost.

As indicated above, it is clear that most of the respondents are aware that the negative impact of cost and time overruns not only affects the KwaZulu-Natal Operating Unit but Eskom as a whole.

#### 4.5 Reducing cost and time overrun on projects

To determine what can be done to reduce time and cost overrun on projects at the Operating Unit

Effective communication among project stakeholders is very crucial for its success. A skilled team will be required to keep focus on the project scope, project timelines, the budget allocated to the project, the resources and must be able to identify and manage any risk.



*Figure 4.5 Required Project Manager Skills*

The results presented in Figure 4.5 are percentages for the skills required by a project manager to complete a project on budget and on time. Most respondents ranked all the skills required for managing a project from highest to lowest. Below are the top six skills that were highly ranked as required by project managers.

Decision making is ranked very high at 98.91% and 1.09% and 0.0% at medium and low respectively. This is an indication that it is very important to make decisions on time and with the relevant information, because a delay in decision making can result in work delays. Planning is ranked high (94.74%), medium (5.26%) and low (0.0%) respectively. Poor planning leads to poor performance and potential failure, a principle which also applies to projects. All the stages and activities of a project must be planned prior to execution. Gutae (2015: 13) stated that planning is the most essential component of project management.

Communication is ranked high (94.74%), medium (5.26%) and low (0%). Regular communication prevents failed projects as any challenges encountered in the project are communicated to the team in advance and resolved on time. According to Azis et al. (2012: 2625) frequent progress meetings improve the performance and resolve the uncertainties faced during the execution of a project. Time Management is ranked high (94.74%), medium (23.91%) and low (1.09%). This indicates that it is crucial that the amount of time spent on an activity is observed and does not exceed the allocated time. Project schedulers must assist in monitoring the duration of activities. Yakubu and Ming (2010:509) state that in the construction industry the aim of project control is to ensure that projects finish on time, within budget while still meeting other project objectives.

Project executing is ranked high (81.91%), medium (18.09%) and low (0.0%). It is very important that all the project activities are co-ordinated to ensure the execution is a success. Cost Management is ranked high (78.72%), medium (20.21%) and low (1.06%). This entails planning the resources of a project, estimating costs, determining budgets and controlling the costs. According to Khamaksorn (2016:95) essential knowledge and skills are required to manage construction projects successfully and professionally. A project manager requires knowledge and expertise. A project manager must also possess leadership, decision making, problem solving, communication, team work and negotiation skills. It is also very important that a project manager has knowledge in areas such as schedule management and planning, cost management, quality management, risk management and stakeholder management.

The results clearly indicate that in being responsible for the overall success of the project, project managers must have knowledge and skills on decision making, planning, communication, time management and project execution. The project manager must also ensure that the project team's skills and technical competencies are developed to enhance the performance of the project.



*Figure 4.6 Success Factors for a Project*

Figure 4.6 above illustrates the factors that respondents consider as important and necessary for a project to be completed on time and within the budget.

Based on the research results, 97.9% of the respondents believe time is very important. In line with this, Gutae (2015:13) notes that the use of good scheduling tools or more advanced project scheduling tools can help the project team with scheduling and managing their time. Only 93.7% believe team work is necessary. Thus Sanchez et al. (2005:14) state that poor communication and poor co-ordination will result in the poor performance of the project team. The project team must be united. Only 92.6% of the respondent selected cost. Okeyo, Rambo and Odundo (2015: 325) stated that timely payments of contractors and project cost monitoring will prevent cost and time overrun on projects. Another success factor is quality and 86.3% of respondents believe that it is important. The project must uphold certain standards and regulations that are acceptable to the organisation. Essentially these must also ensure customer safety.

It is evident from the results that time, team work, cost, quality and safety is essential for a project to succeed. Roslan (2015:19) believes that in having good strategies and practices in place, cost and time overrun on projects can be minimised.

#### 4.6 Recommendations on processes to follow

To make recommendations on processes to be followed that will result in the timeous delivery of projects

#### “Hypothesis 2”

H<sub>0</sub>: “There is no significant difference exists between level of Project Management knowledge and the timeous delivery of projects

H<sub>1</sub>: “There is significant difference exists between level of Project Management knowledge and the timeous delivery of projects

*Table 4.4 Hypothesis 2 Results*

	Frequency	Percent	Chi Square p-value
	timeous delivery	timeous delivery	
Excellent	16	16.8	3.74
Good	58	61.1	
Average	17	17.9	
Fair	4	4.2	
Total	95	100.0	

Chi-Square value= 70.263<sup>b</sup> df=3

A Pearson’s Chi-Square test analyzing the level of Project Management knowledge and the timeous delivery of projects yielded a chi-square value with a Yates’ correction of 70.263. This value produced an insignificant difference at the  $P > 0.001$  level, that is 3.74. therefore, the researcher failed to reject null hypothesis 2. Which means there is no significance difference between the level of project management and timeous delivery of projects, which means there might be people with high level of project management knowledge but still not being timeous delivery of projects, this is also being supported by the fact that more than three quarters of the respondents believed that their level of project management knowledge was good and excellent. The majority groupings of 61.1% rated their knowledge as good. This can be attributed to their years of work experience within the project management environment.

### “Hypothesis 3”

H<sub>0</sub>: “There is no significant difference exists between following procedures and the timeous delivery of projects

H<sub>1</sub>: “There is significant difference exists between following procedures and the timeous delivery of projects

*Table 4.5 Hypothesis 3 Results*

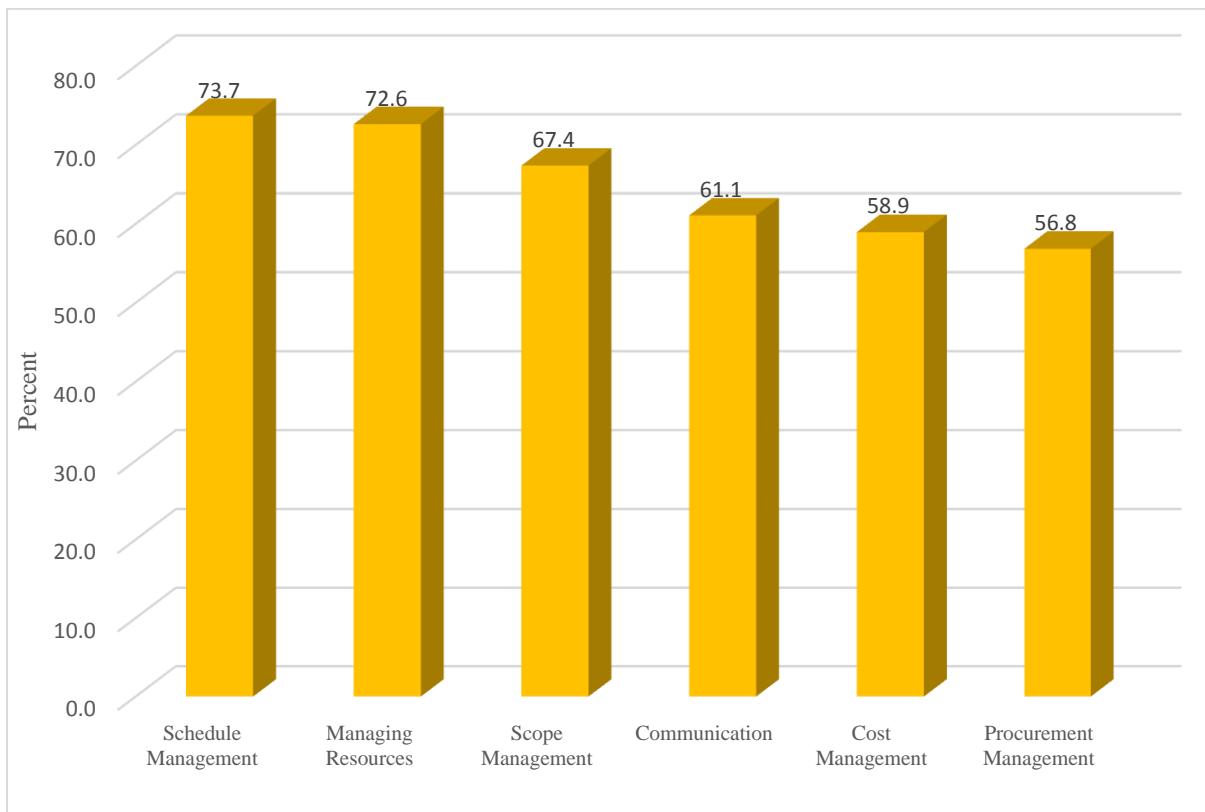
	Frequency	Percent	Chi Square p-value
	timeous delivery	timeous delivery	
Never	21	22.1	0.001
Occasionally	48	50.5	
Frequently	26	27.4	
Total	95	100.0	

Chi-Square value= 13.032<sup>o</sup> df=2

A Pearson’s Chi-Square test analysing between following procedures and the timeous delivery of projects yielded a chi-square value of 13.032. Since this value produced a significant difference at the 0.001 level, the researcher rejected null hypothesis 3. This means there is significance difference in following procedures and timeous delivery of projects. There was a significant difference with regards to this, with approximately half of the respondents (50.5%) indicating that this was done occasionally. This is an indication that 50.5% of the respondents only use Eskom manuals and processes once in a while.

The results indicated that there are respondents who do not use or refer to process manuals. The project manager must ensure the controls are followed for the project to be completed on time and within the approved budget. The PMBOK (2004:157), states that project cost management involves a number of processes that must be adhered to, in order to ensure that the project is completed within the approved budget. This includes following and utilising the process manuals and standards.

**Figure 4.7 illustrates the challenges of managing projects**



*Figure 4.7 Challenges of Managing Projects*

Figure 4.7 illustrates the challenges of managing projects. Most of the respondents (73.7%) found that the schedule management is a challenge. The project schedule is also not adhered to hence there is a cost and time overrun. Olawale and Sun (2010: 518) state that a risk register must be in place for the project at an early stage for proper identification, allocation and management of risks. It is also important to assign cost and/or time implications to all identified risks on the risk register whenever possible, to ensure that the risk register is available to all relevant members of the project team.

Only 72.6% of the respondent found managing of resources a challenge. The project manager must ensure that all the stakeholders are working towards the same goal. He/she must coordinate and manage the various activities and the project team. As depicted above 67.4% found scope management as a challenge. Once the scope has been ascertained at the design phase it must be locked before it proceeds to execution phase. This will assist in reducing time and cost overrun.

Just 61.1% of the respondents found communication to be a challenge. This is an indication that the project team does not communicate hence there are delays on the project. The project team is required to meet monthly and discuss the progress of the project and all the stakeholders that are involved in the project must be present. At this meeting the milestones or challenges facing the project will be discussed. The risks to the project are also identified. If this is not adhered to, the project is bound to fail as communication is very important.

Cost management and procurement management were 58.9% and 56.8% respectively. If the costs of the project are not managed, the project is bound to fail as there will be cost escalation. Mulla and Waghmere (2015:50) stated that the decision to raise a project must be taken once a full investigation, collection of data and proper analysis has been done to avoid waste of expenditure. The results clearly indicate that schedule management, managing resources, scope management and communication are the major challenges in managing projects at the Operating Unit. Khamaksorn (2016:96) believes that technical skills should focus on planning and scheduling while managerial skill focus on making decisions and solving problems.

#### **4.7 Discussion and Findings**

The majority of the respondents stated that design changes was the key factor that contributes to project cost and project time overrun followed by a lack of contractor management. This is mainly experienced at the execution and monitoring phase where all resources are expected to be in place and functional. As a result the Operating Unit experiences financial loss. The results presented indicate that as a project manager it is important to be able to make sound and informed decisions, this must be done in the most reasonable time to prevent any delays or unplanned costs to the project and the business.

The respondents stated that one of the major challenges of managing projects is that project schedules is not adhered to, this creates difficulties in executing and completing the project as planned. Communication amongst the stakeholders involved in the project is minimal this results in the project cost and time overrun. The respondents believe that time management; team work and management of costs can assist in decreasing the overrun in cost and time in the Operating Unit.

## **4.8 Summary**

The research results were presented and analysed in this chapter, in line with the research objectives of the study. The research findings were discussed; the research results highlighted with the main premise that design changes and lack of contractor management contributed to project cost and time overrun at the Operating Unit. There were challenges that were identified, challenges specifically around the management of schedules and resources. While the respondents are aware that cost and time overrun in projects has a negative impact on the Operating Unit financially, the research results revealed that 61% of the respondents were confident that their knowledge of project management is good and a large number of the respondents occasionally referred to the process manuals.

The research results will assist to draw up the recommendations for the study. These recommendations will be discussed in the next chapter.

## **CHAPTER FIVE**

### **RECOMMENDATIONS AND CONCLUSIONS**

#### **5.1 Introduction**

The previous chapter presented a discussion of the results of the study. This chapter will provide recommendations in line with the discussions from previous chapters. The aim is to provide recommendations to Eskom KZN Operating Unit based on the research objectives. It will also highlight the challenges that were faced during the research process. The findings of this research will greatly assist the project execution department at the Operating Unit to better manage projects and ensure that the projects are completed within the approved budget and required time.

#### **5.2 Findings**

It is very important that the research problem is addressed and this is done by identifying the research objectives. Therefore in order to determine if the research problem has been addressed it is important to evaluate whether the research findings are in line with the research objectives. The research findings have clearly showed that the changes of design, lack of contractor management, poor procurement planning, scope creep and inaccurate estimations are the main factors that result in cost and time overrun in a project. When the project is at the execution phase, it will experience delays and this can be a result of scope creep during the project implementation phase or the failure to sufficiently manage the contractor.

The major challenges in managing a project are that project schedules are not adhered to and the resources allocated to execute the project are not properly managed. The project schedule communicates the work that needs to be done, outlines which resources are available for doing the work and if these functions are not managed the project is bound to fail. The majority of project execution staff indicated that they are aware of the financial loss the Operating Unit is experiencing due to cost and time overrun on the projects. This also prevents the Unit from executing new projects and increases its liabilities.

Decision making, planning, communication, time management and project executing are the top five skills that a project manager must have in order to meet the projects objectives. These skills can also enable the project team to be more efficient and effective.

The research results also indicate that half of the respondents are not using the project process manuals. This shows that the processes and guidelines are not being adhered to, hence the required project completion date and planned budget for the project are not observed. This can also result in inefficiencies as the processes and standards are continuously changing. The results that have been presented clearly indicate that the research results have addressed all the research objectives; therefore the research problem has been solved.

### **5.3 Limitations of the Study**

Three limitations of this study were highlighted earlier:

1. The sample of this study was drawn from Eskom's KZN Operating Unit. This study is therefore not a full representation of Eskom as the study did not take into account other operating units of Eskom. Doing so, would have given the researcher a chance to compare the findings against these other units. A study including other Operating Units in Eskom would have resulted in a varied sample.
2. It was noted that some respondents worked in the field and access to the PC was only available when they are in the office. As a result of this, some of the respondents forgot about the questionnaire or did not see the email when it was sent.
3. It took two months to gather all the responses from the required sample of 95 thus the response was very slow. Reminders were sent four times to the respondents, requesting those who had not completed the questionnaire to complete it.

The measure used to collect data did not include certain questions that could have enabled the researcher to conduct a thorough analysis of the research. This was discovered after interpreting the findings.

## **5.4 Implications of this Study**

This study has managed to obtain more insight into the factors that contribute to cost and time overruns at Eskom's KwaZulu-Natal Operating Unit and the impact that this has on its financial performance. The research results highlighted that design changes, lack of contractor management and poor procurement planning are the main factors that contribute to cost and time overrun. This is experienced at the execution and monitoring phase of the project.

On the other hand the project process manuals are not consulted continuously for guidance and a majority of respondents rely on their own knowledge, skills and their lengthy experience on the job to execute projects. It is very important that manuals and processes are always used as there are constant changes that are taking place within the Operating Unit and externally. It also serves as a guide of how to execute one's duties.

The respondents do understand that the Operating Unit is unable to embark on new projects or invest in other opportunities due to project cost and time overrun hence it is very important for a project manager to have decision making, planning and communication skills in order for the project to be completed on budget and on time. The project manager must ensure that time management; cost management and team work are always prioritised if a project is to be successful.

The research revealed that the major challenges in managing projects are poor schedule management; the misallocation of cost per activity and the inaccuracy in determining the duration of an activity. As a result, an insufficient budget is allocated to the project and the completion date is unrealistic.

## **5.5 Recommendations for Operating Unit**

Based on the research findings, the following is recommended for Eskom KZN Operating Unit:

1. The sample was drawn from KwaZulu Natal's Operating Unit and this is not a full representation of the whole Eskom workforce. A more detailed study covering the

other Operating Units that are executing Eskom projects would make the sample heterogeneous.

2. The research results indicated that design changes, lack of contractor management and poor procurement planning are the main factors that contribute to project cost and time overrun. The Operating Unit must ensure that stronger control and monitoring is exercised in these areas to reduce the overrun in projects especially at the execution phase as this is where the overrun will occur.
3. The project manager must ensure that all the project resources are aligned to the project objectives from the start to the end of the project especially at execution phase as this is where cost and time overrun occur.
4. Schedule management is one of the major challenges in managing projects. A proper system for the project schedules must be in place. This schedule must be managed continuously and each activity, of the project must be identified including its cost of the activity and the duration. This must form part of the schedule.
5. Based on the research findings, the project process manuals are not being used as required by the Operating Unit. It is important that on-going training and guidance is provided on how to use these manuals. The project manager must take responsibility in ensuring the use of process manuals by the project team.
6. The Operating Unit must ensure that in addition to allocating sufficient resources to the project, key individuals must have the relevant skills to ensure the success of the project. These skills include decision making, planning, communication and time management. These skills must be applied from initiation to closure.

## **5.6 Recommendations for Future Studies**

There were limitations that were encountered during this study. These are:

1. The research results showed that the respondents are aware that the Operating Unit is losing millions of rands due to cost and time overrun however the questionnaire did not ask the respondents what the estimated loss was. The amount that is lost due to project cost and project time overrun must be quantified.
2. The study did not include sufficient literature on schedule management as this is very important in projects. Cost and time are limited resources which need to be

continuously monitored in a schedule as they are also key performance indicators for the success of a project.

3. The sample was not representative of Eskom as a whole as it only conducted the study at its KwaZulu Natal Operating Unit. A much larger sample will be required for data collection in order to make strategic decisions if Eskom chooses to use this research as a feasibility study.

## **5.7 Conclusion**

The majority of the respondents understand that cost and time overrun is hampering the sustainability of the organisation. The millions of rands that are spent on projects can be invested in other sectors of the organisation. This forces the organisation to borrow money to finance the projects especially the large and complex projects. This also results in increased liabilities for Eskom. For Divya and Ramya (2015:50) “when a construction delay occurs, there is no question that the owner suffers financially.”

The researcher indicated that the main factors that contribute to cost and time overrun at the KZN Operating Unit are design changes, lack of contractor management and poor procurement planning. This mainly takes place at the execution phase of the project. As a result the Operating Unit is financially constrained. Most of the project execution personnel have varying years of experience with project management and now rely on their knowledge and skills in executing projects. The KZN Operating Unit will benefit from this research as there are quite a number of projects that are not completed on budget and on time. The Operating Unit can manage the factors that contribute to project cost and time overrun and also ensure that the scheduling systems used for the projects are efficient and effective.

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## APPENDICES

### Appendix 1: Questionnaire



UNIVERSITY OF KWAZULU NATAL

GRADUATE SCHOOL OF BUSINESS AND LEADERSHIP

Dear Respondent,

#### **MBA Research Project**

**Researcher:** Miss L. Khumalo (031 710 5208)

**Supervisor:** Ms. P. Amrithlal (082 4581613)

**Research Office:** Ms. P. Ximba (031 260 3587)

I, Londiwe Khumalo, am an MBA student at the Graduate School of Business and Leadership, of the University of KwaZulu Natal. You are invited in a research project entitled: The impact project time and cost overrun has on the financial performance of the operating unit at Eskom, KwaZulu Natal Operating Unit. The aim of this study is to determine to what extent does project time and project cost overrun impact the financial performance of the operating unit and the factors contribute to project cost and project time overrun.

Through you participation I hope to understand the impact project time and cost overrun has on the financial performance of the operating unit. The results are intended to contribute to the project execution department in KwaZulu Natal Operating Unit in order to execute project more efficiently and effectively.

Your participation in this project is voluntary. You may refuse to participate or withdraw from the research at any time with no negative consequences. There will be no monetary gain from participating in this survey. Confidentiality and anonymity of records identifying you as the participant will be maintained by the Graduate School of Business and Leadership, UKZN. If you have any questions or concerns about completing the questionnaire or about participating in this research, you may contact me or my supervisor at the numbers listed above.

This survey should take you about 10-15 minutes to complete. I hope you will take the time to complete this survey.

Sincerely

Investigator's Signature \_\_\_\_\_ Date \_\_\_\_\_

1. Gender and age

Male		>25		25 to 35		35 to 45		<45	
Female		>25		25 to 35		35 to 45		<45	

2. Field of Study

Engineering	
Risk Project Management	
Commerce & Accounting	
Risk Management	
Other (Specify)	

3. Project Management Experience

>1		1 to 3 yrs		3 to 6 yrs		<6 yrs	
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4. Please advise your specialist area of project management

Procurement Function	
Risk Management	
Quality Management	
Time Management	
Cost Management	
Scope Management	
Other (Specify)	

5. What is your role within the project life cycle

Design Engineer or Technician	
Quantity Surveyor	
Project Manager	
Project Cost Controller	
Project Scheduler	

6. Project Management knowledge is important in ensuring that projects are delivered on time and within budget?

True		False	
------	--	-------	--

7. How would you rate your own level of Project Management knowledge?

Excellent		Good		Average		Fair	
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8. How often do you refer to the Process Control Manuals of Project Management when executing projects?

Never		Occasionally		Frequently	
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9. What do you think are the main causes of project overrun or delay (select all that apply)

Delay in regulatory approval (e.g. EIA)	
Design Changes	
Poor Procurement Planning	
Lack of Contactor Management	
Escalation in labour cost	
Scope Creep	
Inaccurate Estimations (Bill of Quantities)	

10. What do you think are the most important skills that a project manager should have?  
(Please rate High Medium or Low)

	High	Medium	Low
Decision Making			
Critical or Analytical Thinking			
Negotiations			
Cost Management			
Planning			
Project Execution			
Team Building			
Communication			
Stakeholder Management			
Time Management			
Other (Specify)			

11. What phase of the project lifecycle do you think is a high contributor to project time and cost overrun?

Pre-Planning Phase	
Planning and Design Phase	
Execution and monitoring Phase	
Closure and Handout Phase	

12. Briefly explain why the phase chosen above in 11 is the cause of project time and cost overrun?

--

13. What in your view are the main challenges of managing projects?  
(Select all that apply)

Managing Resources	
Cost Management	
Scope Management	
Schedule Management	
Procurement Management	
Communication	

14. Cost and Time Monitoring are critical in projects?

No		Maybe		Yes	
----	--	-------	--	-----	--

15. Briefly explain your answer in 14

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16. Project time and cost overrun is a norm at Eskom, KwaZulu Natal Operating Unit.

True		False	
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17. Cost Management and Schedule Management are critical in projects

True		False	
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18. Briefly explain your answer in 14

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19. Project time and cost overrun are costing the operating unit millions of rands?

No		Maybe		Yes	
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20. How many success criteria do you think are necessary for a project to be completed on time and within the budget? (Select all that apply)

Quality	
Team Work	
Time	
Safety	
Cost	
Other (Specify)	

Thank you for your time and participation in the survey

## Appendix 2: Ethical Approval



09 May 2016

Ms Londwe Khumalo (214580180)  
Graduate School of Business & Leadership  
Westville Campus

Dear Ms Khumalo,

Protocol reference number: HSS/D459/016M

Project title: The impact that project cost and project time over run has on the financial performance of the operating unit: A case study of the Eskom KwaZulu Natal Operating Unit

### Full Approval – Expedited Approval

With regards to your application received on 05 May 2016, the documents submitted have been accepted by the Humanities & Social Sciences Research Ethics Committee and FULL APPROVAL for the protocol has been granted.

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.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

Dr Shenika Singh (Chair)

/ms

Cc: Supervisor: Ms Prathima Amirthalingam  
Cc: Academic Leader Research: Dr Muhammad Hoque  
Cc: School Administrator: Ms Zarinah Bu Linyej

Humanities & Social Sciences Research Ethics Committee

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