

**The impact of the implementation of Liquefied  
Natural Gas (LNG) as a new business strategy for  
Transnet Pipelines**

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## DECLARATION

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## **ABSTRACT**

To align with the global objectives of lowering greenhouse gas emissions, the South African government aims to diversify South Africa's energy supply mix to improve security of energy supply and to reduce the overall carbon footprint of the country. For this reason, Transnet Pipelines is pursuing the Liquefied Natural Gas (LNG) business and there are concerns in terms of capacity and skills required to implement this new strategy. Understanding factors that influence and contribute to a successful implementation of the new strategy is important.

This study evaluates the impact of the implementation of Liquefied Natural Gas (LNG) as a new business strategy for Transnet Pipelines. Literatures shows that there are currently there are no available LNG skills within South Africa. The study used a qualitative research approach. Primary and secondary data were collected through interviews and from company documents. The target population was twelve and these were drawn mainly from leadership team together with senior and middle managers working on the Liquefied Natural Gas project or from those who have in-depth knowledge of the matters pertaining to the LNG project.

The study used a qualitative research approach. Primary and secondary data were collected through interviews and from company documents. The target population was twelve and these were drawn mainly from colleagues working on the Liquefied Natural Gas project or from those who have in-depth knowledge of the matters pertaining to the LNG project. The latter comprised the leadership team together with senior and middle managers. The researcher initially planned to conduct twelve interviews, but only nine interviews were conducted.

The responses from the interviews show that there are currently no LNG skills within TPL, the leadership team requires up-skilling and exposure to existing LNG plants and operations so that they are equipped to manage, operate and maintain such operations. The study recommends that Transnet Pipelines needs to assess their readiness to implement the LNG strategy. This strategy needs to be developed for Transnet as a whole which will then incorporate roles and responsibilities of different operating divisions and the staffing model that will be adopted to ensure that properly skilled staff are appointed.

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## **LIST OF ACRONYMS**

DoE	Department of Energy
DMRE	Department of Mineral Resources and Energy
FSRU	Floating Storage Regasification Unit
LNG	Liquefied Natural Gas
LTPF	Long Term Planning Framework
SOE	State Owned Enterprise
TPL	Transnet Pipelines

# CHAPTER ONE

## OVERVIEW OF THE STUDY

### 1.1. Introduction

There are a number of growth initiatives that Transnet Pipelines is currently pursuing and these include open opportunities in the Liquefied Natural Gas market for diversification (Transnet, 2018). This is an opening chapter that presents the background and the aim of the entire study. The problem statement, objectives of the study, sub-questions, methodology and contribution of the study are also presented. Finally, a chapter summary is presented. This study therefore concentrates on determining the organisational readiness to achieve the above mentioned growth strategy.

### 1.2. The background of the study

State owned entities (SOEs) are considered to hold an important role in the economy of any country, in terms of the services they provide, such as, access to electricity, transportation, water and sanitation (Balbuena, 2014). Additionally, SOEs provide employment in urban areas in developing countries. Transnet is a state owned entity (SOE) and it is wholly-owned by the South African Government (Transnet, 2018). Transnet plays a critical role in expanding South Africa's strategic and economic objectives and thus Transnet is mandated by Government to expand and to diversify its service offerings and to improve its market positioning (Transnet LTPF, 2017). Additionally, Transnet is made up of five operating divisions one of which is Transnet Pipelines (TPL). Since its establishment in 1965, the company has acquired an overall experience of petroleum pipelines management as well as the pipeline operation and the maintenance thereof (Transnet Pipelines, 2018). TPL occupies a key position within the trading and distribution of petroleum related products network in South Africa. There has been continuous expansion of the pipeline network to meet the capacity demands (Transnet, 2018).

TPL operates the largest multi-product pipeline in southern Africa. It transports petroleum and gas products through its pipeline infrastructure system (Transnet Pipelines, 2018). Additionally, the pipeline infrastructure comprises the storage tank farms, pump stations and the controls centre throughout five provinces in South

Africa. Strategically the South African national economy depends on this network of pipelines. TPL has a workforce of six hundred and fifty five (655) employees as at 31 March 2019 (Transnet Pipelines, 2018). In addition, TPL has the skills, capabilities and the experience of operating fuel pipelines, terminals, loading of related tankers. The author further adds that, TPL employs highly skilled and experienced engineers possessing skills such as electrical, mechanical, and other pipelines related disciplines. The projects department is responsible for planning and executing all major expansion, repairs and upgrades as well as other important projects to ensure maintenance and sustainability of the infrastructure (Transnet Pipelines, 2018).

Since Transnet is a state owned enterprise (SOE), it has developed a framework for long-term planning (LTPF) that is guided by the projections of transportation demand for the next three decades (LTPF, 2017). The LTPF is supported by the Transnet Growth Investment Framework (TGIF) which was established in 2018. The TGIF is designed on the basis that there are attractive business growth opportunities for Transnet that must be considered for investment in order to position itself for long-term sustainability in a rapidly changing economy, society and environment (LTPF, 2017). The LTPF (2017) identified natural gas as a major alternative source of energy for South Africa.

The use of natural gas in South Africa has several advantages such as greater electricity generation and considerably less greenhouse gas (GHG) emissions than fossil fuel energy production. The critical success factor in terms of this growth ambition is for Transnet Pipelines to be positioned as a future operator of LNG terminals (Transnet Pipelines, 2018). Since TPL is currently investigating opportunities to diversify into the LNG market, it is apparent that it will require certain specialised skills to achieve this. This study evaluates the impact of diversifying the business by implementing Liquefied Natural Gas (LNG) as a new strategy for Transnet Pipelines.

### **1.3. Problem statement**

To be aligned with the global efforts of lowering the emissions of greenhouse gases, the South African government intends to diversify its energy mix to improve the security of supply (LTPF, 2017). Bašová (2018) points out that, natural gas, in

comparison to other energy sources, is fairly cheaper and cleaner and it is environmentally friendly. Furthermore, it is anticipated that there will be an annual increase of two per cent of natural gas demand in the world in the long term, which in turn will place natural gas as the leading source of fossil fuels. The decision by Transnet Pipelines to pursue the LNG initiative brings with it concerns in terms of capacity and skills required to implement this new strategy. Galante & Asif (2014) argue that no organisation can succeed in expanding if it does not develop the organisational capability for operating business. Currently there are no available LNG skills specialists within South Africa. This then poses a challenge for Transnet Pipelines with regard to the identified opportunities for liquefied natural gas. This statement therefore necessitates a study to examine whether or not the organisation has the capability and capacity to implement successfully its new LNG strategy.

Understanding factors that influence and contribute to a successful implementation of the new strategy is important. There are many challenges that the company may be confronted with that may have a favourable and unfavourable impact in achieving of the new objectives. Due to the nature of the new strategy, there are certain specialised skills that are required. There may be unintended consequences if thorough assessments of the capability and capacity within Transnet Pipelines are not undertaken. Based on the fact that there are no LNG skills specialists in South Africa, this study will find out whether or not Transnet Pipelines is adequately equipped with skills and capacity to implement the new strategy.

#### **1.4. The aim of the study**

The aim of the study was to evaluate the impact of the implementation of Liquefied Natural Gas (LNG) as a new business strategy for Transnet Pipelines in Durban, KwaZulu-Natal.

#### **1.5. The objectives of the study**

The study focused on the specific objectives described below:

- To identify skills needed to implement Liquefied Natural Gas (LNG) as a new business strategy for Transnet Pipelines;

- To understand if employees have the required competencies to implement Liquefied Natural Gas (LNG) as a new business strategy for Transnet Pipelines; and
- To recommend strategies that can be used by Transnet Pipelines Leadership to implement successfully the new Liquefied Natural Gas (LNG) strategy.

### **1.6. Research sub-questions**

The following research sub-questions were identified:

- What are the skills needed to implement Liquefied Natural Gas (LNG) as a new business strategy for Transnet Pipelines?
- Are employees skilled appropriately for the implementation Liquefied Natural Gas (LNG) as a new business strategy for Transnet Pipelines?
- What are the strategies that can be used by Transnet Pipelines leadership to implement successfully the new Liquefied Natural Gas (LNG) strategy?

### **1.7. Methodology of the study**

There are three research methods that can be utilised in a research study namely: quantitative, qualitative as well as mixed-methods. The chosen methodology for this study was a qualitative research approach. Qualitative research involves assessing and making sense of how individuals or groups attribute meaning to social or human issues. In this research design, data were collected from participants and were inductively analysed in order to interpret the meaning (Creswell, 2014). The reason for choosing a qualitative method was because the aim of this study is exploratory, therefore, its findings are going to be used to gain the initial understanding that may support decision-making where necessary.

Qualitative research is an interpretative approach, which give emphasis to subjective personal encounters and their meanings (Starman, 2013). Primary and secondary data were collected through interviews and company documents. Creswell (2014) highlights the following as some of the qualitative research characteristics that occur in a natural setting and humans are involved. Attention is drawn to the perceptions of participants and researchers are mostly concerned with understanding how things happen.

The advantages of using a qualitative method are; flexibility to explore unexpected ideas during research and being sensitive to the background aspects (Ospina, 2004).

Semi-structured interviews and company documents were utilised to for data collection. The interviews represented the most important source of information. The interview schedule, which was aligned to the research questions was developed and it contained eleven questions. This was mainly to ensure that the information was recorded properly and there is consistency in the questions being asked. The scheduling and the mode of conducting the interview was done at the convenience and, in terms of the accessibility, of participants. The informed consent information sheet and consent form that provide the background of the research were sent to all participants using email.

The interviewees were guaranteed anonymity and some gave permission to audio record the interview. Once the data were collected they were then entered into Microsoft Excel for analysis. A thematic data analysis was chosen as the suitable method to analyse data for this study. This process was efficient and time-saving. The questions that were contained in the interview scheduled led to the emergence of themes which were closely related to the research objectives.

### **1.8. Contribution of the study**

This was a preliminary study conducted in the TPL division regarding the impact of implementing a new business venture for the organisation. There were two main aims:

- Firstly, to add value to the academic discourse on the impact of implementing a new business venture for the organisation; and
- Secondly to support the business needs by providing insights, strategies and skills required for state-owned enterprises to implement the new LNG strategy.

## **1.9. Chapter outline**

This study contains five chapters which record the logical flow of the research process undertaken. The details of these chapters are as follows:

### **Chapter One: Overview of the study**

This chapter provides the context of the study by outlining the background, the aim and objectives of the study, whilst also providing an understanding of the problem statement. The research sub-questions, methodology and contribution of the study were also presented.

### **Chapter Two: Literature Review**

This is a literature review chapter which examines and synthesises relevant literature for the current study. The chapter outlines the available literature and then finds gaps that exist in the available literature. The chapter also explains the key terms under organisational growth strategies, on organisational growth strategy, diversification, diversification in State Owned Entities, organisational readiness and leadership in an organisation.

### **Chapter Three: Research Methodology**

This chapter presents the research methodology and provides the motivation for the selected methodology chosen. The chapter outlines the research design and methods, the location of the study, the population of the study, the sampling methods, the interview schedule construction and the administration thereof. The ethical considerations, analysis of data, validity and reliability of the study are also addressed as well as the research limitations of the study.

### **Chapter Four: Presentation and Analysis of Data**

In this chapter, data resulting from this study is presented and then analysed. Some sections of the results are presented with the aid of tables where necessary.

### **Chapter Five: Discussion of Findings**

This chapter discusses the findings presented as per the preceding chapter.

### **Chapter Six: Conclusion and Recommendations**

This is the concluding chapter of the study. The answers to the research questions and the findings of the study are summarised. Recommendations based on the study analysis are also presented.

### **1.10. Chapter Summary**

The chapter provided the background and the aim and objectives of the study, whilst providing an understanding of the problem statement. The research sub-questions were defined and the study methodology was declared. The contribution of the study was also highlighted as it informed both practice and theory. This chapter therefore served as a broad structure and introduction to the study and served as a predecessor for the remaining chapters. The following chapter presents the literature that was reviewed for this study.

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1. Introduction

The review of literature was based on books, journal articles obtained from electronic databases such as EBSCOhost, Emerald and Science Direct which were accessed through the University of Kwa-Zulu Natal (UKZN) electronic library and Transnet Freight Rail electronic knowledge centre as well as Google Scholar were also utilised to search for relevant literature. This chapter covers the work of different authors concerning the global energy sources, liquefied natural gas, and organisational growth strategies with specific emphasis on organisational diversification, organisational readiness which included leadership and employee readiness. This chapter aims to establish a firm foundation on which the findings of this study are going to be based upon. The key terms that used in the study are defined in the following section.

#### 2.2. Definition of key terms

This sub section defines all the terms used in this study. Although not all the terms used in the study are defined in this sub section, but the key terms are highlighted to bring about common understanding the concept of the research topic. The key terms used are: organisational diversification, organisational growth strategy, organisational readiness related and unrelated diversification. The definitions of these terms are tabulated below.

**Table 2.1. Definition of key terms**

<b>Terms</b>	<b>Definition</b>
Organisational diversification	Diversification is a strategic approach for entering other markets with new products and it is usually utilised by organisations when they discover alternative opportunities in the market (Durmaz & İlhan, 2015).
Organisational growth strategy	A growth strategy that is used by companies for expanding, developing, sustainability and success of the business and these strategies include aspects such as; market penetration, market development, product

	development and diversification (Absanto & Nnko, 2013).
Organisational readiness	This refers to the organisations' members' shared commitment to change and to the belief that there is a collective capacity to change (Weiner, 2009).
	Organisational readiness focuses on possessing the appropriate skills at the appropriate time in terms of leadership and employee skills particularly in implementing a new strategy and the degree to which members of the organisation are willing to participate in and support a certain undertaking (Gudergan, Buschmeyer, Krechting, & Feige, 2015).
Related diversification	A diversification strategy is associated with expanding business either through acquisition of competing products or services or development of new products or services internally (Rizea, 2015).
	Related diversification refers to ventures that are related to businesses that an organisation is already engaged in (Chang et al., 2013).
Unrelated diversification	This means diversifying into businesses that have no obvious connection to the organisation's existing operations (Chang et al., 2013).

The terms defined in table 2.1. above are the most used in the study and it is important to provide these definitions for the readers to have a common understanding of the research problem. The following section will

## **2.3. The Global Energy Sources**

Energy is one of the production units in the economy responsible for driving all kinds of economic activities and it is used for electricity, transportation, heating and manufacturing of all types of products (Edomah, 2018). There are several sources of energy that are used globally for different purposes and they fall into one of the two categories of energy: renewable and non-renewable energy.

### **2.3.1. Renewable Energy**

Renewable energy resources comprise of any of the following, wind, solar, biomass, geothermal energy and hydropower (Botha, 2017). Additionally, they produce less pollution than non-renewable energy sources and have potential to decrease reliance on fossil fuels while reducing carbon emissions. The development of renewable energy technology is rising and its use is becoming more widespread (Energyfive, 2017). This view is supported by Anderson & Hsieh (2017) by suggesting that renewable energy is an emerging and rapidly growing technology. Further, the investment on the renewable energy is growing on a yearly basis and some global petroleum companies (i.e. Total) have invested a massive amount of financial resources to the renewable energy. In one of the energy scenarios, BP's forecast for 2040 suggest that renewable energy is growing at a rapid pace as one of the sources of energy and it contributes half of the growth in global energy supplies and becoming the largest source of power by 2040 (BP, 2019).

In 2015, there was an increase in renewable energy investment in investment in renewable energy in developing economies compared to developed countries for the first time (Anderson & Hsieh, 2017). In meantime, there has been a decline in renewable energy investment in the developed economies since the peak in 2011. The most common advantage of the renewable energy is its cleanliness harmless and unlimited way of generating energy and the world is recognising this (Energyfive, 2017). Harmful gases (such as CO<sub>2</sub>) and waste are not released onto the natural environment when using renewable energy sources and that is why renewable energy is regarded as friendly to the environment. However, some of the disadvantages of renewable energy are less production of energy, expensive investment unit costs and prolonged depreciation times. Additionally, the other major disadvantage of renewable energy is that the production facilities depend greatly on external environmental conditions. Although the disadvantages of

renewable energy are outweighed by the advantages, it is still in developmental stages and it is not used widely by many countries. The non-renewable energy sources are discussed below with more emphasis on natural gas for the purpose of this study.

### **2.3.2. Non-renewable Energy**

Most energy use worldwide is produced from fossil fuels which are non-renewable, such as petroleum, natural gas and coal (Johansson and Thollander, 2018). Fossil fuels are undeniably the most used fuels all over the world for generation of electricity and power (Chris, 2011). The growth in population and the economy are the main sources of energy demand.

#### **2.3.2.1. Coal**

Due to its availability, most of the developing and developed world, has been using coal as a main source of fuel for centuries (Chris, 2011). Most power plants use coal more than any other fossil fuel. There are two coal exploitation methods used, namely, the opencast mining and the underground exploitation. There is a possibility for the new and innovative method called underground coal gasification (UCG) that is being considered and is currently being piloted. Coal is mainly used for electricity production (Musial, Sermet & Niec, 2017). Chris (2011) suggests that some of its advantages include availability, affordability, reliability, well-known technologies, efficiency and safety. However, there are some considerable disadvantages of coal including GHG emissions, mining destruction, sizeable generation of waste and emission of dangerous substances.

#### **2.3.2.3. Natural Gas**

Natural gas is a relatively cheap and clean energy source that is environmentally friendly (Bašová, 2018). In order for the gas trade to succeed, cooperation and commitment between countries that have sufficient reserves is required, especially those countries planning to build partnerships. Diversification of energy sources is greatly supports the security of energy supply. In the long term it is projected 2% annual increase in demand of natural gas in all regions of the world. Additionally, investment in energy efficiency is meant to enable transition to a lower carbon

economy and reduce dependence on coal-generated electricity (Musango et al., 2014).

The growing supply and demand of natural gas has resulted in it becoming the fastest-growing fossil fuel and this in turn resulted in the announcement of billions of dollars of capital investment (Nichols, 2016). Although natural gas is one of the fossil fuels, it is a preferred option to minimise the carbon dioxide emissions and thus the quality of air improves. LNG is mostly used as fuel in the transport industry, mainly in vehicles such as trucks, locomotives and other similar types of vehicle (LTPF, 2016). A study that compared the emissions of coal and natural gas used for electricity generation in the United States of America showed that, natural gas is a cleaner energy source when using the existing power generation technology (Jamarillo, et al., 2007).

International exploration and production companies are attracted to Africa's natural gas resources because they intend on meeting demand for products in growing markets, such as India and China. Additionally, this is expected to set in motion construction of onshore pipelines that will connect gas production fields to LNG infrastructure (Oirere, 2018). There are numerous gas projects ongoing in different parts of Africa, but they remain hindered by lack of infrastructure, as well as slow financing guarantees and uncertainty about hydrocarbon regulations that will directly impact on the achievement of the anticipated 128 per cent increase in gas demand by year 2040 (Oirere, 2018).

#### ***a. Liquefied Natural Gas***

When natural gas is converted into liquid, it is called liquefied natural gas (LNG). At -162 °C in the presence of atmospheric pressure natural gas is converted to liquid. The liquefaction process reduces the volume of natural gas 600 times of its original volume to make it easier to transport the gas from one place to another (Hussain, 2019). LNG is forecast to become one of the most valuable commodities in the world and its global trade is expected to increase from approximately 240 MMtpy in 2014 to about 420 MMtpy in 2025 (Nichols, 2016). Most emerging markets in South East Asia are pursuing natural gas and liquefied natural gas capacity and infrastructure. The demand for gas is currently dominated by North Asia with Japan being the world's largest LNG customer (Sutcliffe, Gastech 2017). The development of new

LNG infrastructure and the extension of existing projects have met inconsistent outcomes in Africa, with political challenges faced by countries such as Ghana on their export project and the success in shipping of its first cargo from Golar, LNG's newest venture, in 2018(Oirere, 2018).

Although there is some progress in the development of LNG projects in Africa, commitment from respective governments is required to address concerns about emissions, political uncertainty and other related challenges that impact directly on LNG development (Oirere, 2018). The gas transmission pipeline projects around Africa are likely to be positively impacted by the increase in public investment of gas power plants in Africa, the recovering global oil prices and continuing insecurity in key producer markets. The Outlook for Energy (2017) revealed that natural gas will be positioned as the leader in fossil sources by 2040. Southern Africa lacks a developed gas transport infrastructure network. Distances between production and consumption centres are large which requires networks achieving economies of scale to be viable, yet markets are insufficiently developed to absorb economic volumes.

There are major changes in the LNG markets where the increase in customer focus is observed (KPMG, 2015). LNG exports are seen to be crucial in the facilitation of economic growth in African countries (Smith & Herscowitz, 2016). The current uncertain global situation offers a number of insecurities specifically in the environmental, as well as economic and political spheres that could squeeze the LNG market faster than anticipated (Sekiguchi, 2019). The reduced cost of regasification and the role of natural gas as an option to clean energy systems presents opportunities for suppliers (KPMG, 2015). Floating Storage Regasification Units (FSRUs) which are deemed to ease of market access and the availability of competitively priced LNG are unlocking new markets (Sekiguchi, 2019).

The increasing production of natural gas throughout the United States supports the growth of the LNG market (Suter & Wilson 2015). Furthermore, this growth has led to a considerable increase in development of differently sized (small, medium and large scale) LNG facilities. There are some benefits in terms of lower engineering costs, so it is a relatively good time to build pipelines and liquefied natural gas (LNG) plants, but only if investors are confident that those projects will generate sufficient

revenues in the long term (Ford, 2016). There has been a great deal of discussion on broadening the base of African gas production to include new LNG producers in Mozambique and Tanzania, plus the development of marginal fields in Cameroon and elsewhere for local power generation (Oirere, 2018).

It is feared that the development of planned LNG plants in Mozambique and Tanzania could be delayed by a combination of low prices and a glut of new production capacity that is due to come on stream after 2020, which could continue to depress prices unless the market recovers quickly (Oirere, 2018). In addition, there are a myriad of technical hurdles and regulatory obstacles that need to be crossed before commercial production can begin, and many in the industry complain that governments have been too slow to act, usually because of a lack of industry knowledge. The cost of energy strategies and the limited knowledge and awareness of these strategies are the two major barriers against the implementation of these strategies (van der Westhuizen & Young, 2018). This section provided an overview of the global energy sources, the next section discusses the South African energy mix.

## **2.4. The South African Energy Mix**

In order to reduce dependence on a limited number of energy sources, South Africa continues to pursue a diversified energy mix (DMRE, 2019). The South African Integrated Energy Plan (IEP) is a strategic, multi-faceted framework which considers the important role that the sources of energy play in the economy and this planning process is effected to establish the suitable approach to achieve current and future energy needs in the most effective and efficient manner (DoE, 2018). This section briefly discusses the South African energy mix as described in the Department of Mineral Resources and Energy's Integrated Resource Plan (2019).

### **2.4.1. South African Coal Market**

Coal is the most abundant form of fossil fuel in South Africa, this is why there are many existing and newly established coal powered power stations (DoE, 2018). Additionally, this makes South Africa the 5th largest coal reserves producer in the world, which is valued at approximately 66.7 billion tons (DMR, 2016). Due to the existing energy generation infrastructure, coal remains the dominating source of

energy for electricity generation in South Africa continues to be coal, and also provides for about 50 % of South African energy needs (DMRE, 2019).

#### **2.4.2. South African Renewable Energy Market**

The constantly increasing cost of conventional fossil fuels energy, the next feasible alternative is renewable energy (DoE, 2018). Furthermore, South Africa is presently rated as the 12th most attractive investment for renewable energy. At the same time South Africa has an abundance of sunshine which lends itself very well for solar water heating and electricity generation. Renewable energy is energy generated from any of the following sources, wind, biomass, solar and concentrated solar power (CSP), and small hydro technologies. These sources offer an opportunity for energy diversification (DMRE, 2019). Additional benefits include possible tax rebates, lower operating costs, and an improvement in an organisation's corporate social responsibility. There are, however, also barriers to implementing such strategies, including high capital implementation costs; limited knowledge, education and awareness; limited incentives and finance; a weak services market; and a lack of technological support (Botha, 2017).

Before the year 2010, the renewable energy sources 2030 target for South Africa's ranged between 15% and 29% (Edkins et al., 2010), however, the country is currently forecasting a gradual increase in capacity of renewable energy by 9% of the total supply of electricity capacity in South Africa's by 2030 (DoE 2013). Additionally, should the growth of the country's economy remain constant at 2-3% ranking, renewable energy will only contribute 6% of the overall electricity supply of the country by 2030 (WWF, 2014).

#### **2.4.3. South African Natural Gas Market**

According to DMRE (2019) South Africa has limited established natural gas reserves, which are at 27 million cubic metres. The technology for gas to power provide the flexibility required to complement renewable energy. Although in the near future, the prospect is to pursue the importing of gas options, there is also an opportunity for local and regional gas resources will allow for an increase in supply. Investigations to assess the scale of local shale that is recoverable and coastal gas are being conducted (DoE, 2018). Furthermore, cooperation and collaboration with neighbouring countries is being carried and possible partnerships are being

established so that exploitation and beneficiation for natural gas can be jointly conducted in the SADC region (IRP, 2019). The main players in the natural gas industry in South Africa include but not limited to Sasol Gas, i-Gas, The National Energy Regulator of South Africa and PetroSA. In 2015, natural gas made up 3% of the total primary energy supply in South Africa. Natural gas domestic production amounted to 26% in 2015 whilst imports amounted to 74% during the same period.

The short term and long term infrastructure requirements are being developed through the SADC Gas Master Plan (DMRE, 2019). Additionally, this is to allow for the development of a natural gas market. In one of the energy scenarios, BP also forecast for natural gas suggests that the gas market grows vigorously supported by the ongoing growth of liquefied natural gas (BP, 2019). South Africa is rated as the 14th major greenhouse gas emitter (Musango et al., 2014). One of the barriers to the development of natural gas may be construction of transport infrastructure that is capital intensive and the impact on the geographical area through which the pipelines infrastructure is built (Bašová, 2018).

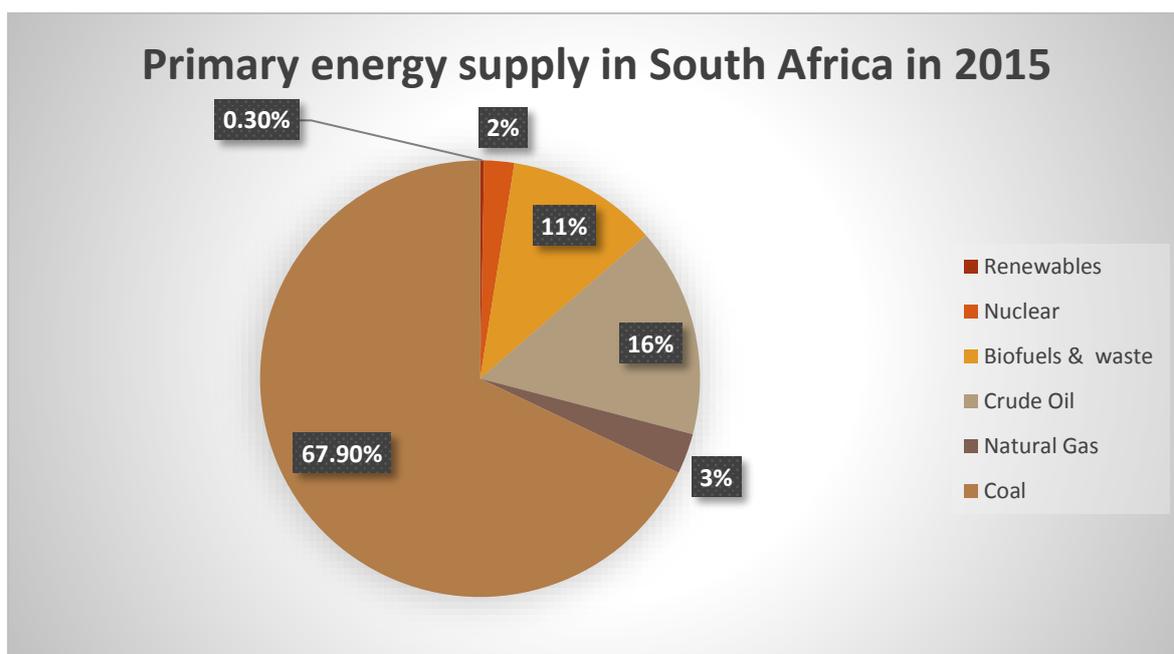


Figure 2.1. Figure 1: Primary energy supply in South Africa in 2015 (International Energy Agency, 2015 as cited in Edkins et al., 2010).

The primary energy supply for South Africa are illustrate by figure 2.1. above which clearly shows that coal supply is at 67.90% of the country's supply. This energy supply caters for different industries demand as illustrated by figure 2.2. below.

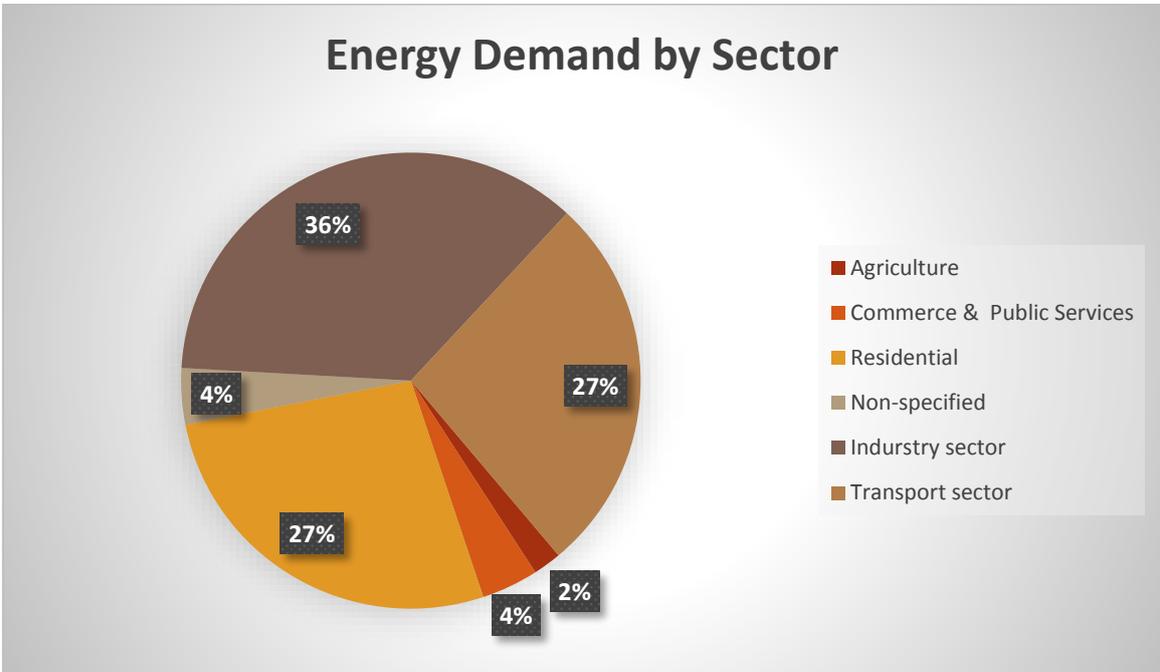


Figure 2.2. Energy Demand by Sectors (Source: DoE Energy Balances, 2015)

Figure 2.2. shows energy demand by sector, with the industry sector being the highest at 36%, followed by transport sector and residential at 27% respectively. This section provided an overview of the South African energy sources, their supply and demand overview as well as the key energy policies and legislations. The next section presents the liquefied natural gas market in South Africa, the liquefied natural gas value chain, the liquefied natural gas skills as well as the LNG project in Transnet Pipelines.

**2.4.3. South African Key Energy Policies and Legislations**

There are several policies and legislation that govern and regulate energy in South Africa and they are briefly illustrated on Figure 2.2. below.

Policy / Legislation	Objectives
White Paper on the Energy Policy, December 1998	<ul style="list-style-type: none"> <li>Increasing access to affordable energy services</li> <li>Improving energy governance</li> <li>Securing supply through diversity</li> </ul>
White Paper on Renewable Energy, November 2003	<ul style="list-style-type: none"> <li>Sets out Government's vision, policy principles, strategic goals &amp; objectives</li> <li>Government's RE goals, and how the Government intends to achieve them</li> </ul>
Nuclear Energy Policy, October 2008	<ul style="list-style-type: none"> <li>Promotion of nuclear energy as an important electricity supply option</li> <li>Creation of a framework for safe and secure utilisation of nuclear energy</li> </ul>
Integrated Energy Plan (IEP)	<ul style="list-style-type: none"> <li>To guide the development of energy policies</li> <li>To guide the selection of appropriate technologies to meet energy demand</li> <li>To propose alternative energy strategies</li> </ul>
Integrated Resource Plan (IRP) 2010-30	<ul style="list-style-type: none"> <li>Electricity infrastructure development plan</li> </ul>
National Energy Act, 2008	<ul style="list-style-type: none"> <li>Ensures that diverse energy resources are available in sustainable quantities and at affordable prices in South Africa.</li> </ul>
The Gas Act, 2001	<ul style="list-style-type: none"> <li>To promote the orderly development of the piped gas industry;</li> <li>To establish a national regulatory framework;</li> </ul>

Figure 2.3 South African Energy Policies and Legislation (Source DoE, 2018, p4)

This section provided a list of some of the policies and legislation that govern the energy industry in South Africa and the objective for each. The South African liquefied natural gas market is discussed in the next section.

## 2.4. Liquefied Natural Gas Market in South Africa

Addressing the issues of greenhouse gas emissions has become a global priority that involves both organisations and human beings (van der Weshuizen & Young, 2018). Natural gas hold a vital strategic status in the energy market (Bašová, 2018). Although this is the case, the developing countries have found themselves trailing behind on this drive including South Africa which is facing rapid industrialisation and its primary source of energy being coal (KPMG, 2015). It is therefore important for South Africa to develop and implement energy management strategies which will support and improve the country's overall culture of energy management awareness. South Africa is confronted by serious energy limitations, and the government plans to increase the country's reliance on natural gas (KPMG, 2015).

The high cost of diesel has led to government instructing the South African power supplier, Eskom to change the mode of power from diesel to gas on its generators (KPMG, 2015). Therefore, South Africa cannot avoid the use and development of natural gas as well as LNG. Although there is currently some gas supply and distribution in South Africa through Sasol to north eastern parts of the country, further development of gas infrastructure is required which includes LNG import

terminals, transmission pipelines, storage and regasification facilities, as well as secondary distribution pipeline (LTPF, 2016). Additionally, the infrastructure will also assist in moving gas through the pipelines to the regional demand centres and then secondary distribution pipelines will distribute to individual customers. The different uses of natural gas are illustrated in figure 2.3 below. The figure shows that there are several uses from electricity generation to transportation. Gas is used in different industries for a number of reasons.

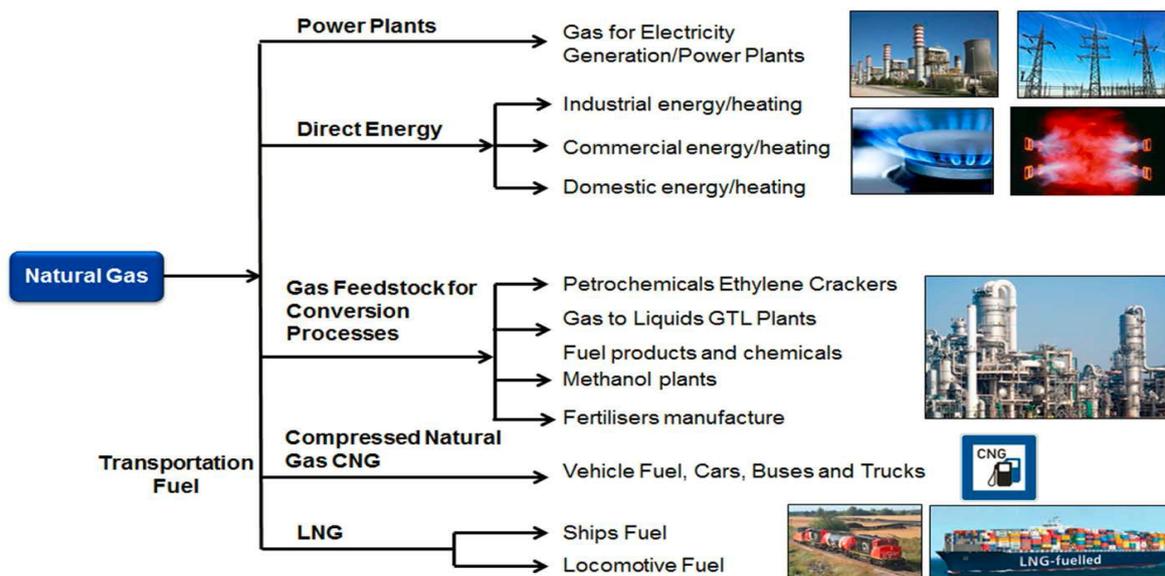


Figure 2.4. Uses of Natural Gas (Source: Transnet SOC Ltd LTPF 2016, p374)

Government gives permission to explore or produce mineral resources through the Mineral and Petroleum Resources Development Act and there are proposals for amendments to the Act and revisions to related oil and gas legislation is underway (LTPF, 2016). South African power utility Eskom, which is the biggest power company in Africa, has already developed several gas-fired power plants in coastal areas but GSG-fired plants would offer an excellent alternative to coal as power plant feedstock in the heart of Southern Africa (KPMG, 2015).

## 2.5. Liquefied Natural Gas Value Chain

There are three main segments in the gas value chain, namely, upstream segment, midstream segment and downstream segment (Edomah, 2018).

### **2.5.1. Upstream Segment**

The LNG value chain begins from upstream where exploration and production processes take place (Smith & Herscowitz, 2016). The upstream business deals with exploring and production of natural gas from underground gas reservoirs that are usually located offshore (Edomah, 2018). Furthermore, gas exploration involves some activities such as drilling operations, geophysics assessment and design, as well as the development of the gas field. On the other hand, production basically involves bringing the gas to the surface. In this part of the value chain direction and guidance is provided in order to decide on the investment and maintenance plans, as well as plans for resources (including finance) to manage the assets that support the achievement of desired outcomes (Smith & Herscowitz, 2016).

Historically, there is more risks associated with the upstream business than any other segment and this remains true to this day. (Edomah, 2018). Additionally, organisations that operate in this segment understand the risks associated with it and have developed proper mitigations to deal with any of them if they were to materialise. Contracts must be drawn and agreed upon for acceptance of gas and to begin supplying consumers (Smith & Herscowitz, 2016). The next segment of the value chain is the midstream where processing and transportation occurs.

### **2.5.2. Midstream Segment**

The midstream segment involves obtaining the gas from the upstream to the consumers. This segment involves the processing phase, where regasification occurs, this is when the temperature is increased so that LNG can be returned to its natural gaseous form (Smith & Herscowitz, 2016). This type of business also involves pipelines transportation, liquefaction and storage of natural gas occur (Edomah, 2018). Furthermore, most midstream gas businesses are “toll road” businesses involving processing plants storage facilities and pipelines. A fee is charged to their customers for using their transportation and/or storage facility. Most organisations in this industry have interest in this segment (Edomah, 2018).

Most of the midstream normally takes place at an onshore import terminal with docking facilities for the LNG carrier and cryogenic storage tanks to store the LNG until it can be regasified in the plant. This is the appropriate time for the LNG

development project team to complete the bankable commercial structures which include all possible LNG solutions. Finally, although specialised cryogenic expertise is required for midstream, the capital costs are much lower compared to the upstream and for liquefaction. The final segment in the LNG value chain is downstream where liquefaction to shipping and distribution to the consumer happens (Smith & Herscowitz, 2016), and it is discussed in the following section.

### **2.5.3. Downstream Segment**

The downstream segment deals with those that convert gas produced to useful forms of energy for the consumers. These can be refineries, marketers, to gas to power plants, industrial consumers as well as other utilities applications (Edomah, 2018). Furthermore, downstream is where buyers and sellers account for the changing local and international market conditions (Smith & Herscowitz, 2016). The marketing and trading of LNG entail careful planning so that profits are produced to satisfy all stakeholders and to allow for growth if this is the anticipated outcome (Smith & Herscowitz, 2016).

Assurance in terms of the infrastructure implementation is required from relevant countries to obtain maximum domestic benefit from the LNG value chain, which includes the construction of gas power infrastructure required for delivery to consumers and some of the markets have relied on gas pipeline for a long period (Smith & Herscowitz, 2016). Providing LNG is dependent on gaining access to infrastructure and African developers need to create adequate demand (KPMG, 2015). When importing natural gas, it is crucial to have storage capacity for natural gas from ships and a regasification units to convert LNG back into natural gas state.

Figure 2.2 shows the summary of different natural gas value chain segments and the activities associated with them. The upstream, midstream and downstream are shown accompanied by specific key features for each element of the value chain where examples of activities for each are also indicated. Edomah (2018) argue that in the oil and gas industry, businesses have historically made the most returns from the midstream and downstream sector more than the upstream sector. This is due to the very volatile nature of the upstream business (Edomah, 2018).

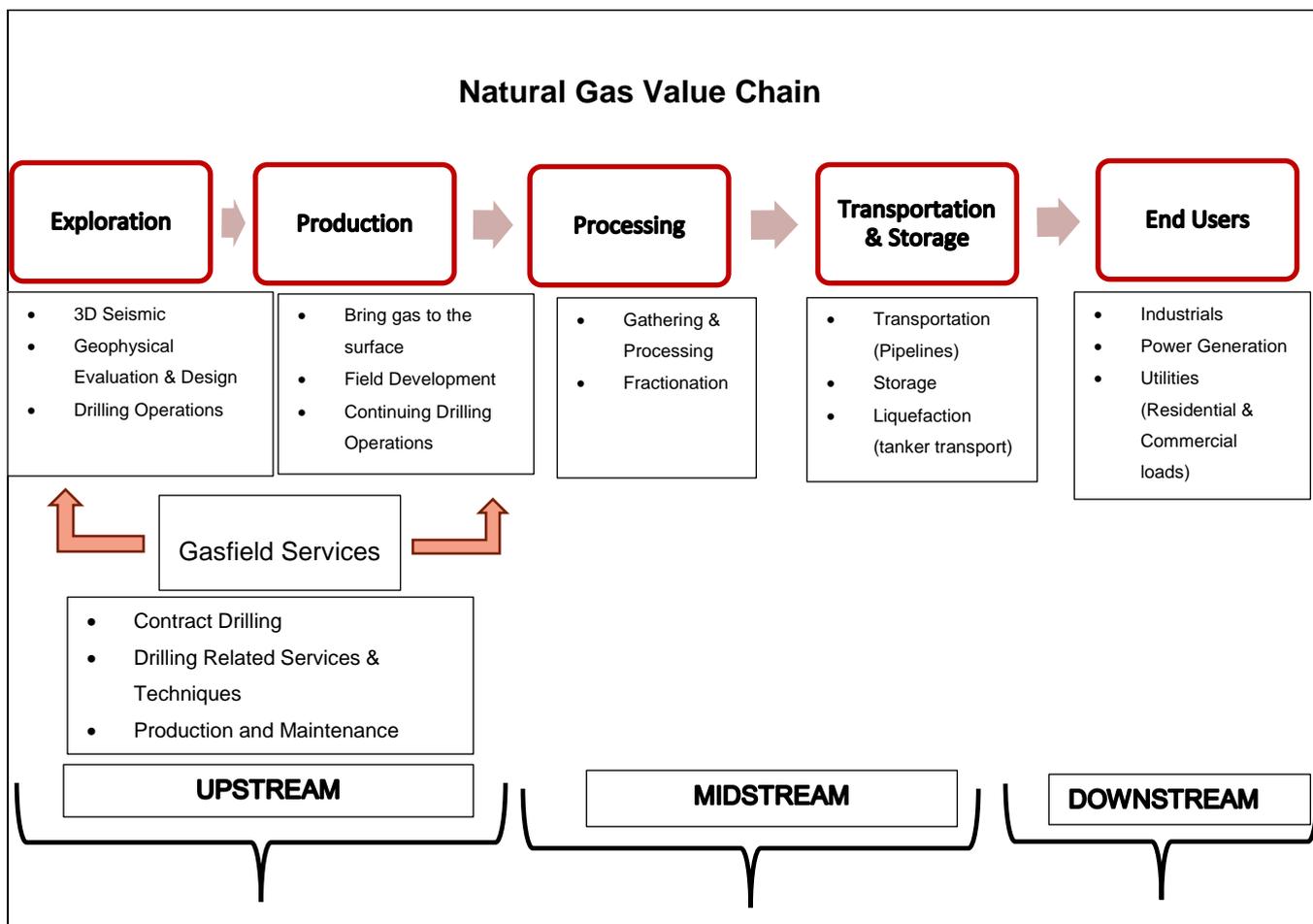


Figure 2.5. The natural gas value chain (Source: MOGA, 2016 as cited by Edomah, 2018, p3)

For any organisation to actively participate and operate in any segment of the value, certain specified skills are required. The required LNG skills are discussed in the next section.

## 2.6. Liquefied Natural Gas Skills

Most countries exploring the establishment or grow natural gas use, may not possess the necessary technical and operational skills and capability required to develop, manage and maintain the natural gas business (Smith & Herscowitz, 2016). Operators, contractors and support service companies face great challenges regarding attracting and retaining talent in the LNG market (Harrier, 2013). Additionally, the countries' existing laws and regulations that govern and regulate may be sufficient for the development of LNG, however, they may lack experience and skills required to develop a significant natural gas infrastructure. Finally, the complex skill sets required to deliver LNG projects requires a long-term investment in training and development across areas of technical skills deficit including engineering and geo-sciences.

Government and regulatory approval must be obtained on a host of complex, inter-related factors covering every aspect of design, implementation, execution and production, from environmental responsibilities and community engagement through to health and safety measures and sustainable energy strategies. And each of these considerations has implications for talent too, with often highly specialised knowledge and experience being required that at the best of times may be thin on the ground (Harrier, 2013). They further suggest that the nature of the industry means companies need to work very hard to attract the most talented candidates with LNG sector experience. Even if operators are prepared to pay premium salaries, it is becoming increasingly important to find other ways to differentiate themselves from competitors.

The LNG sector's labour shortage comprises two distinct but overlapping elements: construction, with talent required for planning, commissioning and building facilities, and operations, and for those responsible for exploration, production and output. Operations people with the right qualifications and experience (and a willingness to commit) are in high demand and short supply – to the extent that many in the industry are investing more in training and developing people, from apprentices and graduate trainees to those with transferable skills from energy, heavy process engineering and power sectors (Harrier, 2013). Identification of required skills needs to happen as early as possible during the planning phase of the project for training to be planned and provided to avoid project delays and this training provided by combining formal and on-the-job-training (Smith & Herscowitz, 2016). Furthermore, the ideal time to consider training for LNG export and import projects, is during the initial assessment of the project's viability, through all the project phases.

Unlike the past workforce where manual labour was more prevalent, more automation increased in most industries for efficiency in recent years (Howell, 2017). For this reason, it is important that organisations' employees are empowered to have programming, automation control and other science, technology, engineering and mathematics related skills. Technological evolution and extinction of old practices requires organisations to manage and implement change successfully to survive and thrive in today's business environment (Bloir & Scheer, 2017). Bawany (2017) emphasised that as digital transformation expands across the organisations

and new skills are required. At the same time, investment in technological development and skills is critical for African countries to reap the economic benefits (Fofack, 2018).

Over recent decades, the skill mismatch and prolonged shortage of skilled workers and technical expertise across key strategic industries and sectors of production have been illustrated by the massive outsourcing of infrastructure development. However, adapting skills to the market must be accompanied by establishment of world-class research institutions and economic infrastructure to sustain growth and expansion (Smith & Herscowitz, 2016).

## **2.7. Liquefied Natural Gas Project in Transnet Pipelines**

Transnet is exploring prospects to diversify into the liquefied natural gas (LNG) market (Transnet, 2019). Furthermore, Transnet Pipelines is planning to participate in the construction, operations and maintenance of the first LNG Terminal in South Africa, and therefore, positioned as a future operator of LNG terminals. Transnet pipelines is anticipating to successfully diversify into the LNG market with well-positioned infrastructure to ensure that the LNG terminal and associated pipeline infrastructure services meet market requirements (reliable, cost effective and efficient) by the year 2024. Transnet's contribution to the national agenda is to enable the development of a natural gas economy, lower energy cost and reduced carbon emissions (Transnet, 2019). The plan is to independently manage the midstream infrastructure integrated Port (marine and regasification) facilities and gas transmission networks (pipelines and virtual) from KwaZulu-Natal to inland regions and supporting Eastern Cape and Western Cape gas market developments. This will be done in partnership with private sector sponsors and operators.

The target date for landed LNG in South Africa is 2024, assuming that the required regulatory approvals are secured. If Transnet manages to secure proper project financing from government, the following are planned to be achieved between the years 2024 – 2026:

- LNG import and regasification in Richards Bay by 2024;

- Seed the market for a doubling of natural gas use in the wider economy from 2025; and
- Enable gas-to-power generation in line with government Integrated Resource Plan from 2026.

Some of the challenges identified for the southern region in short-term gas supply:

- Gas supply will be constrained from the year 2023;
- Serious security of gas supply implications for South Africa, absence of major finds of gas in the region.
- Although there is a lot of gas usage in Southern Africa, there is little mention of current and future industrial gas requirements in energy planning (Transnet, 2019).
- The project execution that includes engineering, procurement, and construction (EPC), business establishment, commissioning and start-up are planned for 2023-2024.

## **2.8. Organisational growth strategy**

Organisational growth is one of the most prevalent corporate strategies, it is about expanding the business in terms of assets, sales and profits (Absanto & Nnko, 2013). The authors further explain that growth strategies are not one size fits all, they need to be customised for every business according to its specific industry. Crawford (2013) supports this view by stating that organisations must ensure that their growth strategies are aligned to their overall growth goals. Durmaz & İlhan, (2015) note that there are numerous reasons that influence organisations to grow and the most important is that growth provides organisations with competitive advantages and it improves the companies' resilience.

Most organisations determine appropriate growth strategies according to their organisational structures and competitive environment (Durmaz & İlhan, 2015). Growth strategies are used by companies for expansion, development, stability and success of the business and one of these strategies is diversification (Absanto & Nnko, 2013). Rizea (2015) argues that when an organisation makes a decision to grow, it is also needs to decide strategically whether or not to diversify. Although there are several growth strategies that companies may use, focus is placed on

diversification for the purposes of this study. The following sub section discusses organisational diversification.

### **2.8.1. Organisational diversification**

Organisational diversification is one of the researched topics in the business world, with researchers offering an array of arguments and suggestions on how to implement diversification in different organisation. This section looks at what is organisational diversification, types of organisational diversification as well as diversification theories. Several studies suggest that diversification strategies are more likely to be profitable in developing economies (Absanto & Nnko, 2013; Anil et al., 2013). Many authors have shown in their studies that diversification is an effective strategy, but there are still some researchers who hold different views (Afza et al., 2008). Diversification is a strategy used to enter new markets with new commodities when new market opportunities are identified (Durmaz & Ilhan, 2015).

Rizea (2015) suggests that diversification is one of the alternative routes that a company may take to expand its portfolio in terms of growth. Furthermore, an organisation may also diversify when the current products are not aligned to the growth path or if no profit is realised in the current operations. Eukeria & Favourate (2014) assert that diversification continues to be a vital strategy business growth worldwide. Eukeria & Favourate (2014) agree with this assertion by stating that diversification strategies are employed by organisations to grow operations through offering different products and services.

Chirani & Effatdoost (2013) suggest that there are several reasons that influence organisations to diversify; it may be meeting customers' multiple needs or a survival strategy (Absanto & Nnko, 2013). The aims of diversification by organisations management of risks, increasing profit, better market share, and efficient and adequate use of financial and human resources (Yigit & Behram, 2013). Scur & de Queiroz (2017) suggest that the process of diversification in an organisation must be evaluated from the perspective of growth based on knowledge to maximise efficiency. Most companies that consider diversification do it along two dimensions which are; geographical footprint and product type (Oh & Contractor, 2014). Kannan & Saravanan (2012) state that diversification strategy involves acquiring new skills, techniques and facilities for organisations. The types of diversification organisations

may consider when deciding to diversify their business are discussed in the next section.

## **2.8.2. Types of organisational diversification**

When an organisation decide to pursue business diversification, a decision must be taken on what type of diversification is going to be most suitable to support their business model. There are two types of diversification that organisations may choose from, namely, concentric or conglomerate diversification (Chirani & Effatdoost, 2013). These types are discussed briefly below.

### **2.8.2.1. Concentric diversification**

According to Rizea (2015) concentric also known as related diversification is a diversification strategy which relates to growing a company either through acquisition of competing products or services or through development of new products or services internally. Related diversification refers to diversification into ventures that are related to businesses that an organisation is already engaged in (Chang et al., 2013). This enables an organisation to retain and maintain its existing skills and competencies and share resources across different business units. Some companies employ a concentric diversification approach to maintain and improve performance (Absanto & Nnko, 2013).

Related business has a strategic attractiveness because it allows for skills transfer, lower costs and a stronger competitive advantage (Kannan & Saravanana, 2012). In this type of strategy, the key decision-makers of the acquiring company ensure that they choose new businesses that are highly compatible with their current business (Kannan & Saravanana, 2012). Thus, they search for new companies whose products, markets, distribution channels, technologies, and resources are familiar but not identical to their own. Furthermore, this type of diversification holds a strategic attractiveness from numerous perspectives such as skills transfer, decreases cost, similar brands, as well as competitive advantage in the market. The following barriers to concentric diversification are noted by the authors as depicted in figure 2.3 below.



Figure 2.6. Barriers to concentric diversification strategy (Source: Kannan & Saravanana, 2012, p71)

This section covered the advantages of concentric diversification as well as possible barriers. The following section discusses conglomerate diversification and some of its barriers are also looked at.

### **2.8.2.2. Conglomerate diversification**

According to Castan˘er & Kavadis (2013) conglomerate also known as unrelated diversification is defined as a diversification strategy that broadens the organisation's existing operations. Conglomerate diversification refers to diversification into businesses that have no obvious connection to the organisation's existing operations (Chang et al., 2013). A conglomerate is when two or more companies come together to engage in entirely different businesses to form one organisational structure, usually involving a parent company and numerous divisions (Absanto & Nnko, 2013). Furthermore, this type of business occurs in completely different markets with different and new products. Conglomerate diversification strategy gives organisations an advantage when they experience low sales and profits in their existing businesses and the main reason for acquiring an organisation is its profitability (Wheelen, & Hunger, 2012).

Ramaswamy, Purkayastha & Pettitt (2016) found that although overall diversification had a positive impact on companies' performance, unrelated diversification resulted in poorer performance compared to related diversification strategies. Kannan & Saravanana (2012) point out a different view highlighted by the study conducted by

Michael Porter's which suggests that, when compared, related company is marginally more profitable than the average concentric company and he also noted that the advantages of this strategy in different companies include:

- Exceptional skills of top leadership teams;
- Risks the business may be facing are scattered over diverse industries;
- Organisation's financial resources can be invested in industries that present the best profit forecasts;
- Developing shareholder value; and
- More profits based on general organisational competencies.

However, there are several barriers to Conglomerate diversification as illustrated in Figure 2.4. below.

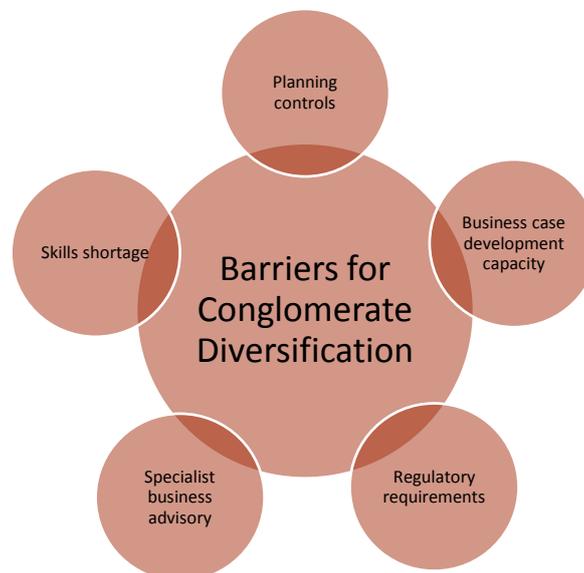


Figure 2.7. Barriers to conglomerate diversification strategy (Source: Kannan & Saravanana, 2012; p71)

This section covered the advantages of conglomerate diversification as well as possible barriers. Given the discussions above, organisations including SOE need to consider the benefits and barriers of using any of the diversification strategies.

### **2.8.3. Organisational diversification theories**

There are several theories that describe the options that companies consider when diversifying their businesses. For the purposes of this study, three theories will briefly be discussed. These theories are: exclusive theory, process theory and disruption theory (Chirani & Effatdoost, 2013).

### **2.8.3.1. Exclusive theory**

Exclusive theory indicates that companies use diversification to dominate the market. The key assumptions of this theory include; different companies use diversification to boost their financial position, to reduce competition in different markets at the same time, and to prevent more competitors from entering the markets they operate in. The exclusive theory benefits support the common philosophies and relations of competitors (Chirani & Effatdoost, 2013).

### **2.8.3.2. Process theory**

Process theory implies that strategic decision making is deemed as the result of internal processes of the organisation. These processes may include the workflows, policies and procedures or the political influence and power in the decision making process instead of the best option (Chirani & Effatdoost, 2013).

### **2.8.3.3. Disruption theory**

Disruption theory suggests that diversification incentives happen due to economic disruption. The economic disruption necessitates major changes in an individuals' views and expectations, and increases the total degree of uncertainty (Gaat, 1969 as cited in Chirani & Effatdoost, 2013).

The three theories discussed above are some of the theories that must be considered by companies including state owned entities such as Transnet because of the reasons suggested by them.

## **2.8.4. Diversification in State-Owned Enterprises**

There are very few studies on the impact of diversification on state-owned enterprises (SOEs). Clarke & Kohler (2005) define a state-owned enterprise as a business that is entirely or partly controlled, owned and operated by a government. Additionally, they are companies established by a government to carry out business activities, such as the providing critical infrastructure and related services essential to the proper functioning of the economy; for example, electricity, airports, harbours and pipelines on behalf of government. Generally, SOEs' main goals are to safeguard the welfare of the public, and therefore, governments must monitor and evaluate their economic effectiveness and efficiency as well as their social efficacy (Kim, Shin & Yu, 2019). Public organisations are operated in complicated environments with a host of different stakeholders, unclear and frequently

contradictory objectives, as well as a high level of public scrutiny and political influences on decision-making processes (Rainey 2014).

Unlike their private sector counterparts, SOEs are regulated to make decisions that do not necessarily maximise the profits (Bova & Yang 2018). Šunje & Kulović, (2019) suggest that since most state-owned enterprises generate their revenues on the market, they therefore must be organised as corporations. Normally, SOEs are struggling to oppose demands from political leaders and other government institutions because they are controlled by the state (Holder & Zhao, 2015). Private companies have shown that they are not concerned with the general interest. Many businesses are actively separating the economic benefit from the social benefit, believing that it will be well-respected in the local community (Ahamat & Rahman, 2017). Szarzec & Nowara (2017) pointed out the shift in SOEs from operating in domestic markets only to competing in international markets with their private counterparts over resources and customers. Aharoni (2000) suggest that in countries where political interference in SOEs is tolerated and corporate governance systems are not well developed, there are chances of SOEs becoming sources of wealth and power for the minorities, such as politicians and bureaucrats who control government institutions.

The implementation of organisational changes, such as, organisational structure, delivery of public services and governance, is a considerable challenge for public sector organisations (Isett et al., 2013). Public organisations are often described as being relatively bureaucratic (Rainey 2014). Research shows that given the financial difficulties of many African countries, scarce resources have been conserved wherever possible, and governments have obtained measures to alleviate this problem (Amankwah-Amoah, 2014). The author further adds that in some countries, privatisation and liquidation of these enterprises became increasingly common because of the increased reluctance to fund unprofitable SOEs.

Complexity and uncertainty are the main challenges for SOEs because of the changed norms of society, particularly in terms of inherent reactions to change and to those factors leading to change (Karp & Helgø, 2008). The authors suggest that, public organisations are characterised by;

- They operate in a complicated internal and external environment which are influenced by dynamic developments in society;
- They are accountable to multiple structures, such as the government, ministers, citizens and society and need to deal with pressure and constant power play of all these; and
- They are measured by the value they create for the citizens more than their ability to make profit.

Governments must enable SOEs to operate without political interference; otherwise, SOEs may cease to exist (Kim, Shin & Yu, 2019). Furthermore, state-owned companies in the most developed countries of the world do not show a satisfactory degree of business efficiency. Restructuring has become a global phenomenon that is applicable in almost all parts of the world and in very different types of organisation (Eskić et al., 2018). State-owned enterprises represent approximately 10% of global gross domestic product (Bruton et al., 2015). State owned enterprises are currently characterised by their ability to prosper by adapting to the ever changing environment and transforming (Musacchio & Lazzarini, 2014). Mgaya (2017) suggests that the main reason for the delay in decision making, inefficient performance of duties by public servant and inefficient bureaucratic processes is lack of competent professionals in the public sector with adequate knowledge and skills for the oil and gas industry. Kabeyi (2018) suggests that it is important for organisations to exercise due diligence and develop key competencies and capacity to execute successful diversification.

## **2.9. Organisational readiness to implement a new strategy**

As a division of a state owned enterprise, it is important for Transnet Pipelines to understand its readiness to implement a new strategy. Weiner (2009) defines organisational readiness as the organisational members' shared commitment to change and the belief that there is collective capacity to do so. Organisational readiness focuses on having the right skills at the right time in terms of leadership and employee skills particularly in implementing a new strategy and the degree to which members of the organisation are willing to participate in and support a certain undertaking (Gudergan, Buschmeyer, Krechting, & Feige, 2015). Organisations need to recognise the changes in customer needs so that they are able to exploit existing businesses that have not peaked (Havard, 2011). Lerch et al., (2011)

suggest that it is vital for an organisation to measure its readiness in advance to determine the success of implementation of a new venture.

High performing organisations succeed by tracking what competitors do, renew their capabilities and nurture their existing talent. New strategy implementation processes pose internal and external challenges to the company, such as, the availability of machinery, skills, knowledge of the needs and demands of customers that the company intends to serve (Singh et al., 2010). Gudergan, et al., (2015) suggest that when organisations are facing organisational change, they must not only focus on employees but also on organisational aspects. Weiner (2009), Higgins (2010) & Lerch et al., (2011) agree that resource availability is one of the elements associated with organisational readiness for implementation of a new strategy. In recent years, there has been evidence of a shift in focus from strategy formulation to strategy implementation (Kalali et al., 2011). Strategy implementation is critical because in practice, strategy fails at the implementation rather than at the formulation phase (Greer, Lusch, & Hitt, 2017). Furthermore, the implementation of the strategy is normally considered difficult when compared to strategy formulation because it involves members of the entire organisation which requires the cooperation and teamwork.

Strategy implementation encompasses the entire design of the organisation to allocate employees to tasks and to coordinate their activities in such a way that the organisation will achieve its strategic intent (Grant, 2016). Additionally, organisational leaders who are considered accountable for the implementation of the strategy in the organisation have been criticised for failing to successfully implement these strategies and have eventually lost their jobs. Involving relevant employees early and enabling structural systems have been identified as key factors influence strategy implementation success (Maotwanyane & Pretorius, 2018). The authors identified nine capabilities needed to enhance the quality of strategy implementation namely: company financial support, leadership, improvement process capability, technology, organisational structure, organisational culture, competence, a change management and the existence of a strategy management office.

Government regulations are external factors that affect the implementation of the strategy and they include approval, licensing and land acquisition (Wheelen & Hunger 2010). Improving the effectiveness of the strategy implementation of investment projects can create competitive advantage for an organisation that could ultimately improve company performance. To successfully implement the strategy, the alignment with the operating strategies, people and processes, as well as organisational culture is important (Goentoro, 2016). Organisations must be empowered to understand potential risks, commitment by leadership and human resources alignment to the new strategic focus and an action plan must be developed to move from the current state to the required state (Higgins, 2010). Lerch, et al., (2011) argue that, the readiness of an organisation is greatly affected by its ability to innovate. Change readiness is influenced by understanding the factors that can influence change readiness (Rajput & Novitskaya, 2013).

Crawford (2013) suggest that organisations must ensure that their strategies are aligned to the overall transformation goals. Many authors agree that the right business structure will provide innovation and agility that organisations need to succeed and to be sustainable (McGuire, Palus, Pasmore & Rhodes, 2015). One of the essential factors to implementing a strategy successfully is support and commitment of the leadership team and senior management in the organisation and for this to be sustained throughout the entire process (Ross, 2011). Furthermore, in order for the strategy to be successfully implemented, there needs to be alignment between the implementation plan and the final goal. Therefore, leaders must ensure that the right people are in the right positions and methods are in place to measure progress against the plan.

David (2011) recommends that all those responsible for strategic planning in different organisational levels should participate actively and understand the strategies at the other organisational levels to facilitate coordination and commitment to these plans thus avoiding inconsistency, miscommunication and ineffective implementation of the organisational strategy. In addition to organisational readiness as an overall indicator of the success of implementing a new strategy, organisations also consider leadership readiness and employee readiness to determine whether they are in a position to implement changes in their

existing operations. Leadership readiness and employee readiness are discussed in the following subsections.

### **2.9.1. Leadership readiness**

According to Kabeyi (2018) leadership is about establishing a shared vision, inspire others, and provide a stable environment during organisational change. Absanto (2013) suggests that having the right people in the right positions means that your employees, and in particular your leadership team, must possess the right knowledge, skills and behaviour and must be positioned appropriately in functional areas with the requisite level of accountability and responsibility. Absanto further asserts that most research studies suggest that many growing organisations recognise that some of their key executives lack the necessary skills to take the organisation to the next level of growth, but most companies fail to act on that knowledge.

Galante & Asif (2014) argue that, the major cause of failures in implementing new strategies in organisations is lack of the right leadership and the right organisational capabilities. They further argue that no organisation can succeed in expanding if it does not develop the right organisational capability to remain competitive. Sinar & Wellins (2017) claim that not having leaders with the right skills can cost companies the ability to respond to major changes. In most organisations, leaders are often so concerned with day-to-day activities and issues that they often forget about the strategic objectives (Crawford, 2013). Organisational leaders have different strengths, while others are good at expanding into different geographies, some may excel in creating new markets (Nunes & Breene, 2011).

A new kind of leadership capability is required in order to succeed in transforming the organisation because insufficient leadership ability is part of the problem (McGuire et al., 2015). Bawany (2017) supports this view by stating that the next-generation leadership competencies are required in order to survive in this fast paced world. Leaders need to know which capabilities are needed for leadership and should start planning and executing them.

Steinberg (2016) suggests that for leaders to remain relevant, they must be taught new ways of solving problems. Padmanabhan (2017) supports this view by stating that leaders of tomorrow will need to develop knowledge, skills and performance in to be able to influence processes, practices, policies and people. Although most researchers believe that it all starts with leadership, a study conducted in 2016 by Development Dimension International from more than 15,000 leaders (as cited in Sinar & Wellins, 2017), revealed that leaders' readiness varies considerably. If it is not strong in any particular area, it may, however, show strength in another area such as in the allocation of resources to support strategy. The study further showed that no specific leadership style is better than any other and that the organisational leadership team style must match the needs of the organisation in terms of capabilities.

Leadership teams must consider continuous evaluation of the change initiatives and how they impact on the conditions of the organisation (Higgins, 2010). Additionally skilled and capable leaders can have an impact on the bottom line and can make an organisation more responsive and prepared (Sinar & Wellins, 2017). Leaders must be able to promote consensus and collaboration from all parties to make the new strategy work (Crawford 2013). Organisational leaders must develop a strategy for continuous learning and development in order to retain skilled and experienced employees' skills in line with the latest technological requirements (Howell, 2017). It is therefore important for leaders at the top to evolve to build the next set of distinctive capabilities (Nunes & Breene, 2011).

Mentoring and coaching of leaders, as well as management and cross-functional teams is important when undergoing organisational change process (Higgins, 2010). Another important perspective drawn from the literature is the notion that leadership should not just be allocated to the individual leader, but rather it must emerge as needed from different individuals based on skills and capabilities (McGuire et al., 2015).

In their research, Sinar & Wellins (2017) found that the most serious skills gaps among organisational leaders are strategic challenges such as, building or improving brands, marketing and organisational culture, which can have a negative impact on organisations. They suggested that leadership skills gap analysis be

conducted to determine these gaps accurately. The authors argue that skilled and capable leaders can have a positively impact on the bottom line and make an organisation more agile, responsive and prepared for any changes in the organisation. Steinberg (2016) suggests that leaders should be learning how to be innovative by learning how to use both new tools and accustomed resources and adaptable to new challenges and unforeseen events.

Viljoen & Klopper (n.d.) suggest that, in order for leaders to effect transformation, they must institutionalise the change. A new kind of leadership capability is required in order to succeed in transforming the organisation because insufficient leadership ability is part of the problem (McGuire et al., 2015). Padmanabhan (2017) argues that that leadership style has an influence on how they handle transformation efforts. They agree that transformational leadership is crucial in driving a successful transformation process. Steinberg (2016) suggests that leaders must think fluidly and they need to learn to make firm decisions despite uncertainty.

Padmanabhan (2017) suggests that, with the availability of several disruptive technologies, the leadership must be aware of how digitalisation can help them realise the long-term vision and growth way ahead of time. He also emphasises that leaders need to be consistently disrupted, enabled and skilled to make any change work. McGuire et al., (2015), suggest that leaders going through transformation must also experience personal transformation. Although literature shows leadership in transformation as an extensively debated issue, there is still no evidence of a definite solution to leadership shortcomings and further research is required to provide a solution.

There are occasions where political leadership is necessary such as during the introduction of public sector reforms, and the process of the change implementation can be influenced by administrative leaders (Ahmad & Cheng, 2018). Political leadership in public organisations is quite different from leadership in private organisations (Kuipers et al., 2013). In leadership, trust between leaders and followers plays a critical role (Kova & Jesenko, 2010). Klettner, Clarke & Boersma (2014) found that there is proof that some leadership structures are established to develop the strategy and are then given rewards to assess and provide assurance on the implementation of the strategy through financial incentives. Sapkota et al.

(2019) suggest that when uncertainty is not addressed during any change in the organisation, there can be a great impact on organisation's ability to grow.

Magrum & Weber (2018) assert that the constantly changing organisational environments create the need for adaptable and flexible organisational structures. Furthermore, any change in an organisation is the movement from one set of circumstances to another which involves the incorporation of people, structure and processes to support the implementation of strategy. In addition the authors suggest that the preparation and development of a new structure by leaders require the development a step-by-step plan that considers all aspects of the restructure and their department's specific needs to succeed. In determining the readiness of leaders to implement the new strategy, the leadership styles are also considered and discussed in the section below.

### **2.9.2. Leadership Styles**

This is because leadership contributes greatly to the overall welfare of an organisation or group (Odumeru & Ifeanyi, 2013). The style of leadership is the way in which leaders use their authority in an organisation and make sure that organisational objectives are achieved (CMI, 2015). It includes planning and organising by managers about relationships between their colleagues and members of the team. Most leadership styles distinguish between leaders can direct subordinates properly and leaders who allow the group to participate and give input (Belias & Koustelios, 2015).

A distinction that is also suggested is where leaders who make decisions autonomously with limited or no participation from other group members and those leaders involve employees in the process of decision making (Belias & Koustelios, 2015). Most researchers have distinguished those leaders who do not set specific goals, have no clear expectations from employees, are not highly involved in the decision-making process and are incapable of solving problems instantly, therefore being less popular and less productive (Belias & Koustelios, 2015). If leaders are to succeed in their positions, it is important for them decide on what kind of leadership style is suitable for them and appropriate for their teams and organisation as a whole (CMI, 2015). Furthermore, choosing an appropriate leadership style helps leaders to establish good working relationships and engaged team member.

On the other hand, an inappropriate leadership style may result in disengaged or/and demotivated employees. Having explained the different characteristics of leaders above, the most prominent and studied leadership theories are transformational and transactional theories (Odumeru & Ifeanyi, 2013). Transformational and transactional leadership styles put emphasis on the relationship between leaders and followers directly impact on the level of success of an organisation (Kabeyi, 2018). These leadership styles are conceptualised in the following section.

### **2.9.2.1. Transformational Leadership**

According to CMI (2015) transformational leadership entails engaged followers and charismatic leaders, although the descriptions of transformational leaders differ, but the main focus is on how the leader fulfils the personal development needs of their followers. Transformational leadership improves the performance and morale of employees in an organisation through different approaches (Odumeru & Ifeanyi, 2013). These approaches including matching the followers sense of self to the collective identity of the team and the organisation, mentoring and coaching of followers; assigning challenging tasks to followers to encourage brain stimulation, and understand the strengths and weaknesses of followers. Transformational is considered the widely used leadership style across organisations (Kaleem, Hasad & Khan, 2013).

Transformational leadership is about promoting integrity, clearly defined goals and communication is promoted (Kaleem, Hasad & Khan, 2013). Transformational leaders can motivate and develop a trustworthy relationship with others in order to complete the job at hand (Kaleem, Hasad & Khan, 2013). Organisational leaders must constantly advance their strategies for them to remain competitive and relevant (Favaro, 2015). Sapkota et al. (2019) suggest that leadership teams must establish a sound communication channel and ensure that communication is done openly and honestly and as frequently as possible so that all employees are informed and engaged in the process and also gather feedback from employees.

### **2.9.2.2. Transactional Leadership**

Transactional leadership style promotes adherence to rules by followers and they are rewarded through rewards or punishment (Odumeru & Ifeanyi, 2013). Additionally, these leaders concentrates more on faults and deviations by employees. Furthermore, transactional leaders use an exchange model, where

good work is rewarded and poor work is punished. Transactional leaders are process driven rather than strategic driven. CMI (2015) argue that, although the concept of transactional leadership could lack the dynamism of other leadership approaches, it accurately illustrates the practice in most organisations.

Transformational leaders encourage employees to be productive and successful by offering them challenging projects and considering their personal developmental needs. In their study about leadership and gender in public organisations (Berg, Barry & Chandler, 2011) found that although the style of leadership undeniably matters to those subjected to it, the changes that any leadership effects or attempts to effect are what matter more. Table 2.1. below summarises the characteristics of transactional and transformational leadership styles.

Table 2.2. Transactional vs Transformational Leadership (Source: Odumeru & Ifeanyi (2013), p355).

<b>Transactional Leadership</b>	<b>Transformational Leadership</b>
Responsive leadership	Proactive leadership
Aligned to organisational culture	Innovative culture
Objectives achieved through rewards and punishments set by leader	Objectives achieved through high standards
Leaders mostly concerned with own self interest	Leaders encourage followers
Leaders often maintain the status quo; stress corrective actions for performance improvement	Individualised consideration: Individual behaviour are considered and nurtured Intellectual stimulation: Promote creativity and innovation.

The table above illustrated the differences between transactional and transformation leadership styles, which clear emphasis on how leaders who use these different styles lead the followers. The styles do not necessarily demonstrate one to be better than the other, rather, they show that each style can be used depending on the suitability of the situation at hand.

### **2.9.3. Employee readiness**

Organisational change cannot occur if employees are not ready for it (Vakola, 2013). The need for organisations to have the right people, with the right skills at the right time is frequently discussed by organisations (Baron, Clake, Turner & Pass, 2010). When employees are not prepared, they are more likely to resist the change effort and less likely to function effectively in almost any aspect of change (Magrum & Weber, 2018). Organisational diversification may require a large number of employees to be prepared to undertake the significant challenge of getting the new business started and to be successful (Nunes & Breene, 2011). Researchers have studied how decisions about the manner in which the resources needed for diversification are developed or acquired (Dhir & Dhir, 2015).

Companies often fail to focus on developing and retaining enough core talent, these are employees that possess both competencies and the willingness to drive new business models (Nunes & Breene, 2011). Additionally, when organisations are under pressure to improve margins, they normally reduce head count and investment in talent, which adversely impacts on retention of critical skills for reinventing the business. It is important for employees to support change initiatives in organisations and to contribute positively towards achieving desired outcomes (Rajput & Novitskaya, 2013). Companies that fail to reinvent themselves are left struggling when their core markets begin to stagnate (Harvard, 2011). Nunes & Breene (2011) suggest that high performing organisations create challenging environments where employees obtain skills and experience required to start the organisation's next business venture.

Talent pipeline and employee development must be kept flowing in order to succeed in implementing any new strategy (Harvard, 2011). Steinberg (2016) also suggests that employees must be given tools, platforms and communication systems they need to be able to adapt to change. Leaders must teach employees to prioritise ongoing education and professional development. He further adds that the ability of employees to adapt and to be flexible in the changing work environment will determine the organisations' survival or otherwise. The author argues that the focus must be on ensuring that the talent that can start and grow the business is nurtured, therefore the nature of hiring and development of employees is altered. The

availability of resources is one of the factors that are associated with the success or failure of a transformation process within organisations (Vakola, 2013). Lerch et al., (2011) suggest that it is vital for an organisation to measure its readiness in advance to facilitate the transformation success.

Steinberg (2016) reiterates that change is unavoidable, so up-skilling employees on how to be innovative in an ever-changing work environment should be a priority. Additionally, the ability of employees to adapt and to be flexible in the changing work culture will help organisations succeed. Due to the lack of flexibility, employees often work on projects that are irrelevant to the organisational strategic focus (Higgins, 2010). Karp & Helgo (2008) argue that leaders and employees view change differently, they are of the view that most leaders welcome change and see it as an opportunity to strengthen and renew the organisation, while employees (including middle managers) consider change to be disruptive and it disturbs the organisational balance. Additionally, they must be able to identify what types of talent, training and educational experiences will be in demand tomorrow. The only way to ensure ongoing success is to institute highly effective, empowered and high performing teams (Higgins, 2010). It is evident that organisations must explore options for workforce development to meet the robust requirements for skills upgrades and to begin to close the skills gap (Bloir & Scheer, 2017). One of the factors suggested by Dyer, Godfrey, Jensen, & Bryce (2016) for diversification to add value in the real world is that, the required knowledge, skills and capacity should be either existing or is easily obtainable. This section provided an overview of the readiness of employees in implementing a new strategy for an organisation. A number of factors were discussed with a myriad of choices displayed for organisations to consider when deciding to implement a new strategy. The chapter is summarised in the next section.

## **2.10. Chapter Summary**

The literature review was beneficial in creating a background awareness for the study using available literature. The chapter examined and synthesised relevant literature on the key views and arguments of organisational growth strategies, organisational diversification and the different types and theories. Organisational readiness, leadership and employee readiness were also looked at. Further

examination of the literature looked at the link between technological changes and the need for organisations to diversify. There was very little literature found on diversification of state-owned organisations in general. When organisations are assessing themselves they need to use valid and measurable factors. The assessment must be motivated by the willingness to satisfy internal and external customers. The next chapter provides the method used to undertake this research.

# **CHAPTER THREE**

## **RESEARCH METHODOLOGY**

### **3.1. Introduction**

This chapter outlines and explains the chosen methodological elements such as the research design and different methods available in research methodology which were considered in order to select an appropriate methodology for this study. The location of the study, the population under study, the sampling methods, the construction and administration of the instrument were also explained. In addition, the ethical considerations, data analysis, validity and reliability of the study were addressed together with the research limitations of the study.

### **3.2. Location of the study**

The location of the study is Transnet Pipelines Head Office in Durban, KwaZulu Natal, South Africa.

### **3.3. Research Objectives of the study**

The study was conducted to evaluate the impact of the implementation of the delivery of Liquefied Natural Gas (LNG) as a new business venture for Transnet Pipelines.

To achieve the aim, the study focused on attaining the following specific objectives:

- To identify skills needed to implement the delivery of Liquefied Natural Gas (LNG) as a new business venture for Transnet Pipelines;
- To understand if employees have required competencies to implement the delivery of Liquefied Natural Gas (LNG) as a new business venture for Transnet Pipelines; and
- To recommend strategies that can be used by Transnet Pipelines Leadership in the implementation of the new Liquefied Natural Gas (LNG) delivery venture.

### **3.4. Research design**

Research designs are plans and techniques for research that narrow broad norms to detailed methods of data collection and analysis (Creswell, 2014). The decision regarding which research design to use rests on the research problem being studied, the researcher's background and the intended audience. Leedy & Ormrod

(2013) describe research design as a detailed plan of research. It provides the researcher with an adequate way of identifying resources, procedures and data to be collected. Research designs include but are not limited to data sources, data collection, analysis and interpretation techniques. More elements of the research design are discussed below.

There are three types of research approach that can be used, namely; qualitative, quantitative and mixed-methods. All these approaches serve a particular purpose in a research and produce different outcomes. A selection of a research method is influenced by a certain view of the situation being studied. The choice of method to be used for any study is informed by the nature of the investigated phenomenon and whether or not it addresses the research questions being studied (Park & Park, 2016). Both quantitative and qualitative research approaches seek reliable and valid results. The following section discusses both approaches and highlights their differences, advantages and disadvantages.

#### **3.4.1. Qualitative research**

Starman (2013) suggests that qualitative research is characterised by an interpretative paradigm, which emphasises subjective personal experiences and their meanings. The advantages of using a qualitative method are; flexibility to explore unexpected ideas during research and being sensitive to the background aspects (Ospina, 2014). Creswell (2014) highlights the following as some of the qualitative research characteristics: it occurs in a natural setting, where human behaviour and events occur, the focus is on participants' perceptions and researchers are mostly interested in understanding how things occur. Qualitative research relies heavily on subjectivity, therefore; the effectiveness of it is based largely on the expertise of the researcher. In most cases it may be argued that the outcome of the research may not be reliable because they are influenced by the researcher's personal judgments and interpretations.

Table 3.1. Summary of qualitative research designs (adapted from Jean Lee, SK, p89)

Ontology	Subjective
Epistemology	Phenomenology
Methodology	Particularity
Role of researcher	Insider
Researcher – Participant relationship	Involvement
Research methods	Description

The above table reflects the characteristics of the qualitative research approach. The quantitative research approach possess different characteristics to qualitative and it is discussed in the following sub- section.

### 3.4.2. Quantitative Research

According to Yilmaz (2013) quantitative research is defined as a research approach that explains occurrences in using numerical data which are then analysed using mathematical techniques, such as statistics. Additionally, this research approach deals mostly with things that can be measured in a systematically. This type of study’s main objective is to confirm or disconfirm the hypothesis that is being tested. The methods and procedures of this approach let the researcher to acquire a comprehensive set of findings which can be generalised. The linear and non-flexible nature of a quantitative approach requires the researcher to follow a certain order. One of the limitations of the quantitative research is that it can be time-consuming and requires data collection over long periods of time (Goertzen, 2017).

Table 3.2. Summary of quantitative research designs (adapted from Jean Lee, SK, p89)

Ontology	Objectivity
Epistemology	Positivism
Methodology	Universality
Role of researcher	Outsider
Researcher – Participant relationship	Detachment
Research methods	Statistics

The above table reflects the characteristics of the quantitative research design. This section covered the comparison between qualitative and quantitative research approaches and therefore highlighted four essential elements of the research process that must be addressed, namely, the epistemology, theoretical perspectives, methodology, and methods. It is clearly demonstrated in this section that the designs differ in terms of their epistemological, theoretical and methodological underpinnings.

### **3.4.3. Mixed methods**

Mixed methods research is mainly a combination of quantitative and qualitative research methods. These methods can be used concurrently or sequentially to understand a phenomenon of interest. Venkatesh, Brown & Bala (2013) are of the view that a proper coexistence of multiple paradigms is possible in a research inquiry. Employment of a mixed methods approach in a research inquiry should serve certain purposes. The general agreement is that the selection of a mixed methods approach should be driven by the research questions, objectives and the context. The qualitative method was chosen for this study and is briefly discussed in the following section.

### **3.4.4. Chosen Method**

The qualitative method was adopted for this study because the aim of this study is exploratory, therefore, its findings are going to be used to gain the initial understanding and sound base for further decision-making where necessary. As described on the qualitative section above, the reason this method was chosen was because it does not require a large sample and it does not necessarily need to be representative of the population.

### **3.5. Population of the study**

Target population refers to all the members who meet the particular criterion specified for a research study (Alvi, 2016). In this study the target population was twelve and this was mainly colleagues working on the Liquefied Natural Gas project or those who had in-depth knowledge of the matters pertaining to the LNG project, and these comprised the leadership team, senior and middle managers. The eligibility criteria in this study were that the participants had to have one or all of the following:

- Be at a senior management level position or in the leadership team within Transnet Pipelines;
- Have in-depth knowledge about Transnet plans to diversify into the LNG business; and/or
- Be a member of the LNG project team.

### **3.6. Sampling methods**

Gentles et al., (2015) define sampling as the process of selecting specific data to address the research subject being studied. The process of obtaining a sample from a population is called sampling (Alvi, 2016). Qualitative research seeks to describe what is happening within a smaller group of people and not to generalise the outcome of the research to the whole research population. The general rule of qualitative sampling is that you continue to sample until you are not getting any new information or no longer gaining any new insights i.e. you reach information saturation (Battaglia, 2011). This basically means that the sample size is not determined at the beginning of the research. In general, sampling techniques can be divided into two types, namely; probability and non-probability sampling.

#### **3.6.1. Probability sampling**

Probability sampling means that every element in the population has an equal chance of being included in sample (Taherdoost, 2016). In this type of sampling, each element in the population has an equal chance of being selected through the use of a random selection procedure (Battaglia, 2011). Although this type of sampling has the greatest freedom from bias and systematic errors, it is also costly and time consuming (Alvi, 2016). Furthermore, in this type of sampling, the population must be defined accurately. There are various types of sampling methods. The methods on the whole have their own advantages as well as disadvantages.

##### ***3.6.1.1. Types of probability sampling***

Three types of probability sampling, namely, simple random sampling, stratified random sampling and systematic random sampling are briefly discussed below.

##### **a. Simple Random Sampling**

Simple random sampling has been defined as a probability sampling technique in which the elements composing a population are allocated numbers (Adwok, 2015). Simple random sampling is a sampling technique where every element

of the population has an equal probability and likelihood of being selected in the sample and every element must be distinguishable from one another and not have any overlapping characteristics (Alvi, 2016). The main disadvantage of this sampling method is, some members of the population with important information relative to the study may be left out (Adwok, 2015).

#### b. Stratified Random Sampling

In stratified random sampling, the population is separated into groups or strata according to certain characteristics, such as level of education, position, rank, income, sex, or ethnic group (Singh, 2015). The stratified sampling gives more reliable and accurate representation of the population (Etikan & Bala, 2017).

Since participants are chosen randomly from each stratum, a complete list of the population within each stratum must be constructed. Stratified sampling is generally used for commenting on the population or comparison between and among the strata (Alvi, 2016).

#### c. Systematic Random Sampling

Systematic sampling is a type of probability sampling in which every unit or individual is selected according to a predetermined sequence from a list and there is no equal probability of every element been included (Alvi, 2016). In this type of sampling the elements are selected at a regular interval (Adwok, 2015). Furthermore, the attraction of systematic sampling is that the researcher does not need to have a complete list of all the sampling units. The disadvantages of this sampling technique is that the sample may be biased and it is difficult to assess precision of estimates from one survey (Chaturvedi, n.d.).

### **3.6.2. Non-probability sampling**

In non-probability sampling, particular methods are employed to determine which elements are included in the sample (Battaglia, 2011). Furthermore, this type of sampling is commonly used in qualitative research and the sample of participants does not need to be representative of the population, however, a clear justification is required for the inclusion of certain individuals rather than others. The author further adds that the general reason for using non-probability sampling is that more affordable than probability sampling and can often be applied faster. It involves

identification and selection of participants that are knowledgeable and experienced within a particular area of interest (Creswell & Plano Clark, 2011).

### **3.6.2.1. Types of non-probability sampling**

Non-probability sampling is often divided into three primary categories, namely: purposive sampling, convenience sampling and quota sampling (Battaglia, 2011).

#### a. Purposive sampling

Purposive sampling is a non-probability sampling technique where the researcher selects participants with the belief that their inclusion is justified (Taherdoost, 2016). The main objective of this sampling type is to generate a sample that can be considered to represent the population (Battaglia, 2011). In purposive sampling the sample is approached having a prior purpose in mind (Alvi, 2016). This sampling method allows you to choose those individuals or items that will generate the most information about the topic under investigation (Leedy & Ormrod, 2015). Given the subjectivity of the selection mechanism, purposive sampling is generally considered most appropriate for the selection of small samples often from a limited geographic area or from a restricted population definition, where inference to the population is not the highest priority (Battaglia, 2011).

#### b. Convenience Sampling

Convenience sampling differs from purposive sampling in that expert judgment is not used to select a representative sample of elements (Battaglia, 2011). In convenience sampling, participants who are readily reachable or available to the researcher are chosen (Showkat & Parveen, 2017). Although this type of sampling is fast, cheap, and convenient, it can also be subjected to sampling biases and systematic errors (Alvi, 2016). Researchers simply use participants who are available at the moment. The procedure is casual and easy, relative to random sampling. Convenience sampling requires far less effort. However, such convenience comes with potential problems, which will be described.

#### c. Quota Sampling

Quota sampling is frequently utilised by market researchers and those conducting political polls (Battaglia, 2011). In this technique, the targeted

population is large and there are no ready-made lists of names available from which to sample randomly (Showkat & Parveen, 2017). In this sampling procedure, the subgroups of the population of interest are first decided on and for issues of national interest, such as, politics, drug use, or sexuality, frequently used subsets are age, race, sex, socioeconomic level, and religion (Alvi, 2016).

### **3.6.3. Chosen Sampling method**

Purposive sampling was chosen because the study was conducted at the researcher's place of employment. The individuals that were approached for the study were known to be working on the Liquefied Natural Gas project or had in-depth knowledge of the matters pertaining to the LNG project. Purposive samples are used if the goal is description rather than generalisation (Dawson, 2003). This type of sampling is less costly, readily accessible, and convenient and it involves choosing only those individual that are relevant to research design (Showkat & Parveen, 2017). The researcher was aware of the bias that could influence the study and the methods, however, continuous monitoring of and reflecting on the research to avoid any subjectivity that may negatively impact on the research outcome was undertaken.

### **3.7. Construction of an instrument**

The researcher used semi-structured interviews to collect data for this study. The researcher chose the interviews because of the accessibility of the participants. The interview schedule which contained eleven questions was developed to ensure that the information was recorded properly and that the same basic lines of inquiry were followed with each interviewee. Once the data was collected it was then entered into Microsoft Excel for analysis.

#### **3.7.1. Administration of the instrument**

The interviewees were selected based on their familiarity with the topic of the study and their levels within the organisational structure. At the beginning of the interviews, the first few participants were asked to suggest names of employees they felt could be interviewed because of their knowledge and experience of the topic to increase the sample of the study. All interviews were conducted in English. The decision for the use of the English language was based on Transnet's official business language. The interviews took between 45 minutes to an hour to complete.

Four interviewees were recommended by another interviewee. Five interviews were conducted face-to-face in the interviewees' offices, three were conducted at the same time in the boardroom because of convenience and one telephone interview was also conducted. The scheduling and the mode of conducting the interview was done at the convenience and accessibility of participants. The informed consent information sheet and consent form that provided the background to the research were sent to all participants using email. The interviewees were guaranteed anonymity and some gave permission to audio record the interview. The advantages of this technique were that it allowed the researcher to have control over the line of questioning and some participants could also offer additional information that may be useful for the study. The period of conducting interviews was one month.

Follow-up interviews were made thereafter where there was a need for clarity on certain points. The interviews were recorded and notes taken to ensure that no information was lost in case the recording failed. The Microsoft Word format was used to transcribe all interviews and notes were taken during the interviews. Although the information gathered during the interviews was subjective to a certain extent, an attempt was made to ensure that different perspectives of the topic were considered. Due to the open and semi-structured character of the study, the interview questions in the schedule were not strictly followed. It seemed appropriate to let the interviewees answer the questions in an unrestricted way, which allowed them to reveal more information that came to mind regarding the topic.

### **3.8. Ethics Considerations**

The researcher adhered to the ethics policy of the University of KwaZulu-Natal at all times. Details of the aim of the research were shared with participants and a consent form was sent to participants prior to them participating so that they could understand the implications thereof. Data sources were mentioned and referenced correctly. Permission and approval from relevant gatekeepers as well as the ethics clearance from the University of KwaZulu-Natal were obtained before data was collected for the study. These measures were undertaken to ensure that good quality ethical standards for the research were maintained. Privacy of the participants was maintained by keeping their identities anonymous.

### 3.9. Validity and Reliability

Validity and reliability in a qualitative study is challenging. Therefore, the reliability of the study often relies on the times the findings of the study can be replicated. It is often accepted that the more times the findings can be replicated the more reliable the phenomenon. Knowledge was also validated experientially because of the insider status of the researcher being part of the organisation being studied.

### 3.10. Data analysis

The process of data analysis involves making sense out of the information collected. It involves moving deeper into understanding data so that an interpretation of this data can be made (Creswell, 2014). Data is a word that describes valid information that can help to provide answers to the research question/s (O'Connor & Gibson, 2017). It is a process where you take descriptive information and offer an explanation or interpretation (Creswell, 2014). A thematic data analysis was chosen as the most suitable method of analysing data for this study.

The goal of a thematic analysis is to identify themes, i.e. data patterns that are important and use these themes to address the research question/s (Braun & Clarke 2006). One of the benefits of thematic analysis is its flexibility (Braun & Clarke 2006). This process was efficient and time-saving. Based on the questions that were asked during interviews, the themes that emerged related closely to the research objectives. The process used for the analysis was based on Braun & Clarke's (2006) six-phase process guide for thematic analysis. This process helped the researcher to group data into themes and sub-themes in order to interpret various aspects of the research topic. Phases of thematic analysis are shown by Table 3.3.

Table 3.3. Thematic analysis phases (adapted from Braun & Clarke 2006:p35)

<b>Phases</b>	<b>Description of the process</b>
1. Familiarising yourself with your data	Transcribing data (if necessary), reading and rereading
2. Generating initial codes	Coding interesting features of the data
3. Searching for themes	Collating codes into potential themes, gathering all the data
4. Reviewing themes	Checking that the themes work in relation to the codes

5. Defining and naming themes	Ongoing analysis to refine the specifics of each theme
6. Producing the report	The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back to the analysis of the research question and literature, producing a scholarly report of the analysis.

The above table reflects phases of thematic analysis which are namely; familiarising yourself with your data, generating initial codes, searching for themes, reviewing themes, defining and naming themes and producing the report. The researcher followed the above phases in that order. The researcher encountered some limitations when conducting this study the limitation are explained in the following sub section.

### **3.11. Limitations**

The results of this study cannot be generalised, since the scope of this research was limited to Transnet Pipelines. However, the study offered significant insights into the LNG market in South African, African countries and globally.

There were limitations in terms of gathering data because of the limited knowledge of the topic when the researcher was developing an interview schedule.

Time Therefore, this led to the research being limited to skills for LNG implementation only. The study was only conducted at head office, which meant that some useful information from the depots might have been missed.

### **3.12. Chapter Summary**

The research methodology provides the researcher with an adequate way of identifying resources, procedures and data to be collected. This chapter, as indicated, has focused on utilising different methods and criteria in order to identify adequately the resources and procedures to acquire the information required to meet the objectives of the research. A qualitative approach using interviews was used to gather data. The following chapter presents the research results and findings.



## **CHAPTER FOUR**

### **PRESENTATION AND ANALYSIS OF DATA**

#### **4.1 Introduction**

The previous chapter discussed the methodology used to obtain data for this research study. In order to complete this study accurately, the current chapter presents the findings of the study. As already indicated in the previous chapter the study was of a qualitative nature. This chapter comprises the presentation and analysis of the data resulting from this study. Some sections of the results are presented with the aid of tables where necessary.

#### **4.2. Response rate**

The researcher initially planned to conduct twelve interviews, a total of nine interviews were conducted and the interviewees included the leadership team, senior and middle managers. The decision to stop interviewing was reached when nothing new was being learnt from the information that was being obtained.

#### **4.2 Presentation and analysis of collected data**

This research was based on three objectives. The interview schedule was designed to comprise at least three questions aligned to each objective. The first objective had three questions which sought to determine what skills are required for TPL to successfully implement the LNG as a new business venture for Transnet Pipelines, how long it would take to acquire these skills, and how these skills can be acquired. The second research objective had five questions aligned to it which sought to determine whether or not the respondents felt that TPL currently have the required skills, to determine whether or not TPL, in terms of capacity, can afford to lose these skills if any, and to further determine whether or not there is a possibility for the current skilled employees to be seconded to the new venture.

Furthermore, the second objective sought to determine the number of employees that the respondents felt needed to be recruited at the start of the new venture, and lastly objective two sought to determine whether or not the employees would be willing to be seconded to the new venture, and how this would affect the current TPL operations in terms of staff compliment. The questions aligned to the third and last research objective sought to determine how the respondents believe the current

leadership is equipped, in terms of skills, to facilitate the new venture. Furthermore, the researcher needed to determine whether or not the respondents believe that the new venture necessitates changes in the leadership structure, and lastly to determine the type of training that is required to develop the leadership to ensure that they are ready to implement the new venture for Transnet Pipelines. Below is the presentation of the three questions in response to objective 1 of the research objectives. All nine interviewees responded to the three questions. The obtained results were then summarised and presented in sub-sections in line with the objectives of the research.

### 4.3.1 Skills required

Below is the presentation of the three questions in response of objective 1 of the research objectives. All nine interviewees responded to the three questions.

#### **4.3.1.1. What skills are required for TPL to successfully implement the LNG project as a new business venture?**

When asked this question, interviewees provided various views based on their generic knowledge which included LNG processing skills, cryogenic technical skills, as well as skills relating to handling of imported liquefied natural gas considering that such gas would be imported.

Table 4.1. Responses from interviewees regarding skill required for the LNG project

INTERVIEWEE	RESPONSE
A	<p><i>“You get various levels of skills, you get operational skills, technical skills and management skills. Those are the three categories I think you will cover. Obviously your operations and technical skills will cover your operations and maintenance skills. That is what we call O &amp; M skills. Now the strategy will be, you need resources and skills related to receiving LNG. There are different stages of skills. One is, you’re developing the market, and you bring the first LNG ship. You don’t have land-based facilities, so you need berth operations and berth-receiving skills for LNG ships. Skills will change as and when the infrastructure develops. What sort of skills will be required? I really myself don’t know, but obviously it will be LNG specific.”</i></p>

B	<p><i>“So, as far as the skills are concerned, we have no skills whatsoever, in the gas business. So if TPL really want to go and follow the journey, we need to start training people prior to that. Strategy and Commercial where HR department was engaged to find a company that will look at the skills we have currently and skills that we require for the gas and then suggest how the gap will be filled. So I cannot specifically say what skills. I don’t know if they have done the process, but they have identified the company to assist with identifying the skills.”</i></p>
C	<p><i>“Well obviously I think we need people who have LNG experience, in design, operating and maintaining LNG equipment. But also I think we need people who have skills in LNG business, because we need to understand how LNG fits into the country and what business model you need to implement to ensure that you are able to introduce LNG, because LNG in South Africa, is still sort of an incoming of a small growing business. So you need to understand, strategically from the business point of view, how you are going to position LNG into the market.”</i></p>
D	<p><i>“You get different types of business, you get upstream, midstream, downstream of gas business and those all have different requirements. So there are people out there with the necessary knowledge and experience. So to answer your question, what skills would we need, it depends on where Transnet Pipelines wants to secure business.”</i></p>
E	<p><i>“First of all there is the aspect of importing the LNG, which obviously means that there will be some requirements on the port side, in terms of being able to receive the LNG, in terms of being able to regasify. So if we are talking about the pipeline a completely new type of pipeline, than what we are using currently, which is what is called, the cryogenic pipeline. In terms of handling of the LNG itself, it is completely different to what TPL is currently handling and without me knowing the exact details around the skills that are required, I am not too</i></p>

	<i>sure if it something that you can go directly from handling normal liquid fuels pipeline and maybe just up-skill or train people in handling the cryogenic pipeline, I would think that, because that is the completely new type of infrastructure altogether, it might require completely new skills, which wouldn't necessary exist right now because it is not something that Transnet deals with."</i>
F	<i>"The type of skills we are looking for are, on the berth side, firstly, the operations of LNG vessels entering the berth itself. So we need berth operators, on the land side we need people that can operate LNG terminals and on the pipelines side we also need operators that can operate LNG pipelines. So when we look at this, we are looking at, offshore, onshore and then we are looking at the distribution side. It is important for us to have those three skills. We also require people, you know, other than just operators, we also require people from management levels as well, to manage these facilities, and the operations and maintenance thereof."</i>
GHI	<i>"The skills required for the gas operation are, process specialists and cryogenic technical knowledge. The skills requirements will depend on the model that Transnet will opt for."</i>

For example, interviewee A said; *"You get various levels of skills, you get operational skills, technical skills and management skills. Those are the three categories I think you will cover"*, whilst interviewees E, G, H and I seem to agree that *"the skills required for the gas operation are, process specialists and cryogenic technical knowledge."* Furthermore, some respondents were uncertain about the actual skills required, for example, interviewee A asked; *"What sort of skills will be required? I really myself don't know, but obviously it will be LNG specific"*, interviewee B said *"So I cannot specifically say what skills. I don't know if they have done the process, but they have identified the company to assist with identifying the skills."* Some interviewees also emphasised that the type of business model TPL will employ for the LNG business will determine the type of skills required to implement it as a new business strategy, for example, interviewees G, H and I said; *"the skills*

*requirements will depend on the model that Transnet will opt for”, interviewee C also supported this view by stating that; “So you need to understand, how strategically from the business point of view, how are you going to position LNG into the market.”*

This was further raised by interviewee D who said; *“You get different types of business, you get upstream, midstream, downstream of gas business and those all have different requirements. So to answer your question, what skills would we need, it depends on where Transnet Pipelines wants to secure business.”* The summary of responses from all nine interviewees are illustrated in table 4.1. above. This finding indicates that, although there is general knowledge of which skills may be required for LNG operations, there is a gap, in terms of uncertainty among the interviewees regarding the exact skills required and a clear indication of what these skills should be acquired for. Some direction from the Transnet leadership needs to be provided in the LNG business model that Transnet will opt for.

**4.3.1.2. How long do you believe it will take to acquire these skills?**

In response to the amount of time it would take to acquire the skills required by the employees within Transnet Pipelines to facilitate the distribution of liquefied natural gas, there was a variety of views but no consensus was reached, as to how long it would take to acquire such skills.

Table 4.2. Responses of number of years interviewees believe it will take to acquire skills.

<i>INTERVIEWEES</i>	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>	<i>G</i>	<i>H</i>	<i>I</i>
<i>RESPONSES</i>		2years		3 – 4 years			4 years		

Whilst interviewees A, C, E and F did not specify any particular number of years, what was of particular note was that there was consensus among all nine interviewees that it would depend on the strategy that the TPL would use in acquiring needed skills and that such skills could be developed from within the TPL, sourced outside TPL, or a combination of the two. However an estimate provided by five of interviewees B, D, G, H and I indicated that it would require a period ranging between three to four years with an exception of one interviewee who felt that it could take only two years to acquire such skills. As an attempt to indicate the

correctness of the estimate interviewee D, indicated that *“a period of between three to four years is within the best practices in the world”*.

The interviewees stated reasons for such a lengthy time to acquire the necessary skills depends on a number of factors which among others include; consideration for lenders, operating model, terms and conditions regarding the LNG operations, and lastly technical and operational skills needed. But mainly all the nine interviewees alluded to the fact that the strategy used to acquire such skills would affect the time it would take TPL to acquire such skills. This finding emphasizes that there is a gap, which this study has made clear, that the chosen LNG business model that needs to be used is crucial in providing direction on how long it would take to set up such a business and how long it would take to acquire the required skills.

**4.3.1.3. How are these skills going to be acquired?**

When asked how the skills were going to be acquired, about 77 per cent of interviewees indicated that there are three possible ways of acquiring the required skills either by recruiting new employees from outside the TPL, reskilling existing employees, or a combination of the two. The other participants did not provide answers to this question.

Table 4.3. Responses regarding how the LNG skills can be acquired.

INTERVIEWEE	RESPONSE
B	<i>“Transnet Pipelines will have to have a department of gas, that is my belief and somebody that is going to head that section, just like we have for operations of refined crude line, with a dedicated team, if I may put it that way to look at the gas business.”</i>
C	<i>“Acquiring skills will just depend on the model you will use. You might go to the marketplace and get ready-made skills that you can bring in, and then ensure that you have like a mentoring period with your local skills so that at some point, as and when the local skills have matured, the imported skills can exit. So it just depends on the model. I can get them today, if I want to go</i>

	<i>on the market, if I want to grow them internally, obviously it will take longer.”</i>
D	<i>“The executive members’ vision is to up-skill our existing staff, and then get outside people to come into the petroleum industry to allow our people opportunity to move, you know learning new things, become more marketable, that’s our vision. But for now, the mandate was to review our current positions, and to up-skill our current employees.”</i>
F	<i>“We can go into the open market, advertise in South Africa, you’ll never know, there could be skills here that we have but which have never been utilised because we are not in operations. Because some people do come with skills from outside Africa into South Africa, and work here in the liquid side but not necessarily on the gas side. So we go on the open market, find the people, you know some people are working on the other stuff like other gases, so LPG, so you know they might have some knowledge of gas, which is then an advantage and say look, I don’t have LNG experience but have LPG experience and CNG (compressed natural gas) kind of thing.”</i>
GHI	<i>“Operations and maintenance will depend on the complexity of the terminals. Skills transfer is also relevant. TPL part of the operations, skills transfer – contract model (EPC &amp; O &amp; M contractors). There must be involvement of TPL staff for skills transfer. The EPC contractor will be responsible for designing construction and delivery of the project.”</i>

Table 4.3. shows the responses provided by interviewees on how the LNG skills can be acquired. This finding shows that proper recruitment needs to be done and relevant up-skilling and skills transfer needs to be done where applicable.

#### **4.3.2 Existing competencies**

The researcher had five questions to ask in relation to the second objective. Not all interviewees responded to all questions, and there was overlapping of responses in some of the questions asked. As a result, the following responses will not be presented under each questions, but as an overall view of different responses.

#### **4.3.2.1. Does TPL currently have the required skills?**

When asked if TPL have the required competencies to implement the delivery of Liquefied Natural Gas (LNG) as a new business venture for Transnet Pipelines, some of the interviewees felt that TPL Human Resources Department is better placed to respond to this question, they nevertheless, all indicated that as far as they know TPL does not have such skills. The following table highlights some of the responses from different interviewees.

Table 4.4. Summary of responses to TPL current skills.

<b>INTERVIEWEE</b>	<b>RESPONSE</b>
<i>A</i>	“No, we currently do not have the skills. Although we have a little bit of experience in working with gas, because we do have a gas pipeline, probably that experience is not sufficient for TPL to be able to run the LNG terminals and projects all by ourselves.”
<i>B</i>	“TPL has more experience in pipeline operations and not regasification and marine.”
<i>C</i>	“TPL has done skills mapping in relation to skills needed for LNG distribution and what they found is that TPL definitely has a gap in terms of skills required for LNG distribution.”
<i>F</i>	“Oh no, TPL does not have the skill, so Transnet Pipelines do not have the skills, or we can say, neither does Transnet as a whole. Even though we currently have a gas pipeline, we do not operate that gas line, it is operated by Sasol Gas”.

This finding indicates that there is currently no known existing LNG skills within the TPL, however, the TPL is conducted the skills mapping to determine the skills needed for LNG distribution and have found that there is indeed a gap in skills.

#### **4.3.2.2. Willingness of TPL to be seconded**

The study further investigated whether or not existing employees would be willing to be seconded to TPL’s new LNG venture. All the nine interviewees indicated that it would be difficult to answer such a question particularly because such skills do not exist within TPL. Some of the interviewees indicated that if TPL were to use the existing employees (unskilled employees as far as LNG is concerned) their acceptance of secondment would depend on a number of factors. Interviewee D,

for example, indicated that; *“such a venture could necessitate relocation of employees which may not be easy for some of the employees.”* Interviewees G, H, and I further stated that since the new venture would be based on a premise that the skills needed are scarce, incentives would be needed to entice existing employees to consider being seconded to the new venture. This finding indicates that this cannot be determined at the moment, more information is dependent on the recruitment process that will be carried out.

#### ***4.3.2.3. How many employees do you believe need to be recruited at the start of the new venture implementation?***

When asked how many employees would TPL require for the LNG initiative. All the nine interviewees were not sure exactly how many employees would be needed for such an operation considering that TPL would require to look at the entire LNG operation as a new Department with its own management, skilled, semi-skilled, and unskilled employees. Interviewee F however suggested an estimate by stating that *“I would think we need at least 30, on the management side, operations side and maintenance side, and also looking at possibly the sales and marketing side, 30 would be a reasonable number to have.”* Interviewees G, H, and I further hinted that there might even be a need for TPL to determine man hours to be worked for it to be able to calculate the total number of employees needed. For example interviewee G said *“I believe it is important to check the man hours over a period of 4 years”*. This finding shows that with the current information that the interviewees possessed during the interview period, there was no clear direction on the number of employees that will be required.

#### ***4.3.2.5. How is this going to affect the current TPL operations in terms of staff complement?***

When asked how TPL is going to be affected by the LNG business in terms of staff complement, the interviewees were not sure exactly but certainly in terms of operations the new venture might have an effect on TPL depending on the model to be used. For example, interviewee C indicated that *“the arrangement that we currently have with the customer that uses the pipeline needs to change, in terms of the new arrangement now TPL would get more involved in running of the pipeline*

and the business as a whole”. This finding also points to the LNG business model that will be chosen.

### 4.3.3 Leadership strategies and skills

Objective three had three questions posed to the interviewees relating to the strategies that can be used by Transnet Pipelines Leadership to successfully implement the new Liquefied Natural Gas (LNG) delivery venture. As objective two, there were overlapping responses, however, all nine interviewees responded to all three questions.

#### **4.3.3.1. Based on your knowledge of the current leadership, do you believe they are well equipped in terms of skills to implement the new strategy?**

When asked this question there were differing views because none of the nine interviewees knew all the skill sets needed for such an operation. Table 4.5. highlights some of the responses from different interviewees.

Table 4.5. Responses on management skills to implement the new LNG strategy.

<b>INTERVIEWEE</b>	<b>RESPONSE</b>
<i>B</i>	“As far as skills to implement the strategy is concerned the TPL has the necessary skills.”
<i>C</i>	“Where probably the leadership might not have sufficient skills, the skills are available from the Group point of view. In other words as and when necessary TPL could source the required skills from other divisions of Transnet.
<i>D</i>	“I do think that there are some gaps in the operational and technical aspects, and I believe that it will benefit our executive team to go on a secondment exercise to a gas plant and really understand the core competencies required”.
<i>G</i>	“Managerial and strategic level employees require in-depth knowledge of LNG and the recruitment process will also have to review the skill sets needed.”

Interviewee C went further to point out that *“venturing into LNG might require existing leadership to acquire other skills considering that the new environment would be a competitive environment as opposed to the current environment in which TPL operates.”* What also came out was that the interviewees felt that the skills

necessary depend on the model that the TPL will be using in such a venture which interviewees are not sure of at this stage. For example interviewee C indicated that *“one model can be to have an independent business partner running the pipeline, and Transnet becoming a partner in it. In such a structure one would require a different set of skills than would be the case if TPL were to do everything by themselves.”* This finding indicated that all the interviewees felt that the TPL have the basic leadership skills necessary, which if coupled with necessary training can be of great value to TPL’s LNG venture.

#### ***4.3.3.2. Do you believe this new strategy will necessitate changes in the leadership structure?***

When asked whether interviewees believed that this new LNG venture would necessitate a new leadership structure. All the nine interviewees indicated that it would all depend on the strategy employed. For example interviewee C argued that *“you might have sufficient skills of what you want to do, but holistically you might need partners to help you with some of the other areas. Depending on the extent to which you employ other partners the leadership structure may or may not change.”* This finding indicates that there is a gap in terms of lack of understanding of how the LNG business will be organised in term of structure, there are ideas that it can be a stand-alone unit within TPL or a new stand-alone Transnet division.

#### ***4.3.3.3. What leadership development training is required to ensure that they are ready to implement the new strategy?***

Lastly, when asked what type of leadership development training will be needed to implement the new strategy, the views of the nine interviewees were that a variety of leadership trainings would be needed especially considering the fact that with gas, the TPL would need to go out and look for customers as opposed to the current situation where customers come to TPL because it is a monopoly as a pipeline management unit. All nine interviewees cited change management skills, marketing skills, recruitment and selection skills as some of the most crucial skills that management would need training on, in addition to general management of the LNG business operations.

#### **4.4. Chapter Summary**

This chapter presented the findings of the research that was conducted guided by the research objectives as well as the questions that were outlined in Chapter 1. The questions used in the research instrument were grouped together according to each research objective. Each response was analysed and discussed in terms of the research questions. The interviewees' general stance to each question was illustrated in the form of tables where necessary. There appears to be general uncertainty in terms of the requirements of the LNG strategy as a whole and this was indicated by the differing opinions. The next chapter will discuss in detail the recommendations to improve the maintenance strategy and cohesion between employees.

## **CHAPTER FIVE**

### **DISCUSSION OF FINDINGS**

#### **5.1. Introduction**

The previous chapter presented the findings of the study in terms of the implementation of a new venture. This chapter presents a discussion of the main findings from the research and links the literature to the research outcomes where applicable. The findings from this research study showed that respondents were uncertain of a number of factors that will have an impact on the implementation of the new venture.

#### **5.2. Skills required**

A number of conclusions can be obtained from the results presented in chapter four and which relate to the first research objective. The interviews revealed that, although there is general knowledge of which skills may be required for LNG operations, such as un-skilled, semi-skilled, skilled, and managerial skilled employees, there is a gap, in terms of uncertainty among the interviewees on the exact skills required and a clear indication that for these skills to be acquired, some direction from Transnet leadership needs to be provided on the LNG business model that Transnet will opt for. Additionally, there is another gap, which this study has revealed that, the chosen LNG business model that needs to be used that is crucial in providing direction on how long it will take to set up and how long it will take to acquire the skills in order to run this efficiently. This shows that there is lack of communication from the Transnet leadership structures in this regard. Based on this observation, Sapkota et al. (2019) suggest that leadership teams must establish a sound communication channel and ensure that communication is done openly and honestly and as frequently as possible so that all employees are informed and engaged in the process and also gather feedback from employees.

Process theory implies that strategic decision making is deemed as the result of internal processes of the organisation. These processes may include the workflows, policies and procedures or the political influence and power in the decision making process instead of the best option (Chirani & Effatdoost, 2013). This theory provides some of the issues that may contribute to uncertainty regarding the business model

to be taken. According to the industry publications and literature, South Africa does not have existing LNG skills and capabilities. This is confirmed by Smith & Herscowitz (2016) by stating that most countries looking to establish or increase the use of natural gas, may not possess the necessary technical and operational skills and capacity required to develop, manage and maintain the natural gas business.

TPL currently does not possess these specific skills. These findings support research conducted by Harrier (2013) that suggest that the complex skill sets required to deliver LNG projects require a long-term investment in training and development across areas of technical, engineering and geo-sciences. The TPL currently have not embarked on any LNG-specific training and development in preparation for implementation of this new venture. This exercise will include assessing the current skills versus the required skills. Lerch et al., (2011) suggest that it is important for an organisation to measure its readiness in advance to determine the success of implementation of a new venture. Harrier (2013) further suggest that gas operations personnel need to be identified and attracted once the Final Investment Decision (FID) has been made.

LNG operators with the right qualifications and experience are scarce to the extent that many in the industry are investing more in training and developing people, from apprentices and graduate trainees to those with transferable skills from energy, heavy process engineering and power sectors (Harrier, 2013). The interviewees further revealed that, proper recruitment needs to be done and relevant up-skilling and skills transfer needs to be conducted where applicable. Since natural gas distribution is related to what TPL is currently doing, this process is known as related diversification which refers to diversification into ventures that are related to businesses that an organisation is already engaged in (Chang et al., 2013). This enables an organisation to retain and maintain its existing skills and competencies and to share resources across different business units.

### **5.3. Existing competencies**

The majority of interviewees confirmed that there are currently no LNG skills available within the TPL and Transnet as a whole. This was supported by a respondent from HR department who indicated that TPL has conducted a skills

mapping exercise which confirmed that there is a gap in terms of the required LNG skills. Although Transnet Pipelines has the skills, capabilities and experience to operate the liquid fuels pipeline, they currently do not have the required skills to manage, operate and maintain a LNG pipeline, neither does Transnet as a whole. Smith & Herscowitz (2016) suggest that identification of required skills needs to happen as early as possible during the planning phase of the project for training to be planned and provided to avoid project delays and this training provided through a combination of formal and organised on-the-job-training. Additionally, the perception from the majority of the respondents is that people from outside South Africa may possess such skills and this can only be confirmed once Transnet goes out to the labour market to recruit for these skills.

There is similar experience such as compressed natural gas (CNG) and LPG experience outside TPL which may be beneficial where LNG is concerned. Absanto & Nnko (2013) state that some product lines in companies possess a common thread which may involve similar technology, customers, distribution channels or managerial skills. As noted in previous chapters, Transnet Pipelines is using the related diversification where there is commonalities in the operation of a fuel and gas pipeline. The specialised skills will be in terms of gas handling, however, operating the line may require some up-skilling of existing pipeline operators. This is supported by Kanna & Saravanana (2012) who stated that related diversification business has a strategic attractiveness because it allows for skills transfer, lower costs and a stronger competitive advantage.

#### **5.4. Leadership strategies and skills**

One of the most important outcomes of the research was that all the interviewees felt that the TPL have the basic leadership skills necessary, which if coupled with necessary training can be of great value to the TPL's LNG venture. Interviewees argued that although there are similarities in the pipelines operations, there are differences in handling of liquid fuels and gas. Galante & Asif (2014) argue that, the major cause of failures in implementing new strategies in organisations is lack of the right leadership and the right organisational capabilities. Absanto (2013) supports this view by stating that most research studies suggest that many growing organisations recognise that some of their key executives lack the necessary skills

to take the organisation to the next level of growth, but most companies fail to act on that knowledge. As suggested by Padmanabhan (2017), leaders of tomorrow will need to develop skills, knowledge and behaviour in such a manner that they are able to influence processes, practices, policies and people.

The interviews further revealed that there is a gap in terms of lack of understanding of how the LNG business will be organised in terms of structure, there are ideas that it can be a stand-alone unit within TPL or a new stand-alone Transnet division. Magrum & Weber (2019) suggest that in order for to succeed in restructuring the organisation, company's resources must be directed to its strategic objectives and other growth areas, cost reduction and improved decision making and accountability. Leadership must foster and execute a strategy for changes that positively impact on workforce development and that begin to close the skills gap (Howell, 2017). This view is supported by Sinar & Wellins (2017) who claim that not having leaders with the right skills can cost companies the ability to respond to major changes. Although there are identified opportunities for Transnet to explore the new market, there seem to be uncertainty regarding the structure which suggests that decision making is much more complex because it involves a lot of stakeholders. Isett et al. (2013) points out that the implementation of organisational changes, such as, organisational structure, delivery of public services and governance, is a considerable challenge for public sector organisations.

## **5.5. Discussion**

The researcher observed through the research findings that there is a lot of uncertainty among the interviewees on whether TPL will be at the forefront of the LNG venture. This has shown that there is leadership direction that is required from Transnet Group in this regard. The communication among key stakeholders on this subject seem to be limited because during interviews, interviewees demonstrated knowledge that was limited to the individuals' areas of expertise and they provided mostly general perceptions about the project. The different training offered within Transnet Pipelines needs to also cater for future opportunities that the organisation is looking at. This is mainly because some skills may end up redundant if TPL continues with the LNG venture.

Employee readiness with the organisation may also be a challenge if there is no deliberate effort to openly and honestly communicate about the future of the organisation. This may be an oversight from leadership, however, the project timelines need to be considered so that all relevant resources, including human resources are ready for the implementation.

The uncertainty in terms of the business model to be utilised was mentioned a few times during the interviews, this poses is a concern to the researcher because if this is not known or communicated properly with employees at this stage, it will make it difficult for TPL to implement and execute when the time arrives to do so. There needs to be

## **5.6. Chapter summary**

This chapter discussed the findings as presented in chapter four. A number of conclusions were drawn from the interviews conducted and from the literature. Linking literature with the actual study allowed the researcher to reach the set objectives of the study. The next chapter provides conclusion and recommendations.

## CHAPTER SIX

### CONCLUSION AND RECOMMENDATIONS

#### 6.1. Introduction

The researcher set out to evaluate the impact of implementing LNG as a new strategy for Transnet Pipelines. In order to achieve this, the researcher successfully investigated current skills, required skills and leadership strategies to implement this. This section summarises the research findings in line with the research questions and objectives as highlighted in the introduction chapter of this dissertation and provides recommendations. Overall the research questions were answered. The study was aimed at answering the following research questions:

- What are the skills needed to implement Liquefied Natural Gas (LNG) as a new business strategy for Transnet Pipelines?
- Are employees skilled appropriately for the implementation Liquefied Natural Gas (LNG) as a new business strategy for Transnet Pipelines?
- What are the strategies that can be used by Transnet Pipelines Leadership to successfully implement the new Liquefied Natural Gas (LNG) strategy?

#### 6.2. The aim of the study

The aim of the study was to evaluate the impact of the implementation of Liquefied Natural Gas (LNG) as a new business strategy for Transnet Pipelines in Durban, KwaZulu-Natal.

#### 6.3. The objectives of the study

The study focused on the specific objectives described below:

- To identify skills needed to implement Liquefied Natural Gas (LNG) as a new business strategy for Transnet Pipelines;
- To understand if employees have required competencies to implement Liquefied Natural Gas (LNG) as a new business strategy for Transnet Pipelines; and
- To recommend strategies that can be used by Transnet Pipelines Leadership to successfully implement of the new Liquefied Natural Gas (LNG) strategy.

#### **6.4. Overall summary of findings**

The findings of the study and literature review show that for the successful strategy implementation, an assessment of TPL readiness to implement this strategy is crucial. Generally, there was uncertainty among the interviewees regarding how the new operations of LNG would affect the current TPL operations. The study further confirmed that there is uncertainty in terms of staffing of the envisaged new LNG venture. The interviewees were not sure of a number of crucial factors. For example the staffing model that would be used, and where the initial phase of the LNG venture would start considering that TPL operates from a number of locations around South Africa. The data indicated that all the interviewees were certain of the fact that the TPL lacks skills necessary for such a venture and that such a venture would require skills that range from un-skilled, semi-skilled, skilled, and managerial skilled employees.

There was no consensus among the interviewees as to how many employees would be required for such a venture and how long it would take to acquire such skills. The responses of the interviewees indicated that the TPL, and Transnet as a group do have the necessary leadership skills but that such skills may need to be widened to include LNG operations. The lack of understanding regarding how the LNG business will be organised in terms of structure, there were ideas suggested by interviewees, such as a stand-alone unit within TPL or a new stand-alone Transnet division. There was also a view that perhaps the leadership structure should change within TPL if such a venture were to be embarked upon, depending on the model to be used. It is concerning that there seem to be a decision that was taken in the leadership structures of the organisation that Transnet will be going the LNG route, however, there seem to be uncertainties regarding the important matters such as the LNG structure. These are decisions that need to be communicated to all relevant internal and external stakeholders so that the project is not delayed as per the project timelines.

#### **6.5. Recommendations**

In light of the main findings of this study, the recommendations deemed to be appropriate for the organisation under study are presented below.

Regarding the gap identified in terms of the uncertainty of the skills required to implement LNG as a new business strategy. It is recommended that;

- Transnet Pipelines needs to properly assess their readiness to implement the LNG strategy. This needs to be formally conducted and an experienced LNG skills service provider must be given a detailed scope of the requirements to ensure a successful implementation.
- The scope must not be limited to skills but must encompass issues such as the strategies required, roles and responsibilities, legal and regulatory requirements.
- The staffing model that will be adopted for this venture needs to be articulated properly in consultation with the respective human resources departments to facilitate recruitment, training and other human resources related matters. This process will be supported by the skills mapping exercise that was conducted with TPL to determine LNG skills gaps.
- Training needs analysis also needs to be conducted to identify suitable training that internal employees need to undergo to bridge the existing skills gaps. Training can be in the form of on-the-job training, off-the-job training or through engaging with other training and development service providers with sufficient experience in the LNG business.

Regarding clarity required in terms of the LNG business model that needs to be used, so that it provides direction on how long it would take to set up such a business and how long it would take to acquire the required skills. It is recommended that;

- Direction be provided by the Transnet leadership in terms of the LNG business model that Transnet will opt for.
- The LNG strategy needs to be developed for Transnet as a whole which will then incorporate roles and responsibilities of different operating divisions to ensure that each division is aware of their respective requirements for the project as a whole.
- Communication in terms of the LNG project needs to improve in order for all employees to be aware of and aligned to the strategic vision of the organisation. This mainly includes the progress to date in terms of the LNG project, the timelines involved and all the important matters that may have an impact on current and future operations of the organisation.

Regarding the leadership strategies and skills required to implement the new strategy, it is recommended that;

- The leadership team should undergo training and development to ensure that they are well acquainted with the requirements of operating and managing the LNG operations. This can be done by formal training, exposure to the existing LNG plants and operations globally and attendance at global LNG seminars and conferences.

## **6.6. Limitations of the Study**

There were limitations in terms of gathering data because of the construction of the data collection instrument. This was mainly because of the limited knowledge of the topic during the development of the instrument. Therefore, this led to the research being limited to skills for LNG implementation only which meant the study did not include all the possible factors that might influence the successful implementation of LNG strategy.

The study was conducted only at head office, which meant that some useful information from the depots might have been missed.

## **6.7. Recommendations for Future Studies**

The current study looked at skills required for both the leadership team and employees to successfully implement LNG as a new strategy for TPL. A specific sample was selected because of the perception that they might be knowledgeable of the skills required for LNG business. Future research may look at a diverse sample comprising a number of different individuals from the energy industry as a whole and maybe government representatives. In addition, further study to evaluate the impact of factors other than skills for the successful implementation of the LNG strategy.

## **6.8. Conclusion**

The study was conducted to evaluate the impact of implementing LNG as a new strategy for Transnet Pipelines. Since the research study was only conducted at one Transnet operating division the findings and recommendations cannot be generalised with any degree of confidence. Although the conclusions drawn from the literature and the interviews conducted attempted to answer the research questions, the data collected and analysed revealed that there is limited knowledge

within the TPL regarding the impact of implementing LNG as a new business strategy and the skills required to successfully accomplish this.

It has been shown that there is a serious need for a LNG strategy to be developed that will encompass all aspects including skills. On the other hand, other challenges were found to have an impact on the implementation such as the lack of LNG-related skills in South Africa as a whole. These include LNG technical skills, LNG gas plant operation, management and maintenance skills. In terms of the strategies that can be used by Transnet Pipelines Leadership to successfully implement the new Liquefied Natural Gas (LNG) strategy, this study found that the indication that an external service provider has been identified to assess the current versus future skills required to successfully implement the new strategy, is a good sign that the TPL is trying to determine their readiness for this strategy. Having said this, they also need to align their skill requirements with their LNG project timelines, especially for the project execution phase.

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# APPENDIX A

## Ethical Clearance



30 May 2019

Ms Cynthia Motaung (218039522)  
Graduate School of Business & Leadership  
Westville Campus

Dear Ms Motaung,

Protocol reference number: HSS/0385/019M

Project title: The impacts of the implementation of Liquefied Natural Gas (LNG) as a new business strategy for Transnet Pipelines

### Approval Notification – Expedited Application

In response to your application received on 25 April 2019, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol has been granted **FULL APPROVAL**.

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

The ethical clearance certificate is only valid for a period of 1 year 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 Shamila Naidoo (Deputy Chair)

/ms

Cc Supervisor: Dr Njabulo Khumalo  
cc Acting Academic Leader Research: Professor Ana Martins  
cc School Administrator: Ms Zarina Bullyraj

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Humanities & Social Sciences Research Ethics Committee

Dr Rosemary Sibanda (Chair)

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Website: [www.ukzn.ac.za](http://www.ukzn.ac.za)



Founding Campuses: Edgewood Howard College Medical School Pietermaritzburg Westville

## APPENDIX B

### Interview Schedule

<b>Objective 1: To identify skills needed to implement Liquefied Natural Gas (LNG) distribution as a new business venture for Transnet Pipelines</b>	
QUESTIONS	<ol style="list-style-type: none"><li>1. What skills are required for TPL to successfully implement LNG distribution as a new business venture?</li><li>2. How long do you believe it will take to acquire these skills?</li><li>3. How are these skills going to be acquired?</li></ol>
<b>Objective 2: To understand if employees have required competencies to implement Liquefied Natural Gas (LNG) distribution as a new business venture for Transnet Pipelines</b>	
QUESTIONS	<ol style="list-style-type: none"><li>1. Does TPL currently have the required skills?</li><li>2. In terms of capacity, can TPL afford to lose these skills or is there a possibility for the current skilled employees to be seconded to this new venture?</li><li>3. As a follow up question to the previous one, how many employees do you believe need to be recruited at the start of the new venture implementation?</li><li>4. Was an assessment conducted to find out if these employees would be willing to be seconded?</li><li>5. How is this going to affect the current TPL operations in terms of staff complement?</li></ol>
<b>Objective 3: To recommend strategies that can be used by Transnet Pipelines Leadership to successfully implement of the new Liquefied Natural Gas (LNG) distribution venture</b>	
QUESTIONS	<ol style="list-style-type: none"><li>1. Based on your knowledge of the current leadership, do you believe they are well equipped in terms of skills to implement the new venture?</li><li>2. Do you believe this new venture will necessitate changes in the leadership structure?</li><li>3. What leadership development training is required to ensure that they are ready to implement the new venture?</li></ol>

## APPENDIX C

### Turnitin Report



## Digital Receipt

This receipt acknowledges that Turnitin received your paper. Below you will find the receipt information regarding your submission.

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