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POLICY RESPONSES TO SKILL FORMATION AND INDUSTRIALIZATION IN NAMIBIA: AN INNOVATION AND TRIPLE HELIX MODEL

By

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Submitted in partial fulfilment of the requirements for the degree

MAGISTER TECHNOLOGIAE: COMPARATIVE LOCAL DEVELOPMENT

in the

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May 2018

DECLARATION

I hereby declare that this dissertation submitted for the degree Magister Technologiae at Tshwane University of Technology, is my own original work and has not been previously submitted by me or anybody else to any other university or institution of higher education. I further declare that all sources cited or quoted are indicated and acknowledged by means of a comprehensive list of references.

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Patrick Masiziani Date

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DEDICATION

This piece of research work is dedicated to my late father; Mr Thomas Munichiya Masiziani who groomed and nurtured me to be the kind of man I am today.

ACRONYMS

AFDB	African Development Bank
COSDECs	Community Skill Development Centres
ETSIP	Education and Training Sector Improvement Programme
HEIs	Higher Education Institutions
IUM	International University of Management
MDGs	Millennium Development Goals
MOSS	Ministry of Health and Social Services
NPRSAP	National Poverty Reduction Strategy Action Programme
NCRST	National Commission on Research, Science and Technology
NDP	National Development Plan
NPC	National Planning Commission
NPRSTI	National Programme for Research, Science & Technology and Innovation
NSA	Namibia Statistics Agency
NSFAF	Namibia Student Financial Assistance Fund
NIPAM	Namibia Institute of Public Administration and Management
NIMT	Namibia Institute of Mining Technology
NSI	National System of Innovation
NTA	National Training Authority
OECD	Organization for Economic Co-operation and Development
PPP	Private-Public Partnership
PRS	Poverty Reduction Strategy
NUST	Namibia University of Science & Technology
TIPEEG	Targeted Intervention Programme for Employment and Economic Growth
UNAM	University of Namibia
VET	Vocational Education Training

ABSTRACT

This study aims to investigate, assess and explore policy priorities, achievements, collaborations and linkages with regard to skills generation and industrialisation efforts in Namibia. Such policy areas are viewed as the basis on which an innovation system can be built. By drawing lessons from other countries, a thorough examination of how Namibian institutions are concerned with skills development and industrialisation are at the heart of this study. The study is based on the assumption that a collaborative approach by a range of institutions and organisations is vital in fostering a knowledge-based economy, and that the effects of such interconnectedness are likely to benefit the local people. The country's National Development Plans (NDP4) articulates aspirations for Namibia to become an industrialised country and an industrial hub for Southern Africa by 2030. Such aspirations could be achieved through the introduction of the recently adopted Industrial Policy; where the focus resides on services and manufacturing sectors in areas where the country has competitive advantage.

Industrial development is commonly associated with employment creation and skills development, and the general assumption is that it benefits local people. However, it has to be acknowledged that industrial development requires adequate skills and innovation. Along with this strategic focus, it appears that the Namibian government lacks funding alternatives for postgraduate studies in Science and Technology and innovation development capabilities. From an innovation system perspective, such capabilities are formed through the collaboration of a wide range of participants including government, universities, and the private sector. The key element of this study is to find ways that collaborations amongst institutions can forge ahead policies that include the disadvantaged population in the mainstream economy. The study intends to investigate, assess and explore policy papers using a lens of the existing literature and to provide recommendations and tailor them to suit the specific Namibian context.

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CHAPTER 1: INTRODUCTION

1.1 Introduction

Namibia's colonial occupation by Germany until 1919 and the apartheid rule by the former South African Government until South Africa's independence from apartheid in 1994 resulted in severe distortions in the country's socio-economic structure. Both forms of rule resulted in locals being deprived of their rightful land possessions. These political regimes resulted in unfair distribution of income and land and thus poverty amongst the majority of nationals. However, 28 years after the attainment of independence, the growth path has not translated into tangible benefits for the majority of the population who were formerly disadvantaged by the two forms of government. The constitution of the Republic of Namibia states the following as duties and functions of the members of the cabinet (according to Article 40), "to remain vigilant and vigorous for the purposes of ensuring that the scourges of apartheid, tribalism and colonialism do not again manifest themselves in any form in a free and independent Namibia and to protect and assist disadvantaged citizens of Namibia who have been historically the victims of these pathologies" (Namibian Constitution First Amendment Act, 1998:26).

The issue of poverty in Namibia requires urgent consideration. Poverty is accompanied by drought and starvation. These are facts stated in the report released by the Ministry of Health and Social Services (MOSS) which states that between 2010 and 2013, 772 people died from starvation (Namibian Newspaper, 2013). The breakdown is as follows: In 2010, 367 deaths, in 2011, 316 deaths and 2012, 51 deaths. The figures[1] for 2013 looked better with only 38 deaths recorded from January to May, although the Ohangwena region topped the list with 15 deaths (Muyanicwe, 2013). This raises questions on the commitment of the country's law-makers to the plight of the poor and the sustainability of the country's economy.[i]

It is with this background the study suggests that a combined effort from all sectors concerned will arrest the situation the country is facing. The establishment of an effective innovation system and introduction of a Triple Helix Model amongst institutions and organisations is believed to play a vital role in addressing some of the predicaments the country is facing.

[1] These figures, however, are believed to be higher considering the fact that hospitals do not have records for those who died outside.

1.2 The purpose of the research

The purpose of this study was to explore and examine the scholarly work of institutional collaborations in Namibia and its role within an innovation system framework. The literature on innovation systems emphasizes the importance of skill generation, collaboration efforts within institutions and organizations, as the basis for the establishment of an effective innovation system. Moreover, an effective innovation system is considered to be the cornerstone of a knowledge-based economy, and the generation of a skilled work force that can feed an industrialized economy. Innovation implies mobilization of both human resources and financial capital. It is under such circumstances that a skilled work force can champion industrialization and innovation to mitigate the triple social ills of poverty, unemployment and inequality.

According to Etzkowitz (1990) and Etzkowitz & Leydesdorff (1995), institutions such as universities, private sector enterprises and government ministries and agencies concerned with development are expected to collaborate in what is referred to as the Triple Helix Model. The Triple Helix Model can be provided with a neo-evolutionary interpretation that rests on three sections such as wealthy creation, organisation control and organised knowledge production (Leydesdorff and Zawdie, 2010). Such mandates are the responsibilities of the three main institutions involved, which are government, academia and industry.

The diagram below (Figure 1.1) shows the kind of interaction which translates into the desired Triple Helix Model, specific to each region or locality. This model should not be understood as a complex issue but rather a system that allows stakeholders to take part in the development process. For instance, the involvement of stakeholders such as regional and local public office bearers like Governors, Councillors, Traditional Leaders, Community Leaders, Churches and non-governmental organizations could be involved to solicit their inputs in matters that pertained to the development of their region.

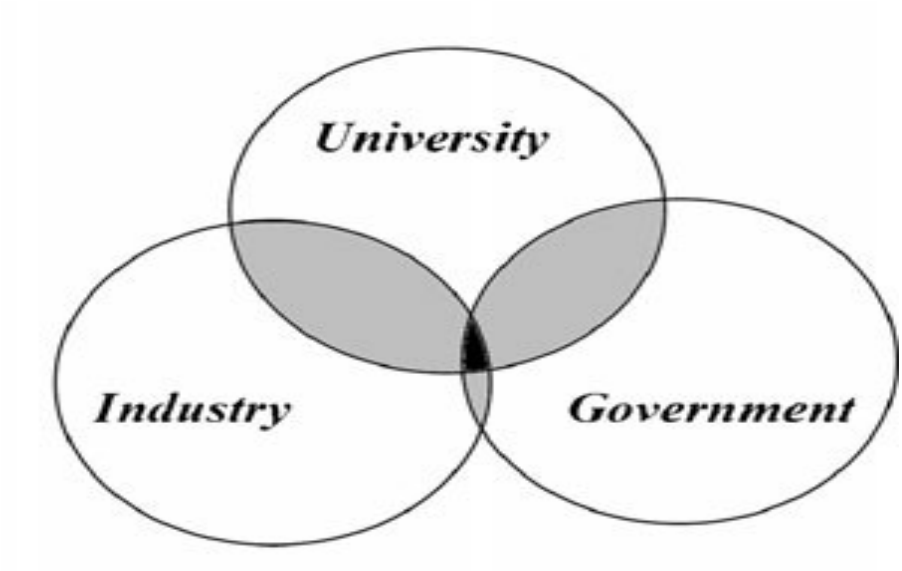

Figure 1.1: A Triple Helix Model

Source: Diagram adapted from Leydesdorff, 2012.

The notion to broaden the Triple Helix Model to more than three helices means bringing the society and the public back into play which would create the desired result as inclusivity can help address challenges at all levels of society (Leydesdorff, 2012).

This study explores the collaborations and interactions of a range of relevant institutions through the examination of their strategies, policy documents and mandates, pointing out desirable areas of collaboration according to literature and other experiences.

The assumption is that synergies among institutions, or what is known as the triple helix model of relationships between universities-industry-government, can result in collaborative

efforts to mobilize resources together and invest in education. This study will investigate the extent to which the National Commission on Research, Science and Technology (NCRST) and the Namibia Student Financial Assistance Fund (NSFAF) grant scholarships and invest in Research and Development (R&D). In addition, it will explore the extent to which the private sector is complementing the efforts of these institutions in terms of sponsoring scholarships. The argument is that as Namibia aspires to become industrialized and to achieve science and technology attributes, a more skilled work force is desired, and thus a greater investment in graduate funding will be needed.

Issues related to the formation of skills will be further explored through the question of equity of scholarship funds for the poor, since education in Namibia is not free. In this respect, the aim is to address the extent to which the poor benefit from such schemes. This statement can be qualified by a quote from National Council for Higher Education (2010:14) which states that, "One of the major challenges facing the higher education system in Namibia is to develop an equitable system where access to higher education goes alongside equity. Although strides have been made in terms of opening up the higher education sector to marginalised communities and to previously disadvantaged people, the higher education system of Namibia is not yet accessible to all".

The results of this study are likely to inform a range of institutions in Namibia such as the National Planning Commission (NPC), the Prime Minister's office, the Ministry of Higher Education, Ministry of Trade, Industrialization and SME Development, the Ministry of Mines and Energy, institutions of higher learning, research institutions, the private sector, civil society organizations, and Non-Governmental Organizations (NGOs). Perhaps, the most important are the following four recently established independent institutions: the National Commission on Research, Science and Technology (NCRST), the Namibia Student Financial Assistance Fund (NSFAF), Namibia Training Authority (NTA) and Namibia Institute of Public Administration and Management (NIPAM). These institutions are viewed as active role players in the country's innovation system, skills development and industrialization. According to Etzkowitz & Leydesdorff, (2000), there is evidence to indicate that the Triple Helix Model is an important analytical model that describes and explains the dynamics of the variety of institutional arrangements and policy models. The

Triple Helix Model is seen as a mechanism that is expected to develop an emerging overlay of communication networks within organisations in an innovation system. In addition, Leydesdorff & Zawdie, (2010) point out that the Triple Helix Model perspective enables us to study innovation systems in empirical terms, for example: the extent to which arrangements are considered to be a system and analysis of best practice trends. Such a model would be a foundation for Namibia, who may realise her dream of becoming an industrialized innovative nation with a skilled workforce. .

In summary, a Triple Helix Model and innovation overlap in the sense that they both foster networking and knowledge and skills transfer within institutions and organisations amongst institutions (Leydesdorff 2000).

1.3 Aims and Objectives of the study

The overall aims and objectives of this study are to discuss Namibia's priorities in terms of skill development and industrialisation; to assess the achievements and to explore the linkages and collaboration accomplishments in skill formation and industrialisation. The specific objectives of the study are:

- To investigate what are the policy priorities in terms of skill development and industrialization in Namibia.
- To assess the achievements in terms of skill development and industrialization in Namibia.
- To explore the linkages and collaboration accomplishments to attain an innovation system in Namibia.

On this basis the research questions that will be answered in this study are the following:

- What are the policy priorities in terms of skill development and industrialization in Namibia?
- What have been the achievements in terms of skill developments and industrialization in Namibia?
- What are the linkages and collaboration accomplishments to attain an innovative system in Namibia?

1.4 Significance of the study

This study is underpinned by previous research and it can also be supported by a strong global belief that collaboration and interactions amongst key role players in its development can result in an effective innovation system. OECD (2007) asserts that innovative joint ventures between the private sector, government agencies and universities should promote co-operation that could benefit society. This study notes, however, that this approach has been missing in Namibia, given the fragmentation amongst role players in an innovation system. The same view is also shared by the National Programme on Research, Science, Technology and Innovation (NPRSTI) (2014) which notes that Namibia's innovation system is fragmented and so the NPRSTI should be adequately empowered to undertake the co-ordination functions for effective execution of its mandate. Similarly, it should also be able to play a role as a national hub to facilitate exchanges, together with other RST interfaces, such as technology transfer offices.

Secondly, this study notes that significant policy priorities have been put in place regarding skill development and industrialisation in Namibia. Although these policies from the following institutions are not necessarily in accordance with each other and are not all implemented, they are from: The Ministry of Mining and Energy, Trade, Industrialization and SME Development, Higher Education, Training and Innovation, Labour Ministry, the National Planning Commission (NPC), Universities, National Commission on Research, Science & Technology (NCRST), Namibia Institute of Public Administration (NIPAM), National Training Authority (NTA) and Namibia Student Financial Assistance Fund (NFSAF). On the basis of the evidence provided, this study advocates for a Triple Helix Model approach as a model that would help Namibia achieve its skill development and industrialisation agenda. Etzkowitz *et al.* (2007) states that in a knowledge-based society, universities, industries and governments have equal roles and form a Triple Helix in stimulating innovation. While government helps support new developments through changes in regulating the environment, offering tax incentives, and providing public venture capital; industry can take the role of universities by developing training and research (Etzkowitz *et al.* 2007). The presence of such interactions can help jump-start the creation of innovation and thus expansion of economic growth. Empirical studies of the Triple Helix Model reveals that exchange relations and insights from science and technology studies enhance knowledge

production, and such knowledge can add value to economic exchange relations (Leydesdorff, 2009).

Thirdly, on the question of achievements in terms of skill development and industrialisation, Namibia has prioritised policy and institutional formations. But, what remains to be seen is whether such policies and institutions will live up to their expectations and mandates. For instance, the formation of the National Commission on Research, Science & Technology NCRST, NSFAF, NIPAM, Vocational training centres and the Namibia Statistics Agency (NSA) are taking steps in the right direction toward the attainment of skill development and industrialisation. This is because these institutions deal directly with skill development and industrialisation achievement.

It has been stated that if these institutions could collaborate, harmonise their policies and effectively implement policies geared towards skill development and industrialisation, their interactions are likely to bring benefits to the local community. The National Programme on Research, Science, Technology and Innovation (2014) articulates the development of indigenous knowledge, partnerships between academia and socio-economic sectors such as agricultural sectors and other public bodies as collaborative initiatives that are likely to benefit the local people.

In summary, this study presents critical questions that need to be answered as these questions form the framework of the study. As such, the establishment of an effective system of innovation and a Triple Helix Model within the institutions concerned, incorporating skill formation is the cornerstone for development. The general understanding is that synergies may bring about stakeholders' involvement at grassroots level and by doing so benefit the local population.

1.5 Outline of the study

This study will be presented in six chapters:

Chapter 1: Introduction and Background of the Study

This chapter provided an overview of the topic highlights starting with the introduction, the purpose of the research, aims and objectives of the research and the significance of the study.

Chapter 2: Research Methodology/Design

This chapter outlines how data was collected and analysed in this study. It also gives a brief description on the research methodology that was used with highlights on interpretive and descriptive methods which implies that the study took a qualitative research design/method. In this section, specific attention is given to analysis of policy documents, data from the World Bank and interview questionnaire from stakeholders directly dealing with policy formation on skills development and industrialization in Namibia.

Chapter 3: Namibia socio-economic and policy landscape

This chapter introduces to the reader a geographical description and socio-land scape where the study was conducted. It also highlights on Namibia's broad developmental approaches, policy frameworks that relates to skills formation, industrialization and innovation as well as a brief description of Namibian institutional land scape.

Chapter 4: Literature Review

This chapter reviews scholarly work with special emphasis on innovation systems and how policies sharps skills development and industrialization, Institutional and organizational collaborations, the triple helix linkages between government, industries and academia. Finally, lessons drown from South African innovation systems are examined and viewed to be critical for Namibia in its efforts towards attainment of skills, industrialization and innovation.

Chapter 5: Analysis of data

In this chapter a precise summary of the research findings on data is presented is analysed and assimilated with emphasis on data gathered from respondents (interviews questionnaire), data from the Word Bank and from policy papers.

Chapter 6: Conclusion and Recommendations

This chapter sums up the research findings, draw conclusions and make recommendations.

CHAPTER 2: RESEARCH METHODOLOGY/DESIGN

2.1 Introduction

This chapter discusses and examines ways in which data was collected for this study and how the data was analysed. In addition, various Namibian policies and development strategies are also discussed and analysed. The study takes an interpretive approach as is defined by De Vos *et al.* (2013:8) who states that interpretive and descriptive approaches place emphasis on detailed reading and examination of a text. This could refer to conversation, written words or pictures. In this case, extensive reading was undertaken to uncover meaning embedded within texts. More specifically, readings included the Mineral Policy of Namibia, National Commission on Research, Science and Technology (NCRST) Policy, the Education Policy, Namibia Student Financial Assistance Fund (NSFAF) Policy and the Namibia's Industrial Policy as well as research literature to strengthen the argument presented in this study. Essentially, a number of development strategies were revised including: National Development Plans starting with NDP 1-5. The critical examination of such policies and strategies is intended to determine whether institutional collaboration, industrialization, science & technology and innovation can benefit the poor. Data from the World Bank website was gathered to determine and measure whether Namibia is on the right track when it comes to skill formation and industrialisation. To support the argument hereto, interviews were conducted with the administrative managers at the National Commission on Research, Science & Technology and Innovation as well as directors and their deputies at the National Planning Commission.

The study also compares innovation systems for Namibia and South Africa given the fact that the two countries share almost the same historical and economic state of affairs. The study is desktop research and will employ a qualitative paradigm. This research design was formulated as a plan or a blue print by the researcher to conduct this study. According to Welman and Kruger (2002) refers to research design as a plan used by the researcher to obtain research participants and collection. The study was carried out through a qualitative research design where policy documents, information from the World Bank and information from respondents are used as case study method. Meanwhile, the data will be analysed using policy discourse analysis as well as an explanatory and descriptive method. A descriptive research design help provide answers to the questions of who, what, when, where, and how associated with a research problem. Though the study cannot answer the question why? A

descriptive study can however, be used to obtain information concerning the status of the phenomenon and to describe "what exists" with respect to variables or conditions in a situation. In this case the researcher adopted a descriptive and explanatory research design in the study to allow the dynamics of the study to be discussed and for the researcher to continue find causes and solutions.

2.2 Data Collection

This section presents how the primary and secondary data was collected. It is important to point out that the study mainly took a desktop approach in gathering data. Desktop research has relative advantages which includes trustworthy information. Nowadays, information on organizations and institutions is mostly found in electronic form, extended over several locations such as desktop computers, Personal Digital Assistant (PDAs), mobile phones, digital cameras, (Chirita *et al.* 2006). Desktop research, also known as secondary desk research, is comprised of accessing data from public records, and these days are almost fully accessible through the Internet and company or organization websites (Anderson, 2010).

2.2.1 Policy Documents

Policy documents and other relevant information were collected from offices such as the National Commission on Research, Science & Technology and Innovation (NCRST), the Namibia Student Finance Assistance Fund (NSFAF), National Planning Commission (NPC), Ministry of Trade and Industry, Ministry of Higher Education, Training and Innovation, Ministry of Mines and Energy, University of Namibia, Namibia University of Science & Technology (NUST), Namibia Institute for Public Administration and Management (NIPAM), Namibia Training Authority (NTA) and Namibia Statistics Agency (NSA).

To add value to this study, interviews were conducted to strengthen the argument. The targets were key institutions such as the National Commission for Research, Science and Technology and the National Planning Commission. The interview questions focused on issues regarding achievements in:

- Skills formation and industrialization,
- The institutes' policy priorities,
- The institutes' mandates, as well as
- The linkages and collaboration establishments fostering innovation in Namibia.

The outcome of the interview will be discussed further in Chapter 5 where the data is analysed and the interview questionnaire is attached as Appendix 1.

2.2.2 World Bank Data

In addition, important data was collected from the World Bank website. Such data is used to analyse information using different variables. The detailed analysis of data through graphs will feature in Chapter 5. The World Bank data presents Namibia's achievements in skills formation and industrialisation.

2.2.3 Interview from the National Commission on Research, Science and Technology and the National Planning Commission

To reinforce the argument, interviews were conducted with senior staff members at the NCRST and the NPC. The interview was an attempt to gather primary data, since the targeted institutions are believed to be in possession of the much needed policy information on development, industrialisation and innovation. The interviews also facilitated the researcher to gather first-hand information from respondents whose work it is to deal with these policy issues.

2.3 Data Analysis

This section discusses how data will be analysed in this study. The study deploys two approaches to analyse the data.

2.3.1 Interpretive Approach

In this section, policy documents and information gathered from the interviews at the NCRSTI and the NPC will be interpreted but analysed in Chapter 5. A summary and analysis of the managers' responses from the NCRSTI and the directors at the NPC during the interviews will be presented. Elliot & Timulak, (2005) contend that "qualitative research also requires flexibility during the analysis phase as well, with procedures developing in response to the ongoing analysis". This is true as the researcher needs to read the whole data in order to achieve the whole picture of the phenomenon being studied. The study examines a number of government policies and strategies deployed towards industrialization, skill generation and innovation attainment. This makes policy discourse relevant. Hewitt (2009:4) indicates that public policy research points-out "the themes and issues of public policy embrace political, economic and social life, as well as the environment in which we live". The idea of power relations indicates a common feature of public policy, which is to bring to mind the actions of the government. Secondly, the role of the state has evolved through

history as government has sought to intervene when people's lives are in jeopardy. Thirdly, public policy research questions the legitimacy of the government to take decisions on behalf of their population, the operation of democracy, and the accountability of state actors. Finally, public policy is often described as a process which is dynamic and continuous, and involves many elements (Jenkins, (1993) cited by Hewitt (2009)).

2.3.2 Descriptive Approach

In this study, data from the World Bank website regarding Namibia's skills and industrialization efforts was analysed. Variables such as R&D expenditure, manufacturing, value addition to GDP, school enrolment at primary, tertiary level, primary education teachers, tertiary education and industry and its value were used. The other variables looked at adjusted savings: mineral depletion (% of Gross National Income (GNI) and adjusted net national income (annual % growth) as well as unemployment, and youth total (modelled by International Labour Organization (ILO) estimates). Such variables were used considering the fact that issues such as: level of education, R&D, manufacturing and trade and mineral beneficiation are widely discussed in this study as they play a crucial role towards the attainment of skill formation and industrialisation. These issues are also mentioned in policy documents as development strategies the government would like to deploy in its developmental efforts. To conclude, data from the World Bank as well as from interviews conducted with the senior staff from the NCRSTI and the NPC will be analysed and discussed in the Data Analysis chapter, Chapter 5.

In summary, a major purpose of many social scientific studies is to describe situations and events (Mouton, 2009). A range of context which may formulate descriptive research include conceptual analysis, narrative descriptions, case studies and multivariate descriptive statistics. Mouton (2009) pointed out that the major aim of explanatory studies is to indicate causality between variables and events. The above scenario makes the two chosen approaches relevant to this study.

The next section discusses the geographical locality where the study is conducted. The section explicitly looks at the geographical landscape, population dynamics, socio-economics, policy landscape as well as the institutional landscape that shapes Namibia's policies and its economic status toward the attainment of the much desired skills and industrialization.

CHAPTER 3: NAMIBIA'S SOCIO-ECONOMIC AND POLICY LAND SCAPE

3.1 Geographical description and socio-economic status/indicators

Namibia is a relatively small country which has a land area of 842,000 sq. km. The country's neighbours are Angola in the North and South Africa along the South Atlantic Ocean and Botswana in the east and Zambia in the far north east (Nyiira, 2005). Namibia is situated mostly on a high plateau and is generally arid with prolonged periods of drought resulting in a limited agricultural base with only about 2% of land receiving good rainfall (Nyiira, 2005). However, the Agricultural sector exports about 10% of animal products, live animals and crops. Namibia has a population of about 2.1 million according to the 2011 national housing and population census (National Planning Commission, 2012). The country is characterized by high unemployment rates, poverty and income inequalities. According to a study conducted by the Ministry of Labour and Social Welfare and Namibia Statistics Commission in 2008, during the global economic meltdown, the country recorded a record high unemployment rate of 51.2% (AFDB *et al.* 2012). However, the results from the Namibian Lour Force Survey conducted by the Namibian Statistics Agency in 2014 highlighted that the unemployment rates have significantly reduced in recent years. From this survey the overall unemployment rate stands at 28.1% while youth unemployment is relatively high at 39.2% (Namibia Statistics Agency, 2015).

The Ministry of Labour and Social Welfare (2013) refer to unemployment in a broad sense when all persons within the economically active population or working age group are without work but are available for work, irrespective of whether or not they are actively seeking work. According to the report by African Economic Outlook, "the high youth unemployment is mainly attributed to the educational system that does not equip learners with the skills required by the labour mark*et tho*ugh the education sector receives the highest share of the national budget" (AFDB *et al.* 2012).

To reduce the high unemployment rate, greater efforts to improve on the educational system, are being made, - such as the introduction of free education in all government primary schools. During the 2013/2014 financial year, the education ministry received the lion's

share of R10.7 billion (Nakale, 2013). The budgetary allocation translates into R418.96 to each learner at primary school per year (Nakale, 2013). The national budget for 2015/2016 reveals an increase in education spending of R11.3 billion. One of the key changes in that year's budget was the introduction of free education at secondary school level in all government schools according to a report from the Ministry of Finance (Ministry of Finance, 2015). The year 2013 also witnessed significant development in terms of increased number of textbooks for learners. However, the argument is that such increases in education spending have not yet translated into benefiting the local people as the unemployment rate remains high.

One reason for the high unemployment figure in urban areas could be attributed to the youth population migrating to the cities in search for employment opportunities. Figure 2.1 below shows that the unemployment rate in a broad sense is higher in urban areas than in rural areas for both male and females (Namibia Statistics Agency, 2012).

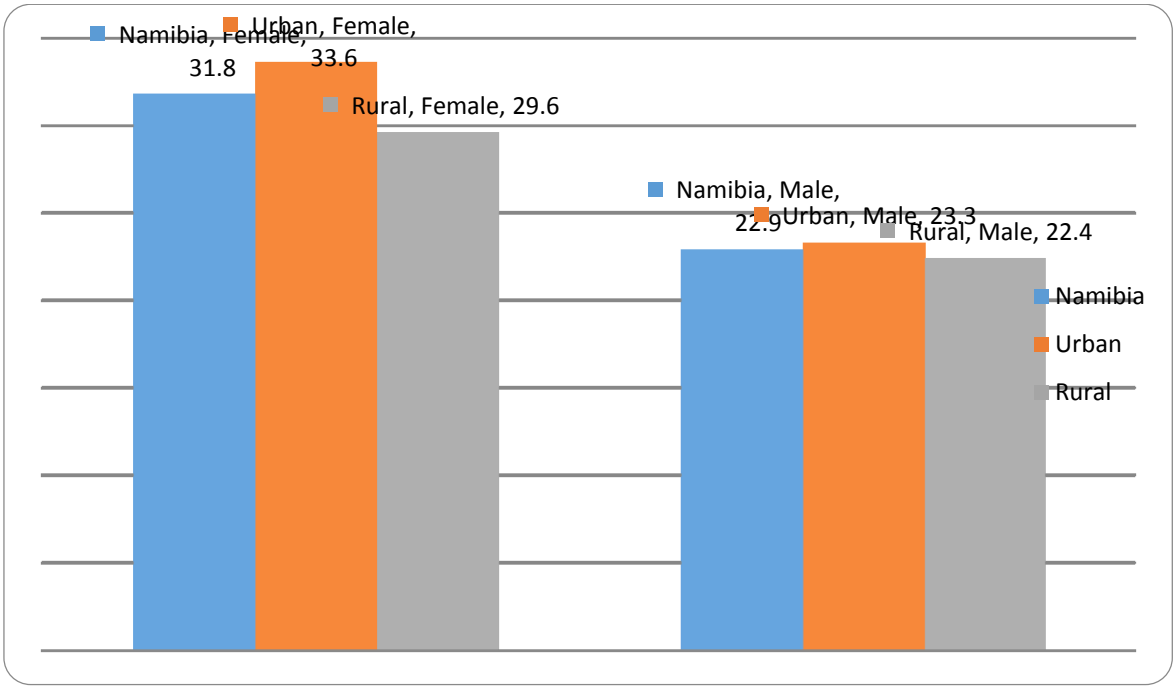

Figure 2.1: Unemployment rate by area and gender in percentages

Source: Labour survey conducted by the Ministry of Labour and Social Welfare and National Statistics Agency in 2011: Adapted from Namibia Statistics Agency, 2012

Disparities are also evident in rural and urban areas of Namibian households. For instance, 13, 6% of the severely poor households are situated in rural areas compared to 4, 4% in urban areas, while 27, 2% poor households are situated in rural areas compared to 9, 5% in urban areas. In comparison to surrounding countries, Namibia has a high Gross Domestic Product (GDP) per capita. However, Namibia is home to one of the world's most unequal income distributions between the rich and the poor (AFDB *et al.* 2012). Namibia is classified as an upper-middle income country, but also yields a high Gini-coefficient (Ministry of Labour and social welfare, 2013). Figures show that the Gini-coefficient came down quite significantly, from 0.70 (out of one) in 1993/1994 to 0.63 in 2003/2004 and it has improved further, - to 0.58 in 2009/2010 Namibia Household Income and Expenditure Survey (NHIES, 2010). This means distribution of income is becoming "fairer". Meanwhile, there is also signs of decline in poverty levels.

It has been argued that Namibia's ambitions and aspirations for industrial development could be achieved given the country's already existing good roads, railways, telecommunications and port facility network infrastructures (Runji, 2003). The same scholar states that Namibian transport infrastructure is comprised of a well-developed and well-maintained road network of high quality bitumen surfaced roads and rail track, connected to the South African rail system; the ports of Walvis Bay and Lüderitz; and several airports capable of handling large jet aircraft. However, the serious challenge that needs to be scrutinized is how industrialization benefits the local people given the country's skills deficit and low level of science & technology and innovation. This argument is acknowledged by Hahn (2010:19) who states that, "dedicated technology transfer centres, technology parks and innovation support providers are understood to be currently comparatively less well developed".

Namibia is not only facing critical shortages of skilled human resources but also faces a skills mismatch. According to Mwinga (2012:13), "Even during periods of high economic growth, employment opportunities do not increase faster, that means the employment intensity in Namibia is very low (no positive relationship between economic growth and employment growth)". According to Mwinga (2012) structural unemployment is caused by factors such as the nature of the educational system the country has and its interface with the needs of the labour market (i.e., the skills mismatch problem), technical change and the use of capital-intensive techniques for the production services, and permanent shifts in the

demand for goods and services. The above statement is supported by Namibia Household Income & Expenditure Survey 2009-2010 conducted by the Namibia Statistics Agency (2012), which indicates that despite reduction in both the incidence of poverty and the incidences of severely poor households, poverty still remains disproportionately higher in female headed households.

Studies have indicated that development practitioners attribute Namibia's social fabric to the lack of skills, poor science & technology innovation, poor industrial development as well as lack of collaborations amongst institutions and a weak national innovation system. This statement can be qualified by scholars like Marope who reported that tertiary institutions have failed to contribute to knowledge and innovation systems (Marope, 2005). This observation is backed by Nyiira (2005) who stated that "Critical constraints in the Namibia's science, technology and innovation system lie with how the roles played by the stakeholders are coordinated to ensure that they are harmonized and executed in tandem with the common objective of causing research, science, technology and innovation to increase economic growth and improve the livelihood of the Namibia people" (Nyiira, 2005:8).

From an innovation system perspective, government ministries and agencies, universities, research institutions and the private sector are expected to collaborate in order to achieve the national goals and objectives set out in the country's Vision for 2030. According to Vision 2030, Namibia aspires to achieve a knowledge-based economy through a knowledge-based society (National Planning Commission, 2012). The importance of a knowledge-based economy is also emphasized by Marope (2005:2) who recognizes that "a knowledge-based Namibian economy would be manifested in an enhanced capacity to apply knowledge and technology to increase the range and value of products derived from the country's rich natural resource base". The study assumes that local people will explore opportunities surrounding change-generating ideas (Bell, 2006).

The ambitions and aspiration for Namibia to become an industrialized nation are evident in the country's long term Vision 2030, industrial policy and the country's National Development Plans (NDPs). The main focus of the country's economic priorities is to address the type of economic structure Namibia should have by 2030. These are informed by the Industrial Policy which states that given the scarce resources, the country needs to

adopt a targeted approach to industrial development, and so the focus should be on logistics and distribution, tourism, enhancing manufacturing capabilities and agriculture (Ministry of Trade and Industry, 2012). Such goals and objectives could be achieved given the already existing good infrastructure in place, the country's peace and stability as well as its political will. This is relevant, as it can be seen from Aubert's work, who states the need to evaluate policies, appraise innovation capabilities and systems in order to define or fine tune government interventions (Aubert, 2005).

Aubert's (2005) study argues that the needs for education and training can be addressed through the collaboration of a range of institutions in an innovation system. Fagerberg *et al.* (2005) contends that innovation is the driving force for tacit knowledge which can result in codified knowledge being generated and exchanged. This forms a fundamental part of knowledge management (Paulin & Suneson, 2012). These components are believed to be the building blocks for skills development and industrialization, and can only be achieved through collaboration amongst role players in the development process. It also implies that knowledge collected, assimilated and distributed can be diffused and adopted for the benefit of the local people. This implies that collaboration amongst academia, industry and government institutions that are concerned with skill development and industrialization needs to work together to create an environment or platform where knowledge and skills are shared to help build a knowledge-based society.

In this study, knowledge creation is argued to be the responsibility of all stakeholders concerned with the overall development of the country. This implies the development and support of a national innovation system to oversee interconnectedness among active role players in the development process. On the basis of these arguments, it is believed in this study that partnerships may be crucial in creating a knowledge-based society which can later translates or forge ahead issues of skills development and industrialization. The benefits of an effective innovation system may therefore address the challenges of poverty, unemployment and inequalities that the country faces.

It is believed that such efforts are geared towards making the country's productive sectors, such as mining, more competitive which will add value to the country's mineral resources. This may create more employment opportunities and develop skills.

3.2 Innovation and skill generation within the mining sector

The Namibian mining sector is one of the industries that require innovative efforts as it is one of the biggest contributors to the nation's economy and creation of employment opportunities (Figure 3.1).

The Namibian economy relies heavily on the extraction and utilisation of its abundant natural resources, which includes some of the world's most unusual flora and fauna as well as minerals (OECD*, et al.* 2013). The mining industry, compared to agriculture and fishing, is of vital importance because it substantially contributes to the country's GDP. For instance, it contributed about 13% to the country's GDP compared with 6% and 4% for agriculture and fishing respectively in 2006 (AFDB/OECD, 2008).

The mining and quarrying sectors contributed 9.6% to the GDP in 2010 and this provided over half of Namibia's exports. This figure has declined from a decade ago when the sector contributed 9.9%, albeit only a slight decrease. Meanwhile, the overall contribution of agriculture, forestry and fishing in 2010 was 7.4% (AFDB *et al.* 2012). Namibian manufacturing is mainly dominated by fish and meat processing. The manufacturing sector contributed about 15.6% in 2006 which improved slightly in 2010 to 15.8% (AFDB *et al.* 2012).

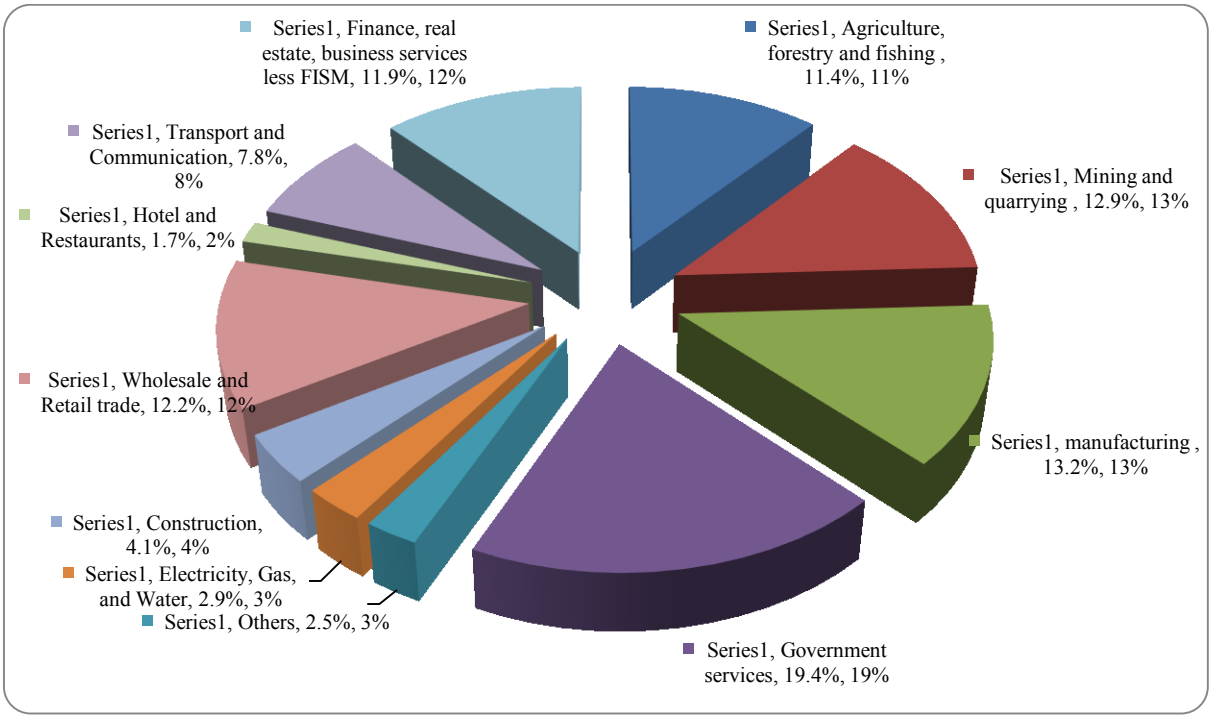

Figure 3.1 Above presents Namibian economic sector's statistics and the contribution to GDP during 2006, GDP by sector.

Source: Central Bureau of Statistics-National Accounts 1996-2006 data in African Economic Outlook, 2012

Although the mining sector contributes only a small percentage to the GDP, the industry does develop skills in the sense that mining companies involved in the mining explorations, cutting and polishing demand specific skills. Namibia's fifth national development plan (NDP5) states that mining provides critical upstream, downstream and side stream linkages for the country's economy. These side stream linkages includes transport services, power, water, skills, research and development, logistics, communications and financial services while upstream linkages includes mining inputs and services (National Planning Commission, 2017). Value-added additions, such as diamonds, copper and other semi-precious stones, are mainly limited to cutting, smelting and polishing thereof. However, skills such as research and development and development of power and water utilities are lacking and thus mining companies' hire expatriates to carry-out such services. This implies that local nationals are not being employed and as such local companies are being blamed for not doing enough in terms of corporate social responsibility.

Kapelus (2002) maintains that mining companies have long had a questionable reputation for social responsibility, especially in developing countries. Mining companies across the globe have come under greater public scrutiny regarding corporate social responsibility. Therefore, as this has brought local companies poor publicity, steps have been made to develop a strategy to benefit the local people. Mining companies operating in Namibia are no exception to this strategy, but it remains to be seen from this study as to how they are committed to corporate social responsibility given the skill deficit the country faces.

Diamonds account for 42% of Namibia's export revenue, 5% of government revenue and 10% of the GDP (Diamond intelligence, 2007) cited by Gawanab (2010). [ii]The same report notes that, although volume output is relatively low, Namibia produces the best quality of diamonds in the world that means that more than 95% of Namibia's produce are "gems". Namibia's diamonds and uranium account for the bulk of the country's total exports, and the

country is also rich in a variety of other minerals with over 30 different commodities produced from about 40 formal mining operations (OECD, *et al.* 2013).

Figure 4.1 below indicates the composition of Namibia's mineral export in 2011. This showcases the enormity of the mining industry, and how it could contribute to skill development through cutting and polishing of these 'gems'. The size of the industry could also play a vital role in scholarship funding.

Composition of Namibia's Mineral Export in 2011 (%)

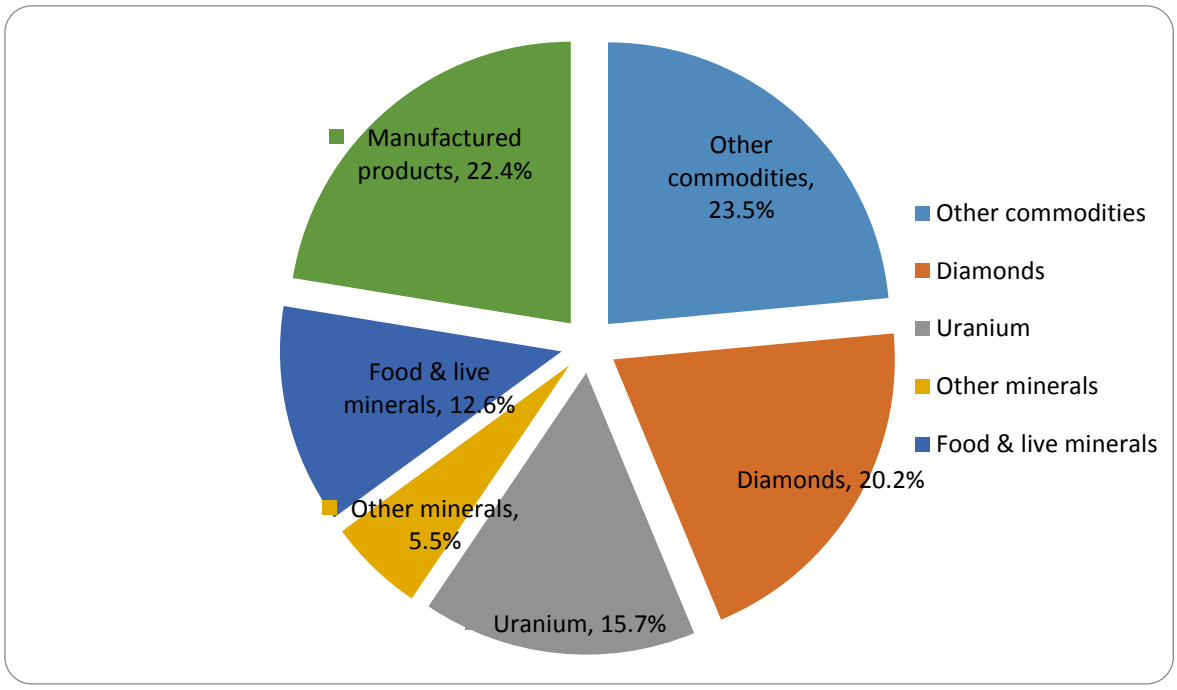

Figure 4: Composition of Namibian exports in 2011 (% of total merchandise exports).

Source: Adapted from IMF country report NO: 13/43, 2012.

Namibia's lack of collaborations among institutions and skill deficit has led to the practice of importing skills from other countries. The country is facing the challenge of building necessary facilities required for the process of innovation to flourish. This prompted the institutional formation and arrangement to collect, analyse and disseminate information and to promote a transparent feedback for policy formulation. This necessitated the formation of the Namibia Statistics Agency (NSA) with the mandate to deal with research and provision of statistical information needed in the policy planning process. But, the capacity to carry out the above idea is still a problem given the skill mismatch. This is evident since to date

Namibia is still bringing expatriates from other countries for technical works which Namibians cannot perform[2]. This study points out that if only mechanisms were put in place to empower local people, then such a trend is not likely to continue.

On the basis of the evidence provided, this researcher argues that the issue of skill deficit needs to be addressed so that Namibians are empowered to carry out technical skills in mining, development of capital projects and medical fields. According to this study, this can be done through the introduction of skills' retention programmes from these expatriates. Mowery and Sampat (2005) state that movements of trained personnel into industrial and other occupations can be powerful mechanisms for the dissemination of scientific research. Moreover, these researchers also say that this would strengthen links between the academic research agenda and the needs of society. The study then assumes that when such arrangements are put in place, the goal of effective skill development can be achieved. In addition, this section also presents how wealthy the country is, in terms of an abundance of precious mineral resources in the mining sector.

3.3 Namibia's broad development approach

Namibia's development process is guided by the Millennium Development Goals (MDGs) and the country's National Development Plans (NDPs). In this section, attention will be given to the assessment of Namibia's policy frameworks and how they relate to skill formation and industrialisation. As previously stated, the policy landscape is shaped by the MDGs and NDPs, such as stated within Vision 2030. The MDGs acknowledge pressing problems for Namibia which include, but is not limited to, poverty, Human Immune Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS), poor sanitation and health care, learners' low level of competencies, severe income inequality and high unemployment rates and this include people who are unemployed and still looking for jobs as well as those who

[2] The latest example is that 50 Zimbabwean expatriates arrived in the country in August 2012, while 65 expatriates came in June 2013 to assist in different development projects for the country. In another development, 25 medical doctors from Cuba came in June 2012, another 45 medical doctors and health specialists arrived in July 2013 (Kapitako, 2013) (New Era).

have given up the hope to search for jobs, while the youth unemployment figure was believed to be much higher (National Planning Commission, 2008).

In terms of development prospects, the promotion of productive sectors with high potential for growth, such as manufacturing, fisheries, tourism, agriculture and mining, are high on the agenda. In order to realize these efforts, top-priority was given to human resource development programmes which was open to all Namibians, especially the unemployed (National Planning Commission, 1995). This clearly shows that prospects for skill formation, collaboration, industrialization, science and technology are long overdue in Namibia. But, the way in which they have been carried out is a cause for concern. According to the 2008 Millennium development report, the 93% literacy rate has not positively reflected in the economic society as the country has not progressed as expected, unemployment rate remains high and rising and the learners' competence level is low compared to other Southern African and Eastern countries (National Planning Commission, 2008).

Another argument suggests that the blame for high unemployment rates are attributed to the earlier policy framework. Take, for example, the Black Economic Empowerment (BEE) programme that has not produced the desired results as the following evidence shows. Black Economic Empowerment, championed by the Congress of South African Trade Unions (COSATU), in South Africa is a policy framework that was intended to broaden the notion of black ownership within the economy. In addition, union investment companies were used as vehicles for progressive social change, as well as worker and black empowerment (Bank of Namibia, 2007). Namibia also adopted the same framework as a policy tool for post-colonial development.

According to Ponte *et al.* (2007), BEE legislation meant to equate 'blacks' who 'historically were disadvantaged South Africans (HDSAs) to the white South Africans. This includes women and disabled persons of all races. Its identification is seen as a central element in addressing the apartheid legacy that was reflected in the ANC's Reconstruction and Development Programme (RDP) which was developed prior to the first democratic election in 1994 and adopted by the newly elected ANC government cited by (Ponte *et al.* 2007). However, lessons learnt by both countries reveals that the BEE programme did not deliver desired results as it benefited only a few elites. This evolved into what is today known as

Broad-Based Black Economic Empowerment (BBBEE) in South Africa, meanwhile in Namibia, the new term refers to the New Equitable Economic Empowerment Framework (NEEEF).

In a turn of events, the Bank of Namibia has argued that BEE failed in both countries as it only benefited crypto-capitalist, petty-minded and self-enriching new black middle-class people who expend their energy on exploiting the public purse (Bank of Namibia, 2007). It is believed that instead of the BEE reaching out to the poor, it only benefited a few elite black people, especially those with 'struggle credibility'. The lesson that Namibia should learn from this is that one model does not fit all. According to Nizalov and Loveridge (2005), some policies may have significantly different effects in different geographical areas due to economic heterogeneity.

After having experienced such shortfalls in BEE, Namibia replaced the term in 2012 to refer instead to the New Equitable Economic Empowerment Framework (NEEEF). It remains contested in this study as to what extent the new paradigm shift will benefit the 'have not's'. The NEEEF revolves around the following objectives (NEEEF 2012):

(a) Ensuring Namibian resources are shared among the people of Namibia in an equitable and sustainable basis; including creating a socially just society;
(b) Removing barriers of socio-economic advancement in order to enable previously disadvantaged persons to access productive assets and opportunities for empowerment;
(c) Implementing measurable policies of redress and redistribution;
(d) Actively guarding against tendencies of window-dressing, favouritism, nepotism and self-enrichment;
(e) Empowering economic ownership of public, private, joint public-private, co-operative, co-ownership, and small-scale family owned businesses; and
(f) Addressing disparities occasioned by class, gender and generational relations.

These objectives may positively enhance Namibia's economic status, if implemented effectively, and Namibia would become a prosperous country. According to the Ministry of

Labour and Social Welfare, (1997), the government recognized that the only way to sustainably eradicate poverty and improve Namibia's income distribution will be by creating productive employment. However, this goal had considerable structural problems given the fragmented Namibian economy. In the first place, some problems faced were that there was no clear-cut differentiation between formal and informal employment (Ministry of Labour and Social Welfare, 1997). Some employers operating informally were not registered for tax or other official purposes, had no contracts, regular wages and workers were not protected by labour legislations (National Planning Commission 1, 2001). Secondly, the government inherited the structural constraints of a limited skill base and the history of actively discouraging informal businesses (Ministry of Labour and Social Welfare, 1997).

Due to the lack of defined strategy on how the objectives of the First Namibian National Plan (NDP 1) were to be achieved, new policy frameworks were initiated, for instance the Poverty Reduction Strategy (PRS) which was approved by the cabinet in 1998. This strategy was based on the overall national development framework of the Vision 2030, according to the second National Development Plan (NDP2) (National Planning Commission, 2004). The 1998 development programme focused on the following policies: food and nutrition, gender, the national agricultural policy and the national drought policy as well as the education and health policies (National Planning Commission, 2004). Such policy frameworks were to be achieved through a comprehensive National Poverty Reduction Strategy Action Programme (NPRSAP) with priority action areas such as (National Planning Commission, 2004):

- developing and maintaining Namibia as a transport and manufacturing hub within the South African region,
- investing in education for all Namibians,
- promoting a healthy sustainable population,
- investing in income generating capacities,
- reinforcing safety nets for the protection of the vulnerable citizens of Namibia, and
- Intelligently managing national or public resources.

Additionally, a poverty monitoring system was put in place to plan and assemble information in order to make informed policy decisions. The challenge though, was to build necessary capacities required to effectively implement and monitor the process. This prompted the institutional formation and arrangement to collect, analyse and disseminate information and to promote transparent feedback for policy formulation (National Planning Commission,

2004). In essence, this is still a challenge as the lack of a skilled work force and lack of funding for graduates remained unchecked.

In another positive development, the government identified through NDP2 in 2001 the need to improve a legislative and institutional framework within which civic organizations were allowed to make contributions in policy matters. This policy framework recognized the important role that civic organizations (COs) can play in development and therefore made provision for involvement in policy development and implementation. This gave birth to Private-Public Partnership (PPP) (National Planning Commission, 2005). The benefits of this endeavour were that many sectors and line managers participated in policy and strategy formation through planning, managing and implementing activities. However, this approach was seen as relatively new in Namibia, and line managers were faced with challenges to develop the necessary skills to help the community, and to identify and implement programmes and projects (National Planning Commission, 2005).

On the policy and institutional fronts, a number of NDP2 targets were achieved. These included the adoption of the National ICT Policy for Education (2005), the Namibia Information and Communication Technology Policy (2004) as well as the E-Governance Policy (National Planning Commission, 2005). In the telecommunications sector, mobile telephones have expanded rapidly and the number of Internet subscriptions increased, particularly in major towns. However, most rural communities are still without adequate access to both the mobile phone network and the Internet (National Planning Commission, 2008). To conclude, evidence shows that duplicating South Africa's strategies does not always work for Namibia. Namibia emulated South Africa's Black Economic Empowerment policy and imitated public works programs. The question that needs to be answered is whether both these policies benefited the masses.

Issues regarding equitable access to Namibian resources are highlighted, as well as development and maintenance of Namibia as a transport and manufacturing hub within the Southern African region, the investment in education for all Namibians and the promotion of a healthy sustainable population. This section presents policy frameworks that are geared towards poverty reduction, skills formation and industrialisation. A question that needs to be answered is whether institutions are coordinated to deliver the desired results on issues of

manufacturing, industrialisation and investment in education. It is also evident that a one-size-fits-all model does not work meaning policies should be designed to suit the specific locality in which they are meant to apply.

3.4 Namibia's Policy framework that relates directly to skill formation, industrialization and innovation

This section discusses the policy framework that incorporates skill generation, industrialization and the country's innovation system. These policy frameworks include the mineral policy, the industrial policy, the Namibian education policy, and the National Employment Policy. This section describes the background of each of these policies in order to introduce their potential or expected contribution to skill formation and industrialization. These four policy areas are crucial towards skill formation and industrialization in Namibia because: (Ministry of Trade and Industry, 2012)

(a) The mineral policy is viewed as the regulatory framework for mining companies operating in the country which are expected to undertake corporate social responsibility;

(b) The industrial policy is founded on the principle of equitable and broad-base economic empowerment, in order to ensure that all people benefit from rapid economic development including breaking the divide between rural and urban disparities;

(c) The Namibian Education Policy and

(d) The National Employment Policy is also part of this process and as such will be described as follows:

The Ministry of Education has put in place a development policy to train staff with the objectives to: (Ministry of Education Training and Staff Development Policy, 2006:4).

a) plan, coordinate and systematize staff members training activities;
b) build a capacity of staff members and support their professional development and growth;
c) ensure that staff members gain access to training and professional development;
d) ensure that staff members training and development is in line with Government legal provisions and national policies; and
e) Enable staff members to render efficient and effective services.

The other principle of The Industrial Policy, is that it advocates for a smart partnership in Namibia's quest for industrialization, including promoting public–private-partnerships (PPPs) and other forms of co-operation between the Government and the private sector (Ministry of Trade and Industry, 2012). Most importantly, the objectives of the industrialization are also outlined in Vision 2030. The vision emphasizes the importance of a change in production structure, a change in export structure, and the contribution to be made to wealth creation by small-and-medium-scale enterprises (SMEs) (Ministry of Trade and Industry, 2012). More specifically, Vision 2030 states that by 2030, the following targets, with respect to industrialization, should be achieved:

(a) The manufacturing and service sectors to constitute about 80% of the country's gross domestic product (GDP),
(b) The country's export of processed goods to account for not less than 70% of total exports,
(c) To establish a network of modern infrastructure that includes railways, roads, telecommunications and port facilities, and
(d) For SMEs to contribute not less than 30% to the GDP (Ministry of Trade and Industry, 2012).

It emerged that the education ministry has not developed the training and skill development policy at a national level, as the policy in place is intended only for the education staff ministry members. In other words, training and skill development in the country is guided by the broader development policy framework through the National Planning Commission, Education Acts and vision 2030.

However, the issue of skill development seems to be highlighted in the Vocational Education and Training Act of 2008. According to (Act NO. 1, 2008), the key Vocational Education and Training objectives are:

(a) To achieve an effective and suitable system of skill formation that-
    (i) is aligned with the labor market,
    (ii) provides the skills that are needed for accelerated development,
    (iii) develops the competencies needed by young people for productive work and increased standards of living; and
    (iv) Promotes access, equity and quality in Vocational Education and Training.

The same Act led to the establishment of the Namibia Training Authority, which is a regulating body of the Vocational Education and Training sector in Namibia. This Authority, together with its mandate, will be also discussed in this study. The efforts by the University of Namibia needs to be commended as they recently introduced a Teaching and Learning Policy with the aim to develop graduates with the following attributes: (Teaching and Learning Policy, 2013)

a) Creative and critical thinking skills in which the graduate is able to explore and invent new ideas and skills for analyzing; inserting logical arguments, figuring out wrong arguments, eliminating incorrect answers and focusing on correct answers;
b) Problem-solving skills, to create solutions to problems;
c) Entrepreneurship and employability skills – graduates who are enterprising in starting new businesses and are self- starters;
d) Organizational and team work skills – skills which enable the graduate to work in an effective collaboration team;
e) Information technology and communication skills, in which the graduate has the ability to work with technology;
f) Research skills and information literacy, graduates who have the ability to search for information;
g) Innovation - graduates who use new ways / methods, and shares ideas and whose work is of high quality.

The National Employment Policy regards the manufacturing sector as the major contributor to the country's GDP. This is because its export-oriented and labour-intensive nature benefitted the economy in terms of employment-creation, skill development and technology transfer (Ministry of Labour and Social Welfare, 1997). In line with the 1992 white paper on Industrial development, a special manufacturing incentives package, including a number of tax-and budget-based incentives[3], were put in place in 1993. This meant that companies could claim a 50% tax rebate for their first five years (Ministry of Social Welfare, 1997).

This was a deliberate move by government to attract foreign direct investment. This move gave birth to an aggressive programme of manufacturing leading to job creation being addressed by the establishment of Export

According to the Ministry of Labour and Social Welfare (1997: 36), the main aims of the Export Processing Zones (EPZ) scheme are to:

(a) Promote and increase the manufacture of export goods;

(b) Provide job opportunities for a wide range of labour, from unskilled to highly skilled professionals;

(c) Increase the country's gross domestic investment, including foreign private investment, and

(d) Encourage technology transfer and the development of management and labour skills.

However, this policy initiative has not materialized as it failed to create the forecasted 25 000 jobs within five years EPZs (Ministry of Labour and Social Welfare, 2013). Its failure is attributed to the absence of a clear implementation strategy, monitoring and evaluation as well as reporting mechanisms. In addition, it further had no linkages to the National Development Plans. (Ministry of Labour and Social Welfare 2013).

The fact that Namibia earns most of its revenue from foreign exchange puts the country is in a position to invest in skill development, science and technology and innovation. This would enable the country to compete on a regional and global market. Such objectives could be achieved through the establishment of institutions that could foster an effective innovation system. The Ministry of Labour and Social Welfare recently launched Namibia's second national employment policy, replacing the 1997 National Employment Policy. During its launch by the President, His Excellence Hifikepunye Pohamba in October 2013, announced its aim was to create 90 000 permanent jobs by 2017. The overall goal of Namibia's Second Employment Policy is to promote full, productive, decent and freely chosen employment which will eradicate poverty and reduce income inequality (Ministry of Labour and Social Welfare 2013). The specific objectives of the policy are: (Ministry of Labour and Social Welfare (2013:12)

Processing Zones (EPZ) as well as Duty Remission Scheme for manufacturing exporters located outside EPZ (Ministry of Labour and Social Welfare, 1997).

(a) Policy harmonization and coherence in order to create a conducive environment for employment creation;
(b) Promoting skills development and employability;
(c) Ensuring gender equality in all areas of employment;
(d) Creating at least 90 000 additional permanent jobs as set out in NDP4 by 2017;
(e) Improving and widening social protection: and
(f) Strengthening labor market information systems and social dialogue.

In fact, the new policy is looking at protecting the informal economy and SMEs against unfair competition from large multinational companies (Mongudhi, 2013). The new policy aims at creating new industries and decent jobs which will last longer than two years, unlike the Targeted Intervention Employment and Economic Growth programme (TIPEEG) which aimed at creating temporary jobs. The question which remains contested is, whether the country will manage to protect infant industries given the global pressure of integration. Like EPZ, TIPEEG also has failed to create the targeted jobs. The new policy, however, recognizes the fact that not enough public funds have been invested in the local economy in the appropriate industrial development (Mongudhi, 2013). It aims to develop agricultural-based industries, renewable energy, housing, water and sanitation, mineral beneficiation, development of tourism infrastructure and transport and logistics development (Mongudhi, 2013).

These same aims and objectives are also anchored by the industrial policy and NDP4. For instance, the industrial policy also states that "economic empowerment is currently being facilitated through voluntary industry charters in select sectors, including mining, agriculture, tourism and finance" (Ministry of Trade and Industry, 2012:6). The fact that Namibia earns most of its revenue from foreign exchange puts the country in a position to invest in skill development, science and technology and innovation in order to be able to compete on a regional and global market.

In conclusion, it is noted that policy framework towards skill formation and industrialization in Namibia seems to exist from various line ministries, such as the Ministry of Trade and Industry, Ministry of Mines and Energy, Ministry of Labor and Social Welfare, Higher Education Ministry, University of Namibia and the Namibia Training Authority. What

remains to be seen is the whether these policies or institutions are harmonized in tandem as the basis for innovation. According to a study conducted by Marope (2005), there is no conclusive evidence of tertiary education and training systems effectively contributing to knowledge and innovation as interviews from stakeholders points to very weak capacity in these areas (Marope, 2005). This argument is supported by Hooli (2016) who stated that Namibia's Innovation System in its broader socio-economic context appears to be static, as this is witnessed by public documents and stakeholder interviews. Similarly, this is also evidenced by the University of Namibia's engineering faculty which is struggling to fully function with the lack of 18 staff members (Matengu, 2011). The same view is highlighted by the latest fifth National Development Plan (NDP5) which singles out obstacles such as weak performance in innovation indicators, inadequate funding for research and development, lack of equipment and facilities as well as limited collaboration between learning institutions and industries (National Planning Commission, 2017). The critical question that needs to be answered is to what extent are skills, knowledge and technology transfer affected if institutions tasked with such enormous expectations still do not have the appropriate number of staff to execute the aspired knowledge-based economy. The next section, therefore, takes a closer look at institutional landscape considering their active role in an innovation system.

3.5 Namibian Institutional landscape

Institutions and organizations that are believed to play a vital role in skill formation, industrialization and science & technology and innovation will be further examined in this section. The main focus will be on institution of higher education and research institutions. This is according to literature on innovation which states that 'institutions matter' as they impact positively on the economic growth of countries (Oyeyinka, 2005). The University of Namibia (UNAM), Namibia University of Science & Technology (NUST) and Vocational Training Centres (VTCs) are key public institutions in the country and were established by act of parliament in 1992 and 1994 respectively (Marope, 2005).

In Namibia, emphasis in the education sector is on improving quality and to contribute to knowledge and innovation. Such a task has been assigned to the aforementioned institutions as well as the National Training Authority (NTA) and Community Skill Development

Centres (COSDECs) to entrust trainable manpower to push the knowledge and technology frontier (Nyiira, 2005). In addition, the International University of Management (IUM) and Namibia Institute of Public Administration and Management (NIPAM) are also at the centre stage to spearhead the much needed training and skill development to take the country to further heights. In particular, the Namibia Institute of Public Administration and Management's (NIPAMs) mandate is to train public servants, especially those in government's middle to senior management positions. Namibia Institute of Mining Technology (NIMT), which offers courses in mining, manufacturing and engineering, was established in 1991. Meanwhile, COSDECs mandates relates to empowering out-of-school youth and disadvantaged groups with skills to enable them to become employable, establish their own small-medium business or to facilitate their transition into a formal VET system.

In practice, issues of industrialization, skill formation, innovation, science and technology are accompanied by funding and institutional reform. It is from this background the study will examine the Namibia Student Financial Assistance Fund (NSFAF) policy framework and the National Commission on Research, Science and Technology (NRST). The NSFAF policy framework makes provision for funding only to undergraduate studies and not post-graduate studies except for students granted assistance in the form of scholarships offered by friendly governments and/or international organizations through co-operate agreements with the Government of Namibia. Financial assistance is granted to cover tuition, textbooks, registration fees and related educational expenses/costs at rates as may be determined and approved by the NSFAF Board and in accordance with the Namibia Students Financial Assistance Fund policy (Namibia Student Financial Assistance Fund, 2012).

The National Commission on Research, Science and Technology was established through Act No 23, 2004 of the Republic of Namibia. Its mandate, duties and functions includes the following:

(a) To monitor and supervise the promotion, co-ordination, development and continuation of research, science and technology in all sectors in Namibia,
(b) To minimize overlapping in fields of research, science and technology,
(c) To promote the participation of Namibians and research institutes in regional and international research, science and technology projects and events, and

(d) In co-operation with the Minister and Ministry responsible for foreign affairs and finance, to enter into agreements on co-operation and maintenance of relationships with similar foreign institutions in the field of research, science and technology research science.

Most importantly, the National Commission on Research, Science and Technology (NCRST) has the following mandate in terms of funding "to co-ordinate the use of moneys of the Fund and investments, and to facilitate, separately or in co-operation with the private sector, the use of public good research outputs, and to stimulate proposals of broad national interest for research, and to provide research grants, loans, bursaries and similar financial aid in research, science and technology" Research, Science and Technology Act, 2004 (Act no 23 of 2004) (National Commission on Research, Science and Technology, 2004:6). It does not explicitly state for which graduate group its funds are directed, which is in contrast to the NSFAF policy which indicates that it is only responsible for undergraduate studies. Thus far it is not clear whether the National Commission on Research and Technology (NCRST) has started offering such financial assistance for research and development.

It is, therefore, assumed in this study that the aforesaid institutions, through interaction efforts amongst each other and their competences and mandates, could be key role players or economic enablers. According to Mazzoleni and Nelson, (2007), "universities and public research organizations are key institutions supporting the process of catching up". The same author states that it may be necessary to emulate successful 'catch-up experiences' by Japan, in the late 19th and early 20th century, and more recently, Korea and Taiwan. It is on this background the study categorizes institutions such as the National Commission on Research, Science and Technology (NCRST), Namibia Student Financial Assistance Fund (NSFAF) and Namibia Institute of Public Administration and Management (NIPAM) as part of Namibia's national innovation system - and most importantly, they are viewed as drivers of skill generation and industrialization. At this point the study presents what is assumed to be an effective Namibian Innovation System Organizations, if only these institutions could collaborate. This would be an important direction for Namibia in its way to 'catch-up' with the global economy as contended by Mazzoleni and Nelson (2007). These researchers maintain that universities and public research laboratories also appear to play 'catch-up' in at least a few industrial sectors in countries such as Japan, Korea, Taiwan and Brazil.

However, the study will only focus on universities, the NCRST, NIPAM and the NSFAF given their anticipated active role in research & development as well as their provisions for study loans and scholarships to mitigate the country's skill deficit. It is believed in this study that industrialization, science and technology and innovation may only be achieved through the empowerment of a skilled work force.

This statement can be consolidated by Marques *et al.* (2006:2) who states that "Insofar as knowledge is becoming an increasingly important, indeed, crucial, part of innovation, the university as an institution that produces and disseminates scientific and technological knowledge, is much more important to industrial innovation". Figure 5.1 shows institutions and organisations believed to be active role players in Namibia's innovation system (Hahn, 2010:12).

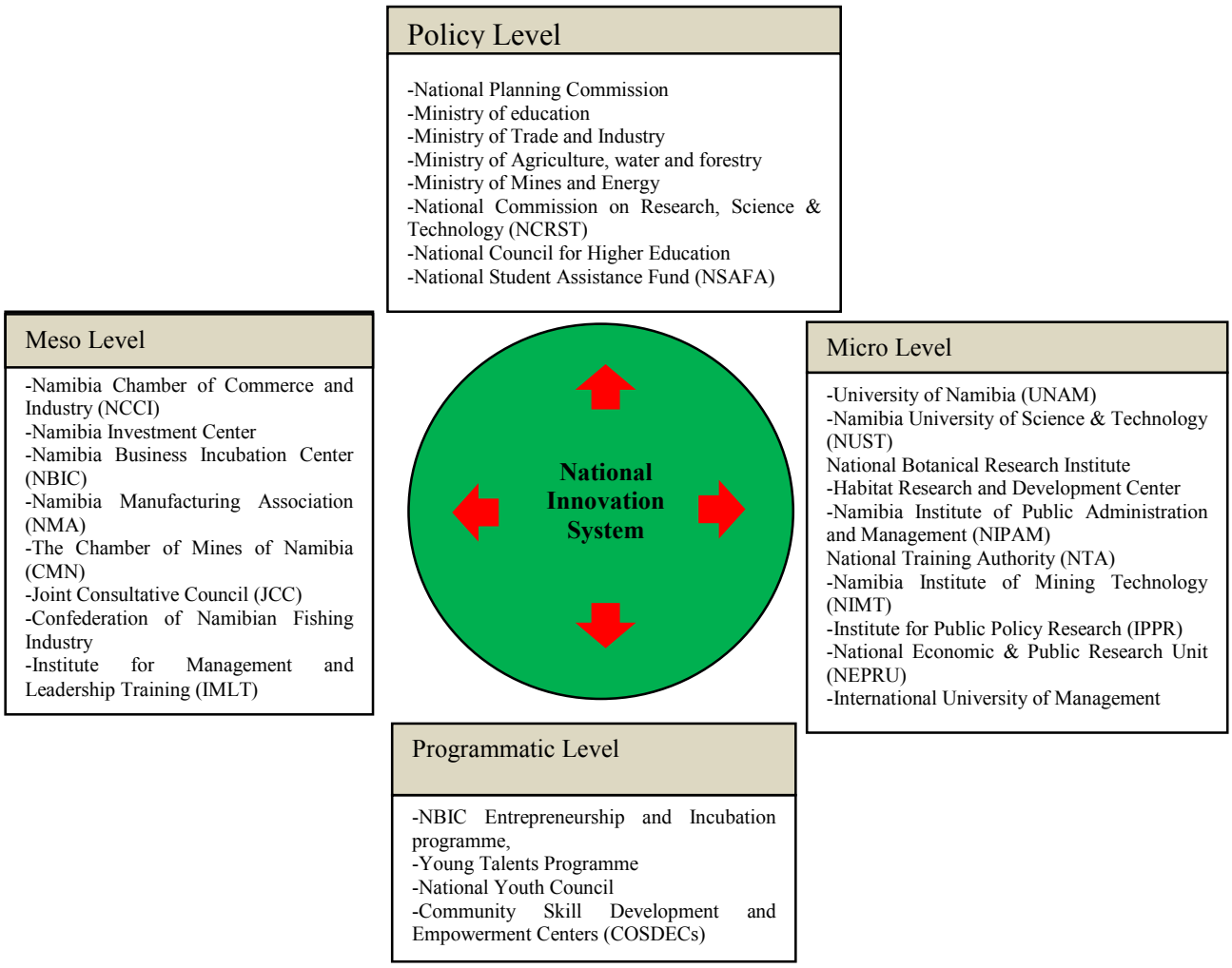

Figure 5: Namibian Innovation System Organisations

Source: Adapted from Hahn, 2010:10

The Education and Training Sector Improvement Programme (ETSIP) states that "Progress towards equity in education has not been rapid enough. More than that, with the current level of performance in education we will not be producing citizens who are capable of making Namibia a knowledge-based economy as is expected of us in Vision 2030" (Programme document, 2007). The National Council for Higher Education in Namibia (2010) cited a World Bank Report (2007) stating that the enrolment rate in developed countries is roughly five to six times that of developing countries. Factors creating an imbalance in achieving equity in higher education include proximity to HEIs, rural and urban differences, household wealth, gender, and variations in cultural practices and traditions among ethnic groups. However, the author of this study is optimistic that given the establishment of institutions and their collaborative efforts some good results can be reaped. In other words, for a country like Namibia to improve its service sector, quality education and skill development are fundamental. In essence, institutions both governmental, universities, private sector and non-governmental organization are crucial in building necessary human capital needed to make an effective innovation system.

The study assumes that institutions in Namibia work in a vertical way, a scenario which needs to be reversed through the creation of both horizontal and vertical structures that are interconnected, because interactions, collaborations and cohesion among institutions enhance the creation of new organizational structures. The statement above can be consolidated by Bell (2006:1) who contends that "It has already been common to try and address the problem facing crossing-cutting S&T policy by lifting responsibility for the governance of S&T to a level of power that rises above and rides across the specialized silos of ministries and specialized international agencies". The problem faced in many instances is lack of implementation as some aspects are well articulated by policy documents and national development plans/strategies in Namibia. This is according to Nyiira, (2005) who states that "An important aspect of the National Vision 2030 is that of cross-cutting nature of the S&T sector. Its integration in other sectors of the economy implies convergence of policies as well as macro level planning and performance monitoring demands on the sector

from the other sectors". In reality, what is witnessed is the complete opposite of what the government proposed as NCRST was only established in 2013.

There is sufficient evidence to argue that such delays and disintegration are due to lack of collaboration among institutions, such as universities and the private sector, and thus impede on the development of the country in general. This was recently pointed out by the minister for the recent established Ministry of Poverty Eradication; who states that poverty is a cross-cutting challenge and thus, all ministries, government agencies and institutions should pull together to combat poverty (Tjitemisa, 2015). The industrial policy of Namibia articulates that "Industrialisation in Namibia will also follow the principle of integrated development. In this regard, it will be built on the following three interrelated pillars, namely market integration, infrastructure development, and industrial development" (Ministry of Trade and Industry, 2012:5).

In another development, the mineral policy states that "Human resource development is critical to the development of the Namibian mining sector" (Ministry of Mines and Energy, 1998:29). The government of the Republic of Namibia took a number of initiatives to develop the skill base in the sector (Ministry of Mines and Energy, 1998). Despite these efforts, the current situation remains disadvantageous as change is very insignificant, and especially as some professional posts in government remain unfilled – namely the Mines and Energy industry, which is struggling to appoint suitably qualified personnel. The mineral policy states that the issues of skilled workforce require a well-coordinated policy intervention which addresses the short-term, medium-term and long-term human resource objectives of the industry (Mines and Energy, 1998).

In summary, the University of Namibia, the Namibian University of science and technology (NUST), NCRST, NSFAF, NTA and NIPAM are institutions whose roles and mandates are directly or indirectly linked to skills formation. The major concern though is that there is no clear funding model for postgraduate studies and research and development (R&D). The author of this study believes if only these institutions could collaborate and mobilise financial resources together with line ministries concerned with industrialisation and skill development, a well-functioning innovation system for Namibia could be attained.

CHAPTER 4: LITERATURE REVIEW ON INNOVATION SYSTEMS AND TRIPLE HELIX MODEL

4.1 Introduction

The section that follows reviews the literature on innovation systems and Triple Helix Model. The concept of innovation has become a buzz word in developing and developed economies as it is seen by many scholars to be at the heart of development. This section also discusses case studies and lessons from developed countries that could be emulated by developing countries. For instance, how countries such as Germany and Brazil transformed its institutional and financial systems to fund their education system. These are key factors believed to play fundamental roles when it comes to skills development, attainment of an innovation system and thus industrialization.

Other proponents are of the opposing view that industrialization and modernization may not be adequate in addressing Namibia's poverty, unemployment and inequalities. The recent discussion at OECD reflects a concern that economic growth does not necessarily improve the welfare of all citizens and might not even reduce income inequality in some groups (Pounov, 2013). There is also little evidence that innovation has a significant role to play in a more inclusive growth. The argument made by Pounov (2013) is that innovation relates to inequality which is based on three factors:

a) Through direct impact on income distribution (innovation favors the highly skilled and risk takers);
b) As solutions for improving the welfare of lower and middle income groups ("frugal innovation"); and
c) Through innovations by lower income groups themselves, (i.e.) grassroots activities. Industrialization and innovation are also accompanied by high technology which is attributed to retrenchment or lay-off of workers in industries.

The evidence from various studies indicates that industrialization and innovation are also accompanied by high technology which is attributed to retrenchment or worker lay-off in industries. This evidence must serve as a warning to the Namibian government in its efforts towards policy formulations as it looks like they only believe that industrialization comes with advantages only. The country is already faced with a skill deficit and for additional

workforce to be laid-off would be tantamount to serious problems. The other area of concern is the issue of brain-drain. This implies that many young Namibians are migrating to Windhoek as it is a metropolitan city leaving outer regions with skill shortages to champion innovation activities. This has led to regions to lag behind in terms of development. This scenario, supported by Aubert (2005), who stated that the brain-drain presents significant challenges for developing countries in their efforts to advocate for a knowledge-based society as the youth populace migrates with their skills to major cities.

Based on these assessments, the 'Triple Helix Model' relations between university-industry-government will also feature, as such a model would be a cornerstone for Namibia's realization of an industrialized, skilled workforce and innovative nation. Etzkowitz, (2003: 295) states that "The triple helix thesis postulates that the interaction in university-industry-government is the key to improve the conditions for innovation in a knowledge-based society".

4.2 Innovation systems and the role of policy

This section defines innovation systems and discusses the relevance of innovation systems to address skill generation and industrialization in the context of developing countries. In the first place it is important to define what innovation is, which according to proponents like Joseph Schumpeter, the pioneer of innovation, is defined as "new combinations" of existing resources, citing examples such as new products, new methods of production, new sources of supply, the exploitation of new markets and new ways to organize business (Fagerberg *et al.* 2005:6). The whole idea was championed by like-minded economists such as Friedrich List who advocated that Germany develop the best technical education and training systems in the world. According to Lundvall *et al.* (2003), the history and development of the innovation system concept indicates that it can be useful for analysing less developed economies, such as what the government did in Germany.

The concept of national system of innovation originally unfolded with the problem of Germany wanting to overtake England through advocacy of infant industry protection as well as a broad range of policies designed to accelerate, or to make possible, industrialization and economic growth Freeman, (1995). The issue of protecting infant industries could be highly contested in smaller countries like Namibia. For instance, Namibia's second

employment policy also champions for the protection of both formal and informal business sectors against unfair competition from mass produced goods of industrialised countries (Ministry of Labour and Social Welfare, 2013). Nelson and Mazzoleni, (2007) contends that business firms and government in leading countries are now against these polices and more so if the result of these forms of government support has been the creation of dangerous competitors in the international markets. The author of this study argues that as long as Namibia depends on donor funding from well-established EU markets with whom they are not comparable when it comes to trade, the country will remain in a vicious cycle of poverty given its geographical location. This is because reports point out that these European countries continue to exploit periphery countries. This argument may be relevant to Namibia as the country depends on foreign government funding for scholarships and other development projects through bilateral agreements as the country does not have its own scholarship funding scheme.

It remains to be seen whether Namibia will establish its own scholarship scheme to fund its post-graduates as this is crucial for industrialisation and innovation. It also remains to be contested if African continents and in Namibia in particular, given its reliance on less developed technology transfer centres, technology parks, business incubation centres and innovation provide support (Hahn, 2010). According to Matengu (2011), initiatives by the Namibian government to put in place science and technology as a fundamental agent to imbed a new culture in our society for production, and which should propel and sustain our economic and social development started in 1999. But, these efforts seem to have been hampered by the Research, Science & Technology Department which was housed or combined in the Ministry of Education's bureaucratic structures. Matengu (2011) also maintains that to facilitate meaningful science & technology programmes that are able to implement, policy-making, they should not be divorced from mechanisms that would ensure successful execution.

Matengu (2011) acknowledges the fact that "the government of Namibia recognises that they do not have capacity to build a strong culture of science and technology in educational institutions and in ICT industry". This argument supports a much earlier statement by Kaldor (1957) who stated that "the central argument that emerged from this literature was that

differences in development stages could be explained by differing rates in the adoption of technology" (Mbula and Wamae, 2010:40). Matengu (2011) also highlighted several subjects that need to be urgently researched (science), then development, finally production and marketing. Other scholars like, von Hippel (1988) and Lundval (1988) also put forward their argument saying "liner model" ignores the main feedbacks and loops that occur between the different "stages" of the process (Fagerberg, *et al.* 2005). Malerba (2002) views the innovation system approach as an interactive process that takes on a wide range of actors. In addition, it stresses the point of saying firms do not innovate in isolation, meaning innovation is a collective process.

Having this in mind, the study therefore treats or defines innovation in a broader sense. Some pioneers like Lundval define innovation as a process of learning and that learning interactions play an important role in the process of innovation (Lundvall, 1992:2). Meanwhile, (Nelson, 1993) cited by Fagerberg *et al.* (2005) states that innovation is shaped by social, cultural and institutional particularities that create, mobilise and distribute resources.

Since innovation is a process/system, Fagerberg *et al.* (2005) contends that a system consists of two kinds of constituents, which are components and relations. These should form a coherent whole and that a system has a function of performing or achieving something. This brings to the fore the importance of institutions as they strongly influence the process of innovation (Fagerberg *et al.* 2005). In the context of this study, it take a more or less radical economic change as it primarily analyses the concept of 'national systems of innovation'. As its name clearly indicates, it takes on distinct areas of analysis, economic policy, and economic interdependence (Lundvall *et al.* 2002). On the basis of this, it is therefore important to define the National Systems of Innovation (NSI) and its importance in relation to policies for developing countries. The study tends to suggest that innovation, since it is shaped by social, cultural and institutional particularities should be aligned to the needs and aspirations of that particular locality for it to serve its purpose.

For the sake of clarity and relevance, the definition will be limited to a few scholars for instance: Freeman, (1987) defines the NSI as "the network of institutions in the public and

private sector whose activities and interactions initiate, import, modify and diffuse new technologies". The other important definition derived from Lundvall is that the NSI consists of "the elements and relationships which interact in the production, diffusion and use of new, and economically useful, knowledge and are either located within or rooted inside the boarders of a nation state (Lundvall, 1992)". Last but not least, Edqvist and Lundvall, (1993) states that "The national system of innovation is constituted by the institutions and economic structures affecting the rate and direction of technological change in society". This scenario suggests or points to the importance of institutions with an innovation system. Therefore, innovation should be broadly defined as it encompasses science & technology, production and innovation systems, geo-political, institutional, macro-economic, social and cultural, policy, promotion, financing, representation and regulation systems (Cassiolato and Lastres, 2008).

Lundvall (2007:97) states that "The wide use of the concept has helped to move the attention towards national policy strategies that constitute positive sum of games both internationally and domestically". A more generally recognised definition of the "system" dimension has moved the attention in policy circles in charge of research, innovation and industrial development from linear to interactive thinking of innovation (Lundvall, 2007:97). Marques *et al.* (2006:1) contends that other authors, such as Etzkowitz and Leydesdorff (1996, 1997, 2000) have proposed the Triple Helix Model, which conceptually affirms the existence of a spiral pattern of relations and links between the three institutional actors: industry, university and government, in which the university tends to play a critical part in the context of a knowledge-based economy.

Other successful catch-up experiences or lessons according to Nelson and Mazzoleni, (2007) cited countries such as Japan, Korea and Taiwan as they represents instances where government played an active or key role in supporting industrial development. Brazil is one country that has put in place an innovation policy, supported by strong institutional frameworks. This study will focus on a few policies that seems to be relevant to Namibia or any other developing country facing poverty, unemployment and income inequalities. The reason is that Namibia, Brazil, Botswana and South Africa are among the top international countries when it comes to high income inequalities. In fact, studies show that Brazilian

income inequality has been on a downwards trend since 1990, with the decline being particularly dramatic between 2001 and 2009 in which the Gini co-efficient fell from 0.60 to 0.54 (International Institute for Labor Studies, 2011).

Modern Brazil has been making progress. For instance, its drive towards industrialization started between the 1950s and 1960s with the introduction of the science policy coupled with the two most relevant federal science agencies created: CNPq, the Brazilian National Science Foundation, and the CAPES - an agency in charge of promoting the personnel hired as university teachers at the federal university created at that time (Balbachevsky and Botelho, 2011). Institutional transformation continued with the most important Brazilian public investment bank-BNDE (later BNDES)-and then the powerful ministry of planning became involved in financing basic research and huge technological programmes through a special fund, known as the National Fund for Scientific and Technological Development (FNDCT) (Balbachevsky and Botelho, 2011).

It is imperative to state that by the 1970s economic expansion grew by 7-10% per year. Such a boom was as a result of huge influx of new resources and flexible instruments adopted by the newly created FINEP-Funding Agency for Studies and Projects. This agency, which opened its operations in 1971, had intentions to support research teams by by-passing all bureaucratic structures within universities and research institutes. This created the ideal environment for science and technology to flourish (Balbachevsky and Botelho, 2011). As the result of such huge investments in education, new research programmes were launched, new research teams were organised with graduates coming back from abroad with doctoral degrees. So, most of these initiatives flourished; and saw the first level of education accredited by the Ministry of Education. These are innovative initiatives that could be pragmatic for Namibia.

For Namibia to achieve its industrial aspirations and skill formation, some lessons can be learnt from other countries. For instance, Germany had put in place three methods to support innovations in firms, - since knowledge transfer from research institutions to private firms flow through many channels: these include:

1. Knowledge generated by public research being transferred to industry by publication of research papers;
2. R&D contacts or co-operation with private companies and
3. Informal personal contacts and the hiring of researchers from public institutions especially from U.S universities (Beise and Stahl, 1998).

Meanwhile, Nelson and Mazzoleni, (2007) state that the perceived importance of cross-border flow of people lies behind the broadening of related policy debates of the cost of a brain-drain. Lundval, (2007) also contends that though the combination of reverse engineering, licensing, and sending scholars abroad, inviting foreign firms and expertise and engaging in international scientific collaboration may be difficult to achieve, but all these elements need to be considered in building the national innovation system.

Some of the factors that are assisting Germany in making things work are bulleted as follows: (Beise and Stahl, 1998)

- Collaboration between scientists within highly profitable technological fields,
- Support between successful firms and government,
- High salary packages.

Namibia with its limited resources may not be comparable to Germany, but then the government needs to find innovative ways on how to invest in its own human capital. This means that some of these lessons could be tailored to suit the country's context. It is high time that academics must start to think 'outside the box'. This is validated by Beise and Stahl (1998) who stipulated that companies would not have undertaken R&D if they had not been funded by the government. In addition, the German Government has extremely invested and supported Polytechnics to complement universities' efforts. Polytechnics have a special role as they enable graduates to specialise in various technical fields which are needed by local small to medium-sized firms (Beise and Stahl, 1998).

In this study, innovation is understood as a new technique of doing things. Matengu (2011) also highlighted that local policies must be an "on-going, flexible and dynamic learning process rather than predetermined, fixed course" and that such policies should take into account local opportunities, based on local commitments, to promote investment in

profitable and appropriate technology. In doing so, this should provide appropriate funding to improve organisation structures (Matengu, 2011). Similarly, Kruss (2011) proposes that "A shift in innovation policy implementation is increasingly evident, away from the predominant 'frontier science' orientation and towards harnessing science and technology for inclusive development". According to Kruss (2011), the push towards 'broad-based social innovation' was an OECD (2007) critique that the policy mission of 'technology for poverty reduction' had been neglected and poorly implemented.

Historically, Namibia faces bigger challenges emanating from Germany's colonization and the former South African apartheid system which resulted in skewed socio-economic conditions, poverty and unemployment. Mbula and Wamae (2010:40) contends that "A growing number of studies in developing countries continue to prove the value of innovation as a driver of socioeconomic transformation and rapid progress leading to sustainable development". Kruss (2011) pointed out that "In developing countries, the human development challenges and social inequalities are so vast that they highlight the limitations of the dominant entrepreneurial models and of an exclusive economic development role for the university" (Arocena and Sutz 2008, Kruss *et al.* 2009, Mwamila and Diyamett 2009).

In contrast, Mohan and Stokke (2010) states that "In early development economics, the interventionist state was assigned a key role in correcting market failures and ensuring economic efficiency, growth, macroeconomic stability and social development". This is also supported by Giddens (2001) who defined a Welfare state as "A state in which the Government plays a central role in reducing inequalities within the population through the provision of certain goods and services. The main aim of the Welfare state is to counteract the negative effects of the markets for the people who, for a variety of reasons, find it a struggle to meet their basic needs".

The country of Brazil also endorsed such essential programmes of collaboration, calling to reform the profile of the Brazilian social policy. According to Faria (2002), the Bolsa-Escola scholarship programme required close operational collaboration between the Ministries of Education, Social Security and Welfare, and Justice, as well as the Federal Economic Fund. The federal government also put in place social policies relating to social protection

measures that were enacted as part of the country's crisis response, including: (International Labor Organization, 2011)

a) Extending protection and support to unemployed workers;
b) Expanding the conditional cash transfer (CCT) programme (Bolsa Familia); and
c) Maintaining the scheduled increase in the minimum wage in spite of the crisis.

To conclude, this section presented a review of the literature on Germany, (a developed country) and Brazil, (a developing country) and shows how serious these countries were in implementing skills generation and industrialisation. Lessons have been learnt on how Germany heavily invested in Polytechnics to supplement the efforts of universities, and also how the Brazilian Government invested heavily in education through the establishment of scholarship programmes. These are lessons the government of Namibia could emulate in efforts to advance and attain skills and expertise that are needed to champion industrialisation. It is only through such efforts a successful innovation system can be achieved. Beside the above, the author of this study also strongly feels that Namibia should be moving towards implementing some of the radical social policies mentioned herein due to social fabrics that exist in the country and again lessons can be learnt from the Brazilian social protection and social transfer programmes.

4.3 Institutional and organizational collaboration

There is a growing relationship between institutions and development which has attracted considerable scholarly interest in view of 'institutions matter' because reports reveal they impact positively on the economic growth of countries (Oyeyinka, 2005). This section therefore explores the importance and the benefits that may be reaped from interactions between institutions and development. Lundvall, (1992) highlights the concept of the national system of innovation with its emphasis on the diffusion of economically useful knowledge. Meanwhile, innovation has long been documented as a social process shaped by

the institutional structures in which it is embedded. It is also acknowledged that increased productivity in industries, technological advancement, increased investment in physical capital and the growth of human capital are factors that are shaped by institutions (Oyeyinka, 2005).

This study, therefore, emphasizes the role of institutional collaboration. In other words, institutions play regulatory functions, they set the 'rules of the game' that shape and guide as incentives individuals or organizations involved in development Oyeyinka, (2005). Formal institutions consist of formal rules (statute law, common law and regulations); and informal institutions consist of social norms, habits, routines and practices and the enforcement of both result in a more formally and humanly devised constraints that structure human interaction (Oyeyinka, 2005). Allison and Shaw (2010) reported three ways in which the Australian institutions of Higher Education added value to regional development:

1. The institutions have traditionally identified benefits such as population growth, housing demand, employment opportunities, increased spending.
2. The benefits relates to transfer of knowledge and training, and
3. The regions with these institutions respond rapidly to changing economics, and as such are flexible and innovative.

It is from this foundation that the author of this study observes its relevance for Namibia. Firstly, this is because the country should have strong collaborative and networking institutions in order to achieve its developmental goals and objectives. But, the argument points to the situation in Namibia in which the country is still faced with a limited set of innovation actors, an absence of collaborative schemes, and a lack of SME involvement with research institutions which makes this approach partially questionable (Hahn *et al.* 2010). Such a scenario therefore calls for policies and initiatives that could enhance coordination to serve joint national objectives of industrialization, economic growth, job creation and skill development in order to realize Vision 2030. This is contended by Lundvall, (2004) who stated that firms or industries that interact amongst each other exploit technical opportunities and promote competence building within its workforce. Such lessons are important for Namibia in its quest for skills formation and industrialisation as knowledge is the most crucial resource to drive development.

Secondly, in developing countries, universities, research institutions and firms that undertake R&D is significantly lower than what is found in advanced industrial countries. This is considered to be an important ingredient of learning for innovation (Oyeyinka, 2005). Namibian universities, research institutions and firms are not an exception to such a scenario and one might argue that this is caused by lack of funding to postgraduate studies. Thirdly, the competence building capacity of organizations such as universities and training centres, many of which were set up explicitly to produce manpower, is smaller and in most African countries has failed to meet the challenges of the new, more competitive global economy (Oyeyinka, 2005). Besides, the capacity of institutions, it is contended in this research that the most critical factor is lack of collaborations within institutions in Namibia. This statement holds reality as Nyiira (2005:7) observed that "the system is conspicuously fragmented with R&D institutions scattered in different ministries and departments and in semi-autonomous institutions that have own legal mandates. The institutions execute their functions in isolation; their mandates and research programmes/activities lack harmony and the coordination among them seems to be not well developed".

Lessons from Portugal's Coimbra University states that interface institutions are fundamental as they play a coordinating role in firms and universities R&D with the ultimate goals being co-operation and the transfer of knowledge and technology (Marques *et al.* 2006). Morgan, (2010) argues that stock of social capital is equally important where they are well developed because they can facilitate collaboration between firms and science base or finance and industry. Mowery and Sampat, (2005) contends that the 'liner model' of innovation process asserted that funding basic research was both necessary and sufficient to promote innovation.

To conclude this section, scholarly work highlights that synergies among institutions and organizations concerned with development are of paramount importance and that their combined efforts can create platforms where resources can be put together for further investment in education and R&D, which is crucial for industrialization.

4.4 Triple Helix, linkages between government, industries and universities

This section discusses the type of interactions expected from active role players in the development process; these role actors includes Government, Universities and Private Sector Industries. Moreover, it should be clearly noted that for such collaborations to bear desired results they should not be limited to government, academia and industries alone. Scholarly work has it that the more role players that come on board, the more effective an innovation system becomes. In this case, the Namibian development context will require stakeholders, such as the Regional constituency office headed by councillors, Regional Councils headed by Governors, various heads of departments, Churches, Traditional authorities and NGOs. Such a spiral network is vital as it represents important segments of the population. The question perhaps is how equipped is this representation given the fact that political office bearers do not have the qualifications to hold any political office. This raises the issue of capacity building for all persons concerned with development and this requires massive investment in skills development.

There is strong consensus to build capacity for public policy management in African countries and controversy on this endeavour in what constitutes the best strategies to realize these objectives. According to Olowu (2002), "the problem is compounded by the fact that many of the programmes aimed at creating capacity through donor initiatives have only aggravated the situation". The scenario is very relevant to Namibia as the country, until today, does not have a programme to fund postgraduate studies. Instead it relies only on donor countries and institutions. According to Nyiira (2005), Namibia has built arrangements for investing in local R&D or supporting innovation ventures for product improvement. However, research financing is fragmented and inadequate; the S&T infrastructure is weak; key economic sectors such as mining and fishery (marine and inland) lack research facilities to support them, and within country linkages are generally weak with reasonably visible vertical linkages, but poor horizontal linkages among S&T stakeholders. Etzkowitz, (2003) points out that the government should take a lead in coordinating and providing the resources for new initiatives.

The study points out that government roles, amongst others, are outlined under three broad categories which include the state as a provider of institutions. This, in the widest sense,

means establishing the 'rules of the game'/ providing an even playing field, so that the state as a provider of income distribution and as an insurance company, -meaning preventing evil/sharing the pie and finally the state as a promoter of economic growth, -meaning promoting happiness/increasing the size of the pie (Reinert, 1997). In addition, Etzkowitz (2003) points out that government is not only responsible for providing rules of the game but also makes available venture capital to help new enterprises. Lessons can also be drawn from East Asian countries such as Japan, South Korea, Taiwan, and Singapore as a developmental state model. This argument can be supported by Lee & Eom (2010) who stress that lessons can be drawn from Korea where government policies placed emphasis on R&D support, networking and partnership as helpful tools for firms to prosper.

Etzkowitz (2003) also brings readers' attention to a statist model where government controls academia and industry. Meanwhile, the recent study of innovation points out that government should enter into a reciprocal relationship with universities and industries in order to enhance each other performances (Etzkowitz, 2003). The Triple Helix Model which is in collaboration between government, academia and industry is viewed by many scholars as the neo-institutional model of arrangements between different stakeholders as the new mode of knowledge production. This model also authorises the studying of bi-lateral academic-industry relations and government-university policies. In this way, the Triple Helix Model is seen to increase understanding of complex dynamics and simulation studies of evolutionary economics (Leydesdorff and Zawdie, 2010). Interesting literature from authors such as Rosenberg (1999) and Ben-David (1968) argue that the lack of central control forced American universities to be more entrepreneurial and their curriculum to be more responsive to changing socio-economic demands (Mowery and Sampat, 2005). This implies that the manner in which Government exercises control over universities should not intervene in their daily routine operations.

The study recognizes the government as the source of contractual relations that guarantee stable interactions and exchange, while universities are seen as sources of new knowledge and exchange which is the general principle of a knowledge-based economy (Etzkowitz, 2003). In the Triple Helix Model, universities appear as an influential actor and equal partner given their new form of academic entrepreneurial status. Meanwhile, Etzkowitz also points

out that the fundamental role of the university as an institution for preservation and transmission of knowledge remains the core mission. It is contended in this study that universities have a special mission to socialise the youth, disseminate knowledge as well as fulfil their many business and governance functions.

The general view point is that in the 'Triple Helix' approach, collaboration which takes place through its traditional role amongst institutional spheres are most involved with innovation, for example: university, firms and government in a region may participate in discussions to enhance local economy, develop regional growth agreements or establish a technology council (Etzkowitz, 2003). In essence, the national system of innovation is a special case of the Triple Helix Model where institutional spheres, each in its own area, play their traditional role in relation to each other. The issue of innovation should not be understood as a complex mountain to climb, but government should rather focus on what is at stake. This implies considering socio-cultural foundations of the country in question. For instance, Aubert (2005) points out Botswana as one good example of a country whose remarkable development achievement was primarily driven by traditional models of governance, sound economic policy which is aimed at protecting wildlife resources and wealth generation from exploiting diamonds.

Studies from Australian universities indicates that higher education institutions are increasingly recognised as a key vehicle in regional economic development and there is evidence in Australia that they play an important role in the maintenance of local economies (Allison & Shaw, 2010). Lessons from Portugal's Coimbra University also contends that in a knowledge-based economy, universities becomes key players in the innovation system, as both supplier of human capital and as the physical space for new enterprises (Marques *et al.* 2006). The same author notes that in one way or another, most countries are currently able to achieve some kind of triple helix with the common goal to develop an innovative environment.

This is the kind of collaboration expected in Namibia. For example: the industrial policy states that it recognizes that industrial development is a shared responsibility between the private sector and the government. This has led to policies advocating for a smart partnership

in Namibia's quest for industrialisation, including promoting public–private partnerships (PPPs) and other forms of co-operation between the Government and the private sector (Ministry of Trade and Industry, 2012). However, the concern in this study is to the extent at which Namibia's private sector complements the government's efforts in developing human capital.

In summary, lessons from the four tigers are depicted through their developmental state model as well as a through outlook on the Australian regional development policy. A Triple Helix Model stipulates how best university-industry-government linkages can advance industrial development and skills attainment.

4.5 University-Industry linkages

This section singles out key role players particularly academia and industries. Scholarly work indicates that interconnectedness between the actors is likely to translate into tangible benefits for the local people. This can be done through job internship, in-house training and scholarship funding if the two actors work together harmoniously. It is also evident from the literature that issues of skills deficit can be mitigated through linkages of this nature.

The study reveals that both universities and industry need each other as they are likely to derive many benefits from such partnerships. Torraco, and Prigge (2006) contend that "from universities, these partnerships provide financial support for the educational, research, and service missions; broaden the experience of students and faculty; identify significant, interesting, and relevant problems; enhance regional economic development; and increase employment opportunities for students". However, these authors also highlight that for industry, such partnerships:

- Provide a platform to access expertise which is not normally at their disposal,
- Aid in the renewal and expansion of technology,
- Improve access to students as potential employees,
- Expand pre-competitive research, and
- Influence internal research capabilities.

The author of this study argues that this is lacking in the Namibian context and should be intensified through a collaborative approach. For instance, many efforts could be enhanced through job internship, research, skill transfer programmes and graduate funding to complement the efforts of the NCRST and the NSFAF. Such collaborations are vital as problems like skill mismatch, as identified by Mwinga, (2012), could avoid structural unemployment.

According to Edmondson *et al.* (2012: 6), the European Innovation Board (EIB) (2012) practitioners report that the most productive collaborations are strategic and long-term. Such interaction is based on shared vision and long standing relationships. This may also translate into deep professional ties, trust and shared benefits that work to bridge the sharp cultural divide between academia and industry. The report outlines that the success of university-industry partnership could be driven by competent or high level delegation from both institutions that should form a steering group. Edmondson *et al.* (2012) points that the most fertile starting point for a partnership comes from when there are projects the industry cannot do by itself, and so the university brings in its expertise to assist.

In essence, the first step to a healthy partnership is assessing the core academic strengths of the university and the core research competence of the company to identify promising opportunities for collaboration. Edmondson *et al.* (2012:9) states that for successful partnerships, both parties should strive for equality with shared decision-making and this should be based on a win-win situation for all. The problem in the Namibian context is that this not realized as companies tend to be very conservative. For example: they are not willing to avail funds for students to further their studies. Such a scenario derails the industrial development process because they expect to employ graduates with the skills needed for the job, but there is all too often a skill mismatch and lack of skills. According to Leydesdorff and Zawdie (2010), the selection of both horizontal and vertical mechanism of communication within institutional arrangements have been shaped to stabilize previous communicative structures; this helps to reduce the problem of coordination with which the institution may be faced. The proposed Namibian innovation system can draw lessons from the Triple Helix Model as the approach is seen to be geared towards a value addition to

economic exchange relations and it gives an explanation towards a knowledge-based economy as a new regime of operations (Leydesdorff and Zawdie, 2010).

Edmondson *et al*. (2012:11) categorically states that "Innovation increasingly depends on the ability of university and industry experts to work together across a number of disciplines, such as technology, design and engineering". Accordingly, this should be the route Namibia should take to realize the dream of becoming an industrialized nation. Some ground breaking approach entail partnerships that is aimed at establishing a multi-disciplinary research institute in which industry researchers and academics pursue solutions to complex and systematic solutions to problems that require cross-disciplinary expertise. Edmondson's *et al.* (2012:16) stresses that "the creation of high-profile multi-disciplinary institutes can help break down traditional academic silos by creating incentives for new areas of research, seeding new courses of study and multi-disciplinary degree programmes, while also driving innovation".

Namibia's institutions of higher learning and industries are by far not that coordinated. From this background it is important that they should start to portray themselves as core knowledge-producing entities that can play an enhanced role in spearheading innovation and development processes. In addition, they should also act as key elements of innovation systems, and provide knowledge for business and industry in the country (Huggins *et al.* 2010). It is only then they can team together with government to invest in technical education so as to reduce the skill deficit and enhance industrialization. According to Rynkun (2007), benefits of interactive learning in a form of learning-by-producing, learning-by-searching and learning by exploring tends to increase stocks of knowledge.

In summary, this section presents literature on scholarly work drawn from various countries experiences (Brazil, Germany, Portugal, Australia) of innovative policies and programmes that enabled these countries to develop to the stages where they find themselves today. The literature presented herein offers opportunities or lessons that could be applied to Namibia in its efforts towards attainment of an innovation system. The literature presented in this section includes important aspects on how these countries invested in education and how

institutions collaborated which resulted in industrialisation. These are lessons Namibia could emulate in its struggle towards economic emancipation.

4.6 Lessons to Namibia from South Africa's innovation system

In this section, the case study on South Africa is depicted as an approach Namibia could emulate without taking away lessons from other countries whose regional innovation has helped Namibia quite significantly. This case study is supported by the OECD policy paper on regional.

The current approach towards skills development and industrialisation seems promising. This is because promotes the establishment of institutions which literature states do matter in an innovation system. The study therefore advocates for strong collaborations within these institutions as literature suggest that the 'Triple Helix Approach' is the basis on which an innovation system can be built upon. This statement can be consolidated by Etzkowitz (2003), who points out that in the 'Triple Helix Approach', collaboration, takes place through its traditional role, amongst institutional spheres who are most involved with innovation, for example: universities, firms and government. These organisations may participate in discussions to enhance local economy, develop a regional growth agreement or establish a technology council.

Morgan (1997) contends that the significance of new regional innovation strategy has been dismissed by proponents who argued that they offer little or no prospects of alleviating problems such as mass unemployment and social exclusion. Lessons can also be drawn from South Africa's innovation system and in particular the Gauteng province. The Gauteng Innovation Strategy is at the forefront of creating a strategy that is not confined to narrow economic outcomes, and this helps to create an inclusive innovation system (Department of Economic Development, 2012:4). According to the Department of Economics (2012), the Gauteng Innovation Strategy is built upon two pillars, namely:

a) the two ministries in supporting the process-Science and Technology, and Education, and
b) the various institutions that result in innovation, and research and development, being the higher education institutes, Public and Private Research Institutes, business, enterprises, and Non-governmental organizations.

The Gauteng Province is the mining hub of South Africa and mining industry continues to be a major source of employment at a time when at least 25 per cent of the working age population is unemployed (Musingwini *et al.* 2012). The important role of institutions in an innovation system is witnessed by the active involvement of universities in Gauteng, which includes the University of Witwatersrand, University of Pretoria, University of Johannesburg, and University of South Africa have historically produced mining graduates for the South African industry, with any shortfall being met by the recruitment of overseas graduates (Musingwini *et al.* 2012). According to Musingwini *et al.* (2012), mining engineering qualifications are offered at the University of Witwatersrand (Wits), the University of Pretoria (Tuks). These include BSc and BEng qualifications, meanwhile the University of Johannesburg (UJ), and the University of South Africa (UNISA) offers BTech and ND/NHD qualifications, respectively.

The statement above suggests that innovation is driven by a number of factors which include human resources, institutions offering both educational/research, business industries and infrastructure. Information from Table 4.1 also presents lessons to Namibia about the importance of regional innovation policies since the country does not have such policies beside regional disparities.

Innovation/ICT cluster	**Education/ Research Institute**	**Multinationals**	**Other Benefits**
Johannesburg	Wits, UJ, JCSE, USAASA	MTN, Vodacom, Microsoft, Oracle, HP, Cisco, IBM, Novell, hollow LG, Sahara, SAP, LG, Alcatel, Unisys and many more	• Large number of graduates • Most advanced infrastructure • Gauteng is a major commercial centre • Access to capital
Tshwane	UP, TUT, The Innovation Hub, CSIR, Meraka Institute, TIA		

Table 4.1: Profile of the two Gauteng Innovation/ICT clusters

Source: Department of Economic Development, 2012:7

This case study, supported by the OECD policy paper on regional innovation strategies argues that "regional actors targeted by the regional innovation systems cover the whole range of stakeholders involved in innovation on a territory: universities, technology-oriented enterprises, knowledge-intensive business service firms (KIBS), other firms, start-ups and new technology-based firms, regional and local government or administration, public funding agencies, intermediaries (e.g. technology transfer offices, advisory bodies, etc.) and their networks, venture capital firms and non-university research institutes" (OECD,2010). This paper articulates that successful experiences of the regional innovation policies are characterized by the following:

(a) Working with policy mix approaches may attract knowledge-based activities and demand talent which has an important implication in terms of institutional settings and policy governance at a regional level;
(b) Strategic intelligence may be adapted and updated over time and be aligned to a benchmark and exchange foreign experiences and peers at a regional level to add useful domestic intelligence;
(c) Ensuring linkages so that localized clusters or growth pole strategies acquire a stronger knowledge dimension and tap into knowledge from both local and global knowledge sources.

This section presents lessons for Namibia to emulate in its efforts towards establishing an innovation system. This can only be achieved if institutions collaborate for the common good. Such lessons are evident in South Africa's Gauteng Innovation Strategy which is achieved through collaboration amongst institutions of higher learning, industry and Gauteng's department of economic development. In summary, other lessons can be learnt from Germany, Brazil, Australia and Portugal's experiences as literature categorically states how these countries promoted their economic wellness. It goes without saying that Rome was not built in one day but it is time Namibia took radical steps to achieve its developmental objectives.

The next section looks at data analysis. It presents findings from the World Bank data and information collected from key stakeholders involved in policy formulation. As the study draws to a conclusion, this section analyses data mainly gathered from the World Bank website. Explanations are accompanied by a range of graphs to illustrate significant factors.

CHAPTER 5: ANALYSIS OF DATA

5.1 Introduction

This section presents information in the form of graphs to analyse the data. The information herein was obtained from the World Bank website and different variables to analyse data. Each graph will be analysed depending the information that was available. It is imperative to note that some of the important information readers may expect might not be available as they do not appear on the World Bank website. Most importantly, the data presented here shows trends over a period of ten years, from 2004 to 2013. Additionally, data from interview conducted will also be summarized through a range of graphs and pie chats to make a meaning out of it. Finally, this sections will end with a conclusion summarising findings presented herein.

5.2 Analysis of Data from World Bank

The graph that follows shows the level of research and development expenditure (% of GDP), manufacturing, value added (% of GDP), and industry, value added (% of GDP). This is an important component in this study as R&D is crucial in skill formation and industrialisation. Expenditures for research and development are current. Capital expenditures (both public and private) on creative work is undertaken systematically to increase knowledge of humanity, culture, and society, and the use of knowledge for new applications. R&D covers basic research, applied research, and experimental development.

The level of R&D is not satisfactory besides showing a rise in 2008, but thereafter it decreased in 2009, 2010 and 2011. However, it increased slightly from 2012. Meanwhile, manufacturing, value added (% of GDP) has maintained its position of not showing major increases or down-trend. However, industry, value added (% of GDP) has been fluctuating with the worst record in 2009 and 2010, but thereafter experienced an increase in the subsequent three years. The author of this study notes that value addition on manufacturing and value addition on trade related goods do not show a sharp increase due to the low level of technology and innovation which is needed in order to create major improvements. In addition, the data, collected from interviewed managers and directors at the National

Commission on Research, Science & Technology and the National Planning Commission, will be analysed through a descriptive and explanatory methods.

The mining industry is one topic extensively discussed in this paper; as such, this graph presents the contribution of this sector to the economy, particularly in areas of R&D, value addition, and GDP. There seems to be a boom of R&D expenditure recorded in 2008 to 35%, but a down trend was experienced from 2009, 2010 and 2011, although a slight increase was noted in 2012 and 2013. The question that needs to be answered is what could be reasons leading to increased expenditure on R&D in 2008 when the world faced an economic meltdown? A sharp down-trend in industry and value addition was also experienced in 2009 after the global economic slump. However, a steady increase has been witnessed from 2010 to 2013. Manufacturing and value addition has shown a consistent trend over the years.

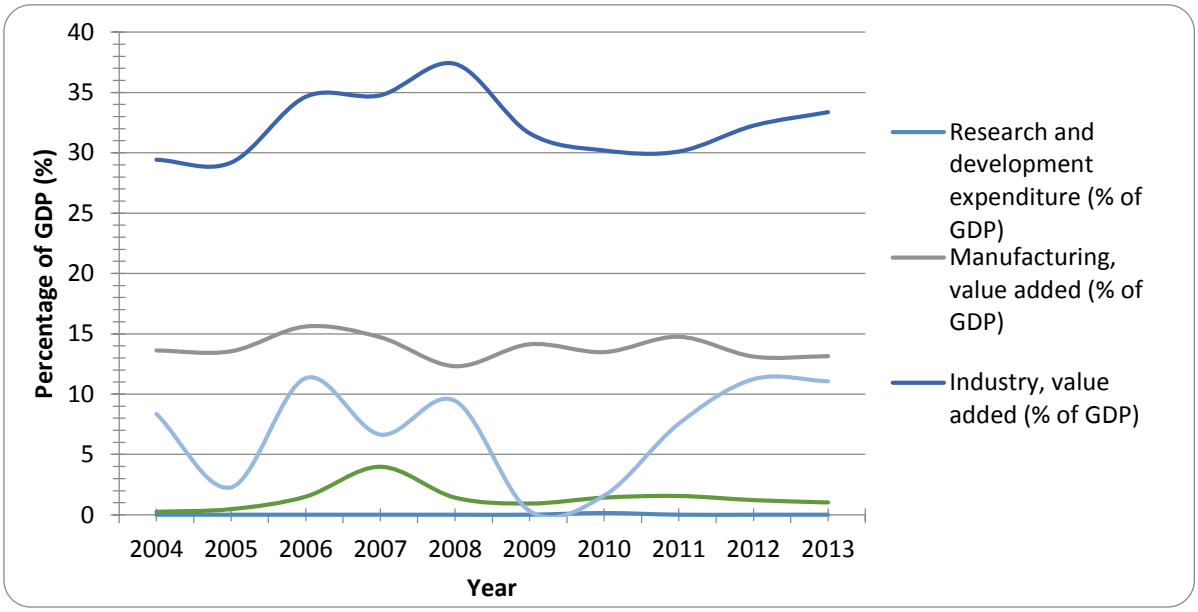

Figure 6.1: Presents data on research and development (R&D) expenditure (% of GDP), manufacturing, value addtion (% of GDP) as well as Industry, value addition (% of GDP).

Source: World Bank. www.worldbank.org/country/namibia.

The next graph, Figure 7.1 indicates adjusted savings: mineral depletion (% of GNI), and adjusted net national income (annual growth) from mineral resources. According to the World Bank, these savings are calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. It comprises of value added in mining, manufacturing (also reported as a separate subgroup), construction,

electricity, water, and gas. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs.

Figure 7.1 shows adjusted savings in mineral national income which also suffered tremendously after the global economic meltdown in 2009. However, there has been a sharp rise from 2010 to 2013. Adjusted net national income recorded a boom in 2007, thereafter no further increase or decrease

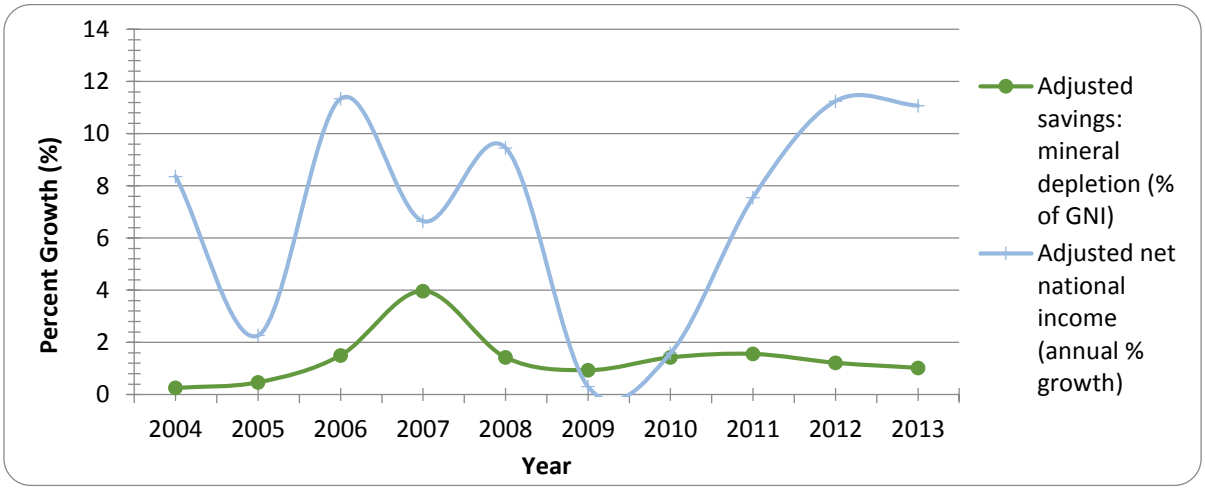

Figure 7.1: Adjusted servings; mineral deletion and Adjusted savings; mineral national income (annual %growth)

Source: World Bank. www.worldbank.org/country/namibia

Adjusted savings: national income (annual % growth) covers savings from mineral resources such as tin, gold, lead, zinc, iron, copper, nickel, silver, bauxite, and phosphate. Adjusted net savings are equal to net national savings plus education expenditure minus energy depletion, mineral depletion, net forest depletion, and carbon dioxide and particulate emissions damage. The author of this study is of the view that besides the 2007 rise in the mineral depletion, the country's minerals are well maintained and could significantly benefit the local people in terms of funding education. With regard to adjusted net national income (annual % growth), the author notes down-trends in 2005 and 2009 but since 2010, this has increased.

Figure 8.1 shows trends in primary education, pupils (% female) and school enrolment primary (% net). This is of great significance as the study primarily deals with skills formation and industrialisation. Primary completion rate, or gross intake ratio to the last grade of primary education, is the number of new entrants (enrolments minus repeaters) in the last grade of primary education, regardless of age, divided by the population at the entrance age for the last grade of primary education. Both the two areas showed a sharp down trend in 2011 and a rise in 2012 but then went down again in 2013. This means there is a need for increased efforts towards making sure that the enrolment of female pupils and the nation at large improves significantly. Such improvements will spearhead the much needed skill formation and industrialisation the country aspire to achieve in its vision for 2030.

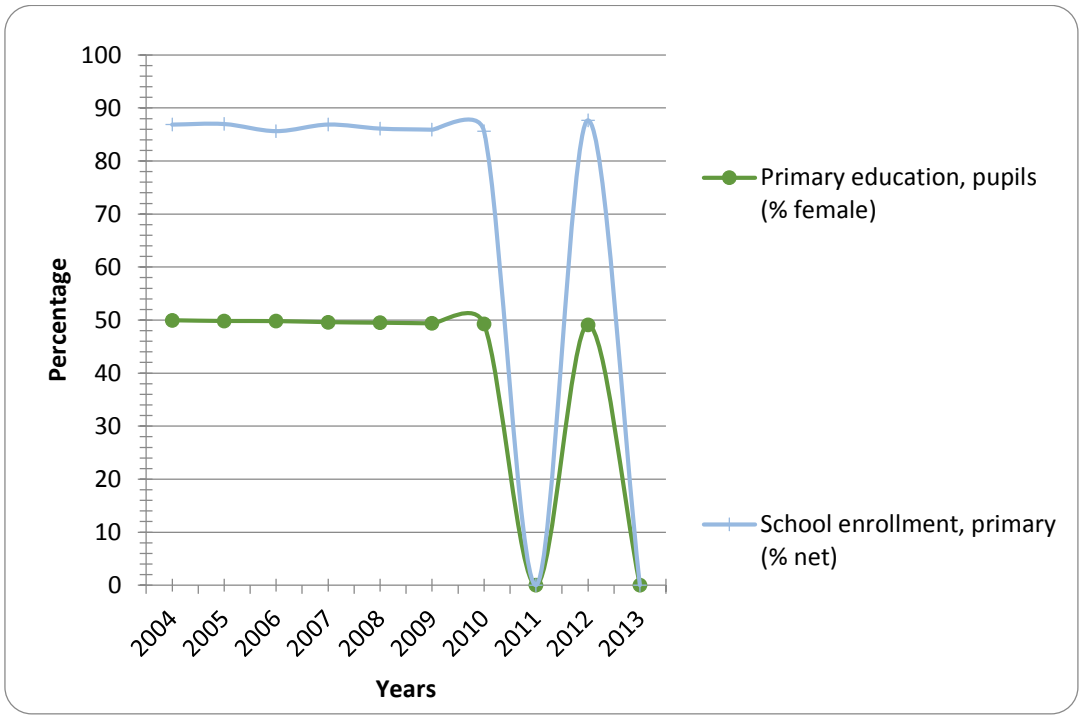

Figure 8.1: Data presents primary education, pupils (% female) and school enrolment, primary (% net)

Source: World Bank. www.worldbank.org/country/namibia

The next graph looks at primary education teachers and female children out of school at primary level. Beside indications of a down trend in 2007, the number of children have steadily increased, but decreased significantly in 2012. The graph also shows a stable

standpoint for teachers at primary education. The author proposes increased effort to train teacher educators at primary level and to put in measures to eliminate school drop-outs at primary schools as these factors may negatively affect the attainment of the much needed skills and industrialisation.

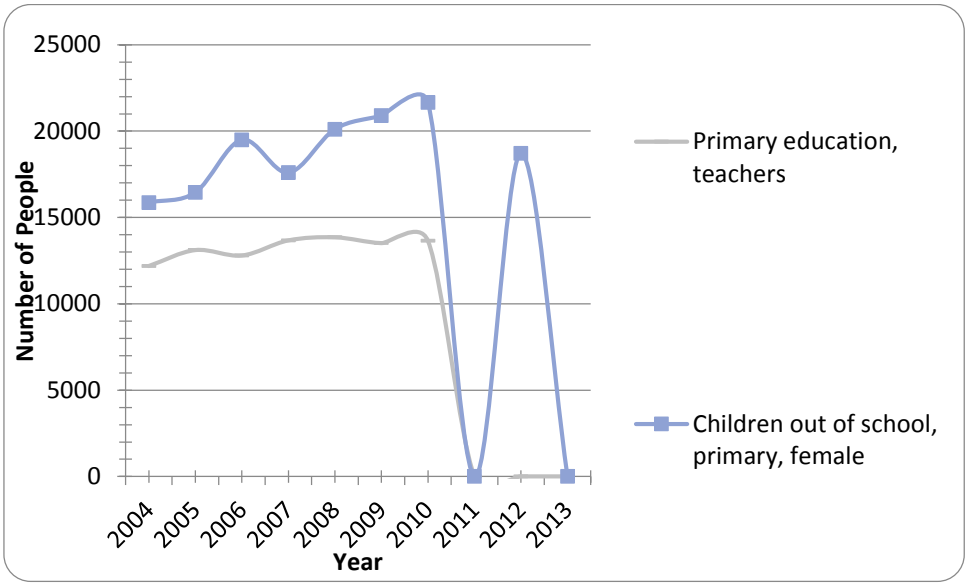

Figure 9.1: Data represents primary education teachers and children out of school, primary, female

Source: World Bank. www.worldbank.org/country/namibia.

Figure 10.1 indicates the number of people between the ages of 15 – 24 who are unemployed. According to the World Bank, the unemployed refer to people who have completed secondary school and are actively looking for employment. It also takes a critical look at the tertiary educators (academic staff) (% female) as well as the gross % of school enrolment at tertiary level.

There has been a significant rise in unemployment in 2006 and a significant increase in 2008. Thereafter, from 2009, unemployment levels increased. The number of tertiary educators have been fluctuating between 2004 and 2009. Currently, this has evened out. The school

enrolment at tertiary has not increased between 2005 and 2009. This is probably because the majority of people cannot afford to send their children to school. .

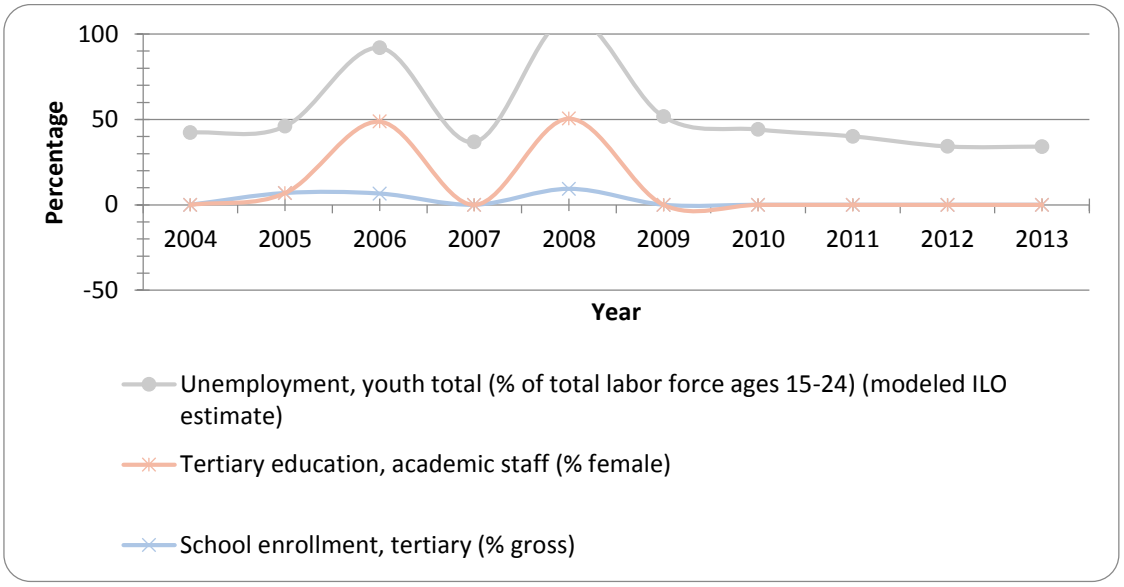

Figure 10.1: Represents Unemployment, youth total (% of labour force ages 15-24) (modelled ILO estimate), Tertiary education, academic staff (% Female) and school enrolment, tertiary (% gross).

Source: World Bank. www.worldbank.org/country/namibia.

In efforts to strengthen the argument and also to support or disagree with the literature, it was important to gather primary data from respondents. The key respondents were managers at the National Commission on Research, Science & Technology (NCRST) and Directors and their Deputies at the National Planning Commission (NPC). The choice of people of such calibre was prompted by the fact that these key stakeholders are directly involved in the formulation of National Development Policies and innovation policies. The next section presents such data in an explanatory and descriptive fashion which is supported by a range of graphs.

5.3 Data analysis from interviews conducted from managers and directors at the National Commission on Research, Science and Technology and National Planning Commission.

This section presents data analysis from interviews conducted from managers and directors at the National Commission on Research, Science and Technology and National Planning Commission. This section of data analysis will follow an explanatory and descriptive approach. The findings from interviews will be outlined in an explanatory and descriptive method through graphs and pie charts. The questions are outlined in Appendix 1.

Figure 11 presents the respondents' responses on the question of policy priorities for institution in terms of skill development and industrialization in Namibia. This meant that 90% of respondents are of the view that policies related to skills formation are in place and only 10% were not in agreement. This means that even though policies are in place, more are needed in order to attain the much needed skills for industrialization.

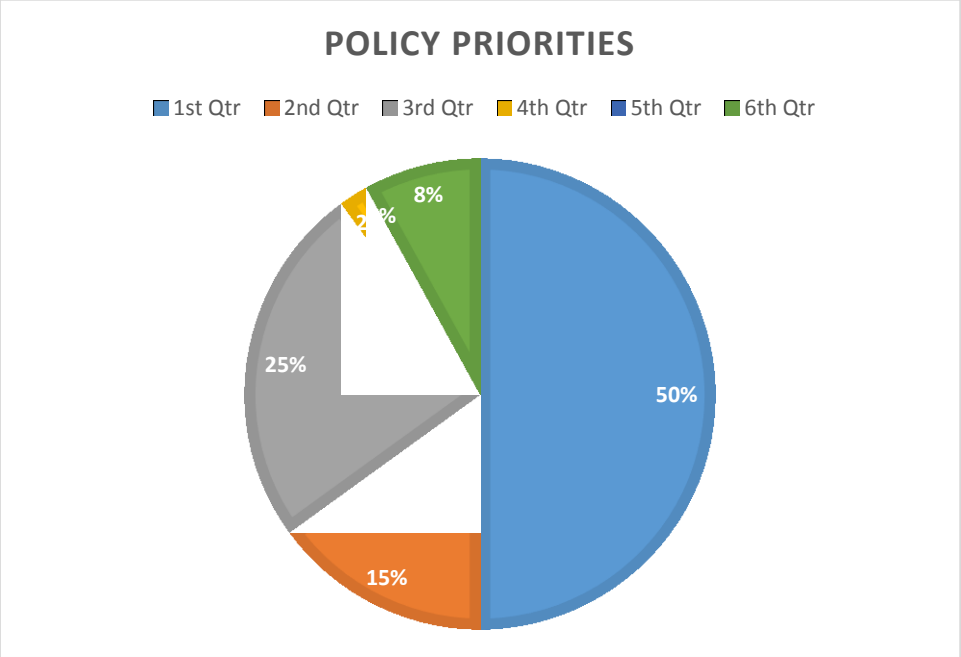

Figure 11: Policy Priorities towards skills attainment and industrialization.

On the question of whether institutional policy mandates were put in place when it comes to skills formation and industrialization in Namibia, respondents had this to say. A total number of 60% of respondents are of the view that a lot of input is still needed by the country to attain skills and industrialization, whereas 20% feel skills and industrialization is partially attained and only 10% believe it is completely attained. Category 4 represents 60% of the respondents who are of the view that a lot still needs to be done to achieve skills and industrialization in Namibia. Category 1 represents 20% of respondents who feels skills and industrialization are partly attained. While categories 2 and 3 respectively at 10% represent respondents who are of the view that skills and industrialization are completely attained. Figure 12 presents the respondents' view on whether there has been some achievement in skills and industrialization attainment.

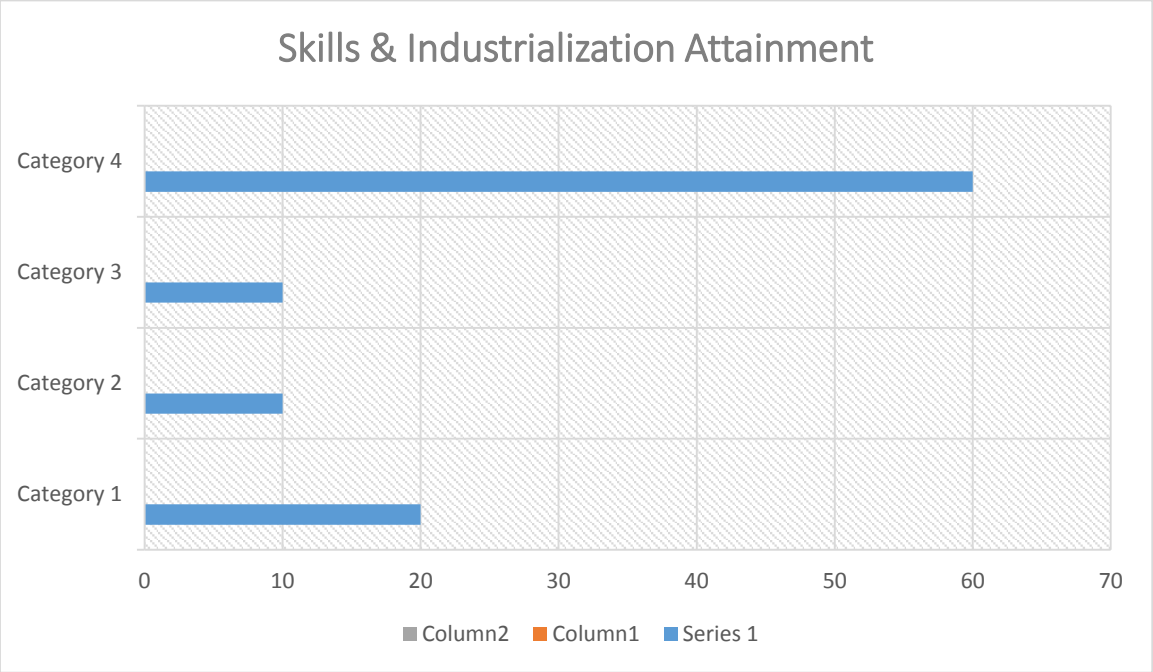

Figure 12: Skills & Industrialization Attainment

50% of the respondents feel that collaborations among institutions partially or strongly exist whereas the other 50% feels that collaborations are fragmented or do not seem to exist at all.

Figure 13: Linkages & Collaborations Establishment

40% of respondents feels there are institutional policy mandates towards skills formation and industrialization, whereas 60% of respondents are of the view that such policies are at its initial stages or may not be in place at all.

Figure 14. Represents leading institutions with the mandates to spearhead skills formation and industrialization in Namibia

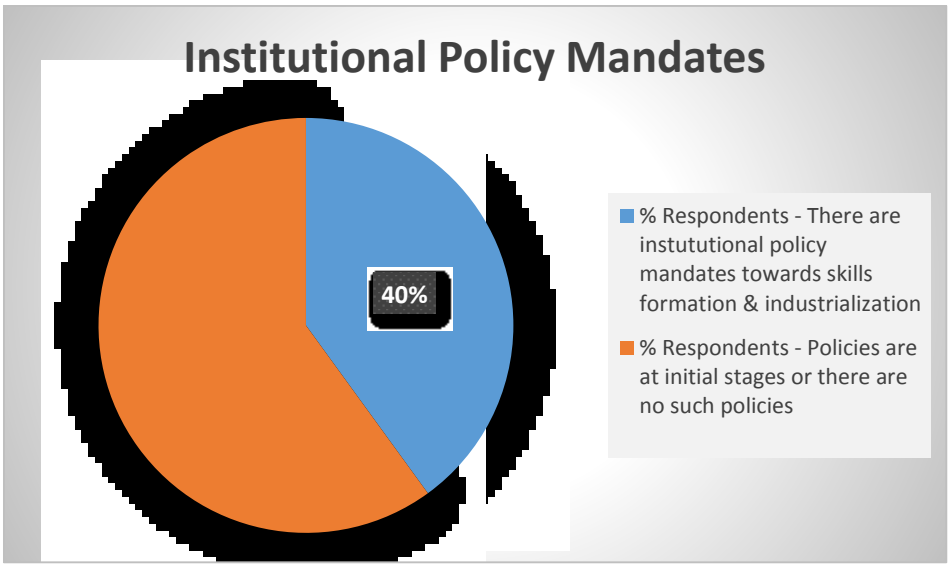

Figure 14: Institutional Policy Mandates

It emerged that 30% of Category 1 respondents felt the National Commission on research, Science & Technology is recognized as the leading institution to spearhead innovation, 50% (Category 3) said it is not yet recognized, whereas 20% (Category 2) do not know whether it is recognized or not.

Figure 15 investigates whether the National Commission on Research, Science & Technology is recognized as a leading institution spearheading research, science & technology in Namibia.

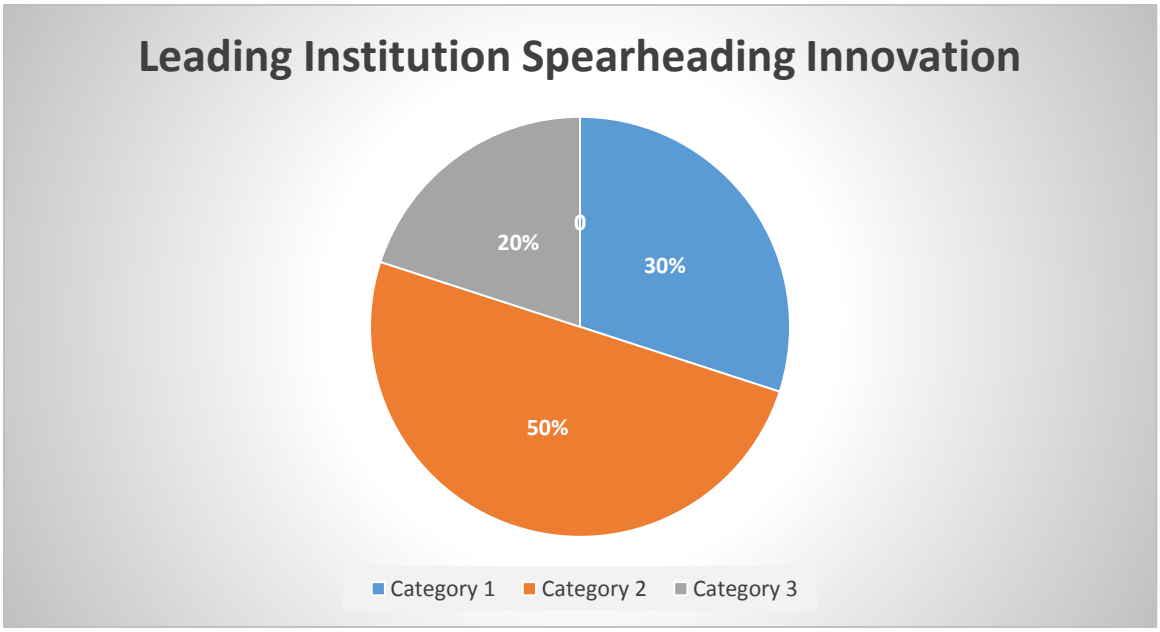

Figure 15: Respondents' views on the recognition of a leading institution to spearhead innovation in Namibia.

1. The very last question for this interview was to ask to what extent the National Planning Commission engaged in communities and stakeholders during the formulation or crafting of policies?

30% of the respondents (Category 1) felt that the National Planning Commission engaged communities fully, whereas Category 2 respondents (20%) felt that the public engagement is only partial when it comes to consultations on policy formulation, while 25% (Category 3) of the respondents felts that the communities are not engaged at all. The remaining Category 4 respondents (15%) felt that the public engagement in matters pertaining to policy formulation might not need the public to be engaged.

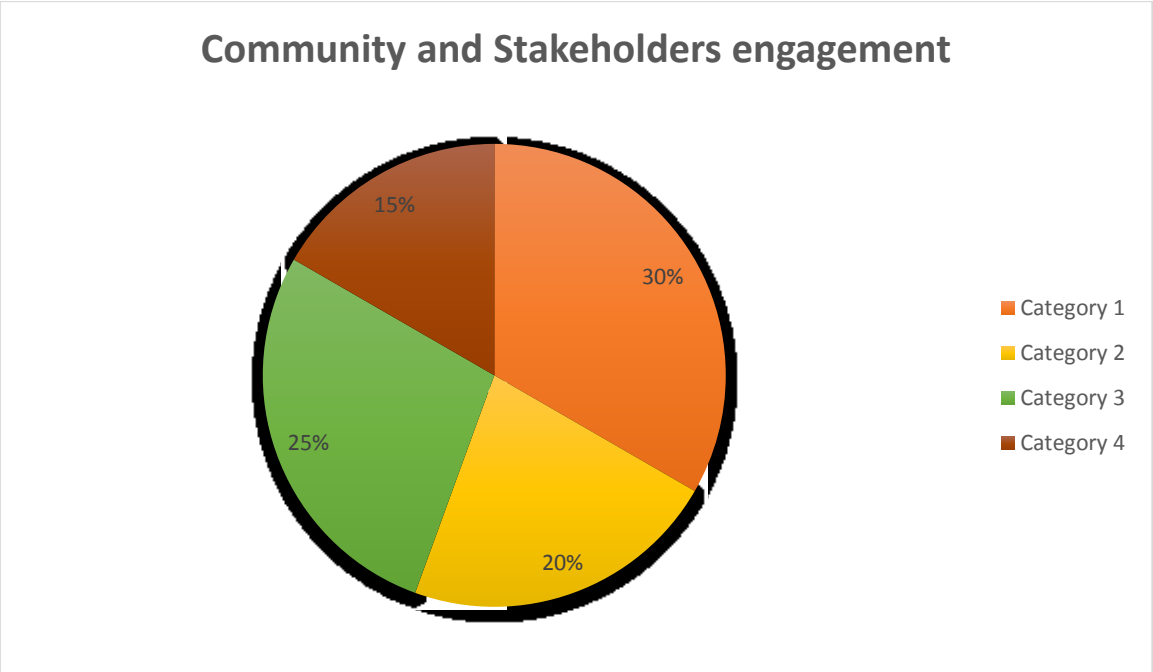

Figure 16: Community and Stakeholders' Engagement

5.4 Conclusion

In summary, the data collected from the World Bank website is presented by graphs using variables to analyse data. In summation, the data from interview conducted is also presented to make it meaningful. For the situation to improve, the researcher suggested a Triple Helix Model of collaboration among institutions such as universities, the NCRST, the NSFAF, and NSA, as well as NIPAM, the NTA, private enterprises and government ministries and agencies concerned with skill generation and industrialisation to mobilize financial resource to fund education. The next chapter will outline some of the recommendation of this study.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

These recommendations are made with the view that if only Namibia could emulate them, the much needed skills or expertise, industrialisation and an innovation system could be attained. These efforts are geared towards poverty reduction and income inequality elimination.

- First and foremost, the establishment of an effective innovation system will be of vital importance. In this study, it is suggested that institutions such as the NCRST, the NSFAF, the NTA, the NSA, the NIPAM, the UNAM, NUST, the IUM, and line ministries and government agencies such as the NPC, the office of the Prime minister, the Ministry of Higher Education, Training and Innovation, the Trade and Industrialization & SME Development, the Mines and Energy Ministry, the Ministry of Agriculture and the Ministry of Labor and Social welfare and the private sector should collaborate, interact and mobilize financial resources together to fund education especially at a tertiary level so as to meet the needs of the labor market.

- The study noted serious concerns regarding poverty and inequality in the country and suggests a combination of economic and social development policies geared at equitable sharing of the country's resources to benefit the poverty stricken masses.

- Lessons from catch-up experiences can be emulated, for instance: lessons from Germany, Australia, Brazil, Japan, South Korea, Taiwan, Botswana and South Africa. However, they require modification to suit the Namibian context.

- The study also notes the tendency for putting in place policies, especially government policies without first confirming if they would work practically. This scenario is a result of lack of consultations or stakeholder's engagements in matters that affect the communities who are viewed as the prime beneficiaries of development.

- The study also found that besides the NCRST being established, other role players have not recognized it as the leading institution in innovation, research and science & technology and as such the public and stakeholders needs to be sensitized of its roles.
- There is no regional innovation policy in Namibia and this makes innovation activities at a regional level dormant. In other words, regions are still depended on national guidelines.

- The study suggests strict monitoring system on whether such institutions are delivering according to the mandates upon which they were established.

- The study also notes that there are only study loans for undergraduate studies in a country faced with a skills shortage. This results in minimal R&D and low innovation. The author of this study therefore suggests that the National Commission for Research, Science and Technology mobilize other stakeholders, and institutions so to put together resources to finance postgraduate studies as they depend only on foreign donors and governments for funding.

6.2 Conclusion

In conclusion, the recommendations made in this study are not binding to any organisation or institution mentioned herein. However, these are pertinent lessons for Namibia, in particular, and other developing countries, in general, to learn and thus advance their development agendas. The study also provides a platform for sharing knowledge with other scholars and the entire academia, as learning is a continuous process.

Appendix 1

Introduction

In efforts to reinforce the argument to this study, the author of this study engaged at least four managers at the National Commission on Research, Science & Technology as well as three directors and three of their deputies at the National Planning Commission. In total the number of respondents is equal to ten respondents. The aim of such engagement was to collect primary data as these are considered to be key stakeholders representing key institutions in policy formulation. It is imperative to point out that the same questionnaire was used at all the mentioned institutions. The interview questionnaire below shows areas that the author was concerned about and thus the responses from respondents:

Date: **May 12 May 2014**

Interview questionnaire

1. Are there any policy priorities for your institution in terms of skill development and industrialization in Namibia?

(a) Strongly agree	(b) Partially agree	(c) Agree	(d) Disagree	(e) Strongly disagree	(f) Partially disagree

2. Does your institution view the attainment of skills development and industrialization as a success in Namibia?

(a) Partially attained	(b)Completely attained	(c) Attained	(d) Not Attained at all

3. What is the level of linkages and collaborations establishments within (institutions or structures) fostering an innovation system for Namibia?

(a)Partially existing	(b) Existing	(c) Strongly existing	(d) Fragmented	(e) Not existing at all

4. Are there institutional policy mandates put in place when it comes to skills formation and industrialization in Namibia?

(a) Partially in put in place	(b) Strongly in place	(c) Are at an initial stage	(d) Not in place at all

5. Is the National Commission on Research, Science & Technology by far recognized as a leading institution to spearhead research, science & technology in Namibia?

(a) Yes	(b) No	(c) Don't know

6. To what extent does the National Planning Commission engage communities and stakeholders during the formulation or crafting of policies?

(a) Fully engaged	(b)Partially engaged	(c) Not engaged at all	(d) No need for engagement

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