

**THE ROLE OF PUBLIC UNIVERSITIES TOWARDS CAPACITY BUILDING IN THE OIL AND GAS INDUSTRY AND THEIR GENERAL CONTRIBUTION TO ECONOMIC DEVELOPMENT: A COMPARATIVE STUDY IN GHANA.**

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## **ABSTRACT**

This study explored how universities are contributing to capacity building in the oil sector as well as their general contribution to sustainable economic development. As a result, the study considered the following issues:

- What is the national policy on capacity building (human resource development) in the oil-gas sector?
- Who are the main stakeholders involved in capacity building in the oil-gas sector and what are their roles?
- How are the stakeholders and the oil companies responding to capacity building in the oil industry?
- What does the government expect from universities regarding capacity building in the oil and gas sector?
- How are the two selected cases [Regional Maritime University (RMU) and Kwame Nkrumah University of Science and Technology (KNUST)] helping to develop the human resources needed for the oil-gas sector through teaching and research activities?
- How are the two selected cases (RMU and KNUST) contributing to general economic development in the country?

This study utilized a qualitative research strategy coupled with a case study as a method; using data collection through interviews and document analysis. The national policy (Local Content and Local Participation Bill) on capacity building in the oil-gas sector was considered. In January and February 2012, individual semi-structured interviews were conducted involving twelve (12) respondents. Respondents included the Public Relations Officer (PRO) of Ministry of Energy, and representatives from GNPC, Luk, and Tullow Oil companies, Four participants from each of the two universities (RMU and KNUST) were consulted. Data collected was analyzed within the context of the literature review using the modified analytical framework from the HERANA project with some information from the UNDP.

In view of the outcome of the study, it could be said that while the Local Content and Local Participatory (LCLP) policy document is to some extent geared towards the service enterprise

notion of the university, there is a need to provide the necessary equipment and motivation towards this goal. Similarly, the two universities in this study seem to be focusing now on high-level human resource development in the oil sector for both national and regional development. However, there appears to be an imbalance between the academic core and student enrollment especially in the field of humanities. Nevertheless, fewer numbers exist in Petro-Chemical Departments. Also, only small numbers of the academic-staff have finished their PhDs.

Studies in the Petro-Chemical Departments are some-how linked with various industries to allow students to do their internship. Thus the programs are linked to some extent to the industrial world hence aiming at national economic development. However, there could be more coordination and integration of petroleum externally funded projects in the future in order to propel sustainable capacity building and economic development.

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## **DEDICATION**

To the Almighty God, who is always faithful and awake to strengthen me during my study despite all the challenges.

To my parents King Palmas Howusu and Peace Afenu who were very supportive and always encouraging me to remain resolute and always go for the best in life because everything is achievable. I remember when I got this admission and did not have money for initial preparations, my parents tried everything under the heavens especially my mother who went for a loan with high interest just to enable to me travel and fulfilled my dream of being a graduate. To you both I remain grateful.

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## ABBREVIATIONS AND ACRONYMS

BOSEIET: Basic Offshore Induction and Emergency Training

CHET: Centre for Higher Education Transformation

DTI: Department of Trade and Industry

DCLG: Department of Communities and Local Government

DFID: Department for International Development

ESRC: Economic and Social Research Centre

GDI: Gender-related Development Index

GEM: Gender Empowerment Measure

GFMER: German Federal Ministry of Education and Research

GET-Fund: Ghana Education Trust Fund

GNPC: Ghana National Petroleum Corporation

GNPCL: Ghana National Petroleum Corporation Law

GDP: Gross Domestic Product

HE: Higher Education

HERANA: Higher Education Research and Advocacy Network in Africa

HDI: Human Development Index

HPI: Human Poverty Index

ICT: Information Communication Technology

IOC: International Oil Company

KE: Knowledge Economy

KNUST: Kwame Nkrumah University of Science and Technology

LCLP: Local Content and Local Participation

LCLPP: Local Content and Local Participation Policy

LCLPL: Local Content and Local Participation Law

LI: Legislative Instrument

MOWCA: Maritime Organization of West and Central Africa

MINCONMAR: Ministerial Conference of West and Central Africa States on Maritime Transport

NLC: National Labour Commission

NASAC: Network of African Science Academic Conference

OECD: Organization for Economic Co-operation and Development

OBG: Oxford Business Group

OSET-Fund: Off-Shore Educational Trust Fund

OGCBP: Oil and Gas Capacity Building Project

POTAG: Polytechnic Teachers Association Ghana

PNDC: Provisional National Defence Council

PNDCL: Provisional National Defence Council Law

PPP: Purchasing Power Parity

PRO: Public Relations Officer

PSA: Production Sharing Agreement

R&D: Research and Development

RMA: Regional Maritime Academy

RMU: Regional Maritime University

SPSS: Statistical Package for Social Sciences

TBOSIET: Tropical Basic Offshore Induction and Emergency Training

TGSS: Tullow Group Scholarship Scheme

UNDP: United Nations Development Program

UNCLOS: United Nations Convention on the Law of the Sea

UNESCO: United Nations Education and Cultural Organization

UK: United Kingdom

US: United State of America

## CHAPTER 1: INTRODUCTION

Many authors have identified the fact that Universities in Africa including Ghana are not contributing enough to Economic development. A recently published book by Centre for Higher Education Transformation on University and Economic Development in Africa also concur (Cloete, Bailey, and Maassen, 2011). Other prominent writers such as Pundy Pillay who wrote on *Linking higher education and economic development: Implications for Africa* (Pillay, 2010b p. 26) identified about nine implications, one of which is ‘*linking economic and education planning*’ after studying three successful systems (Finland, North Carolina and South Korea). It is important to link education to the various sectors of a country’s economy. In other words every aspect of the economy is essential and therefore should be considered with equal attention. A concentration on only one aspect may be problematic. However Science and Technology may be regarded as a center around where the other areas of the economy evolved.

Science and Technology and its link to oil-gas sector is increasingly becoming a global concern since it appears to be the steering wheel for most developed countries with petroleum discovery. It therefore means that any country which has discovered oil and gas should pay more attention to Science and Technology with special interest in the petroleum sector. Developing countries are encouraged in this light in order to maximize their benefit from the discoveries they are making in recent times. A lot of work has been done on science and technology and some work on the relationship of science and technology and oil-gas sector. Some of the studies include: United States and Ghana’s oil, Chinese Petroleum Exploration and the study on Nigeria’s oil (Gilberthorpe and Hilson 2014; Li, Hou and Cui, 2014; Ross, 2003). Attention on Science and Technology in a particular country with a focus on a specific sector could be termed as capacity building in that sector. Local capacity building is a term which is widely used and is concern with training of the human resource at all levels for the petroleum sector. In relation to policy formulation in the sector, it is known as local content capacity building.

Local capacity building is a key requirement for minimizing negative impacts while maximizing benefits from oil and gas exploration. This study is therefore intended to explore Ghana’s preparedness for capacity training in various institutions and how international oil companies are contributing to capacity building both internally (within the companies) and externally (locally

across the country). One institution that comes to mind when it comes to capacity training is a ‘University’ hence the study also seeks to investigate how public universities are responding to calls on capacity building in order to provide the needed human resource for the oil sector and also their general contribution to economic development.

## **1.1 Background to the study**

Higher Education or University Education plays a very important role in capacity training and economic development. This is increasingly becoming a global assertion due to its close relation with the world’s focus on knowledge economy (CHET, 2009). The World Bank’s sponsored study in 2003 identified knowledge as the most important factor in economic development and knowledge is acquired through capacity building or training. Thus knowledge is becoming the core of a country’s competitive advantage and the process of “*knowledge accumulation is just like capital accumulation which enhances economic growth*” (World Bank 2003: p.17). This imply that, the ability of a society to produce, adapt, commercialize, select and use knowledge is a key for sustainable economic growth and improve standards of living (Angula, 2003). Higher Education therefore forms the core of knowledge institution and for any country to develop; proper attention must be given to the highest level of knowledge accumulation which can also be referred to as capacity building (ibid).

There appears to be a direct correlation between ownership of natural resources and control of same. It is through careful study of petroleum law and its relation to Science and Technology that almost universally a nation state will claim ownership of hydrocarbon resources found within its borders or located underneath the territorial waters as enshrined in Article 57 of the United Nations Convention on the Law of the Sea (UNCLOS, 1982). This notion of state ownership over natural resources is also incorporated into Ghanaian law per Article 257(6) of the Ghana’s 1992 Constitution. To ensure maximum control of its hydrocarbon resources, there are essentially three policy models a country may choose from for the structure of its oil industry, plus a number of variations on these themes. These modules are complete state ownership, license model/concessionary system and production sharing agreement (PSA) (Bermudez-Lugo, 2013). Countries who cannot have complete ownership due to their financial status, may settled for either of the last two. Ghana has adopted the Royalty-Tax System (ibid).

This model is similar to the license model. Under the model, the government grants a foreign company (or more often, a consortium of foreign companies) a license to extract oil, which becomes the company's property (to sell, transport or refine) once extracted. However some agreed percentage (royalty) is paid to the country. The Royalty-Tax System has the advantage of the state avoiding high exposure in petroleum exploration and production activity as the system allows the state to benefit from the exploration of its resources without making any financial contribution.

The fiscal package consists of the following: royalty, carried interest, additional interest, petroleum income tax and additional oil entitlements (Bermudez-Lugo, 2013). Nevertheless, if laws are not properly formulated and enforced, the country may be at loss when it comes to claiming its share of the royalties based on the agreement. Thus, one needs to consider the laws (legislation) in the petroleum sector couple with its associated training programs in order to determine a country's preparedness in the sector. Considering the high expectations of Ghanaians that the oil and gas industry will generate economic explosion and accelerated growth, enhance poverty reduction and ensure prosperity to the people, there is a need to design programs that will be actively involving them to help understand issues and also realize these aspirations through the use of local expertise in the industry. This is known in industry parlance as local content approach which is a major policy issue in the oil sector all over the world. It will be interesting to ascertain whether Ghana's "local content" policy is robust enough to achieve the objectives of oil production.

Ghana, formerly known as the Gold Coast is famous for its gold production but oil exploration is dated back to the end of the 18<sup>th</sup> century (Reindorf, 2007). The Republic of Ghana covers an area of 238,540 square kilometers on the coast of West Africa and had a population of about 24 million people (Ghana Web 2013). The country was primarily an agricultural economy: The agricultural sector accounted for about one-third of the Gross Domestic Product (GDP) and more than half of Ghana's labor force (ibid). Mining and quarrying accounted for approximately 25% of the GDP and about 10% of Government revenues. One percent of the labor force is found in the mining sector, meaning about 14,000 people are employed in the mining and its related activities. Ghana is the second leading gold producer and a third producer of aluminum metal

and manganese ore (Ghana Web, 2013). The country also contributes to bauxite and diamond production in the world since it produces a significant amount of these minerals (ibid).

However exploration of petroleum started in Ghana as early as 1896 but it was not until recently when significant attempts were made in order to derive benefits from this natural resource (Reindorf, 2007). To regulate the activities of the minerals sector, various laws and legislations have been made since mid eighties. The Minerals and Mining Law, 1986 (PNDCL, 153), as amended by Minerals and Mining Act, 1994 (Act 478) was to help regulate and monitor the operators in the industry (Hilson, 2006 pp 362-374). The additional Profit Tax Law, 195 (PNDCL, 122): the Minerals Commission Law, 1986 (PNDCL, 154): the Minerals (Royalties) Regulations, 1987 (LI 1349), the Environmental Protection Agency Act, 1994 (Act 490) and Environmental Assessment Regulations, 1999 and as amended in 2002 (ibid). Though all these legal instruments contribute in regulating the activities of the petroleum sector, the Petroleum (Exploration and Production) Law, 1984 (PNDCL, 84) sets out the policy frame work and describe the role of Ministry of Mines and Energy into detail about how activities in the petroleum sector should be regulated (ibid). Ghana National Petroleum Corporation (GNPC) was empowered under GNPC Law of 1983 (PNDCL, 64) to enter any joint venture deem profitable in the petroleum exploration and production industry on behalf of the Government (ibid).

After the major announcement about Ghana's commercial discovery of oil and gas resources on its territorial waters, many people including politicians, business men and even ordinary Ghanaians have high expectations for the country. Some even consider Ghana as an emerging economy in Africa and predict economic explosion in the country. Politicians stand on platforms and make promises such as establishing scholarships and bursaries to help students and even build new universities to reduce the pressure on the entire higher education system. Subsequently, several issues have been raised as to how the country can exert maximum control over her hydrocarbon resources. It is important to learn from how oil and gas discovery is increasingly becoming a curse in some African countries than a blessing and design programs in order to reduce or curtail these misunderstandings when necessary. One obvious focus apart from enacting adequate laws, bridging the gap between regulatory systems, providing good policies regarding petroleum management and environmental protection among others is to propose and



promote programs that will be geared towards local capacity building in order to obtain total benefit from the oil and gas sector.

A project directed towards capacity building is on-going to support Ghana's oil and gas industry (P.R.O, Ministry of Energy). The project seeks to enhance transparency and strengthen local technical skills in Ghana's emerging oil-gas sector. There are parallel programs on-going such as the one by Norwegians to enhance capacity building (P.R.O, Ministry of Energy). However the quality of skills provided and the various levels of capacity building is what must be considered since capacity building could be at different levels. Capacity building that is geared towards creating a permanent enabling environment should also aim at university education which will properly equip the indigenous people about natural resources and how monies accrue from these resources are used.

Karl shows how politically weak countries or states with rich natural resources such as Venezuela among others, are ill-prepared to accommodate large incomes from oil extraction and to transfer them into long-term sustainable benefits (Karl, 1997). This means that, for a country to derive a massive benefit from natural resources it needs to be politically, legally and educationally equipped for the exploration and extraction. The government of Ghana must therefore be ready to help other institutions such as Ministries of Energy, Finance and economic planning, Attorney General and Ministry of Justice, Ghana National Petroleum Commission, Environmental Protection agency, Ghana Revenue Authority and Ministry of Education with its special focus on higher education. Higher education is very important in capacity building or in the training of skilled workers. According to the case study conducted by CHET on eight African countries, they identified that: 'of all the socioeconomic indicators depicted, education is an important instrument for raising a country's development status' (Cloete, Bailey, and Maassen, 2011; Pillay, 2010). Thus higher education's role in capacity building and economic development cannot be over emphasized. The World Bank in 2011 concur by stating: Universities play an important role in training workers to be well equipped in latest technologies and to apply their knowledge to industries, winning customers interest worldwide (World Bank, 2011). If the core function of a university is to produce, preserve and disseminate knowledge, then higher education should be given the needed attention in relation to the oil sector if Ghana wants to develop the petroleum industry (Clark, 1983).

Several studies have been conducted on the role of higher education in economic development in Africa including Lin (2004), Bloom et.al (2006), World Bank (2003) and Gymah-Brempong et.al (2006). The HERANA project is the latest: '*Universities and Economic Development in Africa*'. The study was on two levels: Macro and Micro. The macro (country level) comprised three case studies of North Carolina, South Korea and Finland. The aim of the macro study was to explore the relationship between economic policy and development on one hand and higher education system on the other (Pillay, 2010b). The micro (institutional level) involve case study of eight African universities namely: Nelson Mandela Metropolitan University (South Africa); University of Botswana; Eduardo Mondlane University (Mozambique); University of Ghana, University of Nairobi (Kenya); University of Dar-es-Salaam (Tanzania); Makerere University (Uganda) and University of Mauritius. The micro level study was aimed at understanding the ways these selected universities are responding to calls for a stronger engagement with economic development of their countries and surrounding regions (CHET, 2009).

Similarly, the Accra declaration by the Association of African Universities was equally concern about the fact that all universities in Africa must be development universities (UNESCO, quoted in CHET 2009). Considering development oriented universities, a famous Ghanaian Kofi Annan who was the former Secretary General of United Nations also identified university as a primary tool for Africa's development (Kofi Annan quoted in Bloom et.al 2005). Thus for universities in Africa to contribute extremely to economic development, they must be involved in proper capacity building in order to produce the ever needed relevant human resource towards the continent's economic growth.

However, are African universities responding to these urgent calls? Sawadago (1994) in his study on '*The Future Mission and Roles of African Universities*' disagreed and stated:

*'Dissatisfaction over the value of university education and increasing politicization of universities have often led to university unrest and calls for assessment of assigned roles and missions of universities in order to better prepare these institutions to meet Africa's development needs for the 21<sup>st</sup> century'* (Sawadago, 1994 p. 20-21).

One could even argue today that, many people are in disagreement and sometimes disappointed about non-performance of university graduates in Africa due to augment politicization of education at all level including the highest level of education all over Africa. Educational

policies are changed an expectedly anytime there is a change of government leading to a lot of confusion and the students are nonetheless affected. Meanwhile, for education to contribute meaningfully to economic development, it needs a clear focus and a long term policy which ought to be independent of any political party's agenda. All political parties who will assume governance should be oblige to ad-hear to it. Thus, education especially higher education need to have policies that are free of party politics and which will prevent politicians from using the educational system to promote their personal and political party's vision. These visions are temporary since they are mostly scraped as soon as the party leaves office. Consequently, there is a need to stop politicizing university education in order to have policies that will promote development in Africa.

Nevertheless, Sawadago (1994) observed that 'African universities play important roles in policy analysis as well as national development and national identity because they remain the sole centers for research as well as the principal training centers for skilled civil servants (ibid). Universities must therefore be seen as 'partners' who must go beyond training of civil servants and contribute significantly to development since knowledge has become a core factor for economic development (World Bank, 2003). However, the HERANA study identified several problems in the eight African Universities studied. The study highlighted these problems and noted that, they prevent higher education from making enormous and sustained contribution to economic development. Universities in Ghana must therefore endeavor to overcome these problems in order to be considered as serious 'partners' in capacity building in general and specifically in the oil-gas sector in order to contribute massively to general economic development.

## **1.2 Research problem**

The overall research problem of the study is formulated as:

The Role of Public Universities towards Capacity-Building in oil and gas Sector and their Contribution to general Economic Development. A Comparative study of the Regional Maritime University (RMU) and Kwame Nkrumah University of Science and Technology (KNUST).

### **1.3 Research questions**

- What is the national policy on capacity building (human resource development) in the oil-gas sector or industry?
- Who are the main stakeholders involved in capacity building in the oil-gas sector and what are their roles?
- How are the stakeholders and the oil companies responding to capacity building in the oil industry?
- What does the government expect from universities regarding capacity building in the oil-gas sector?
- How are the two selected cases (RMU and KNUST) helping to develop the human resource needed for the oil-gas sector through teaching and research activities?
- How are the two selected cases (RMU and KNUST) contributing to general economic development in the country?

### **1.4 The significant of the study**

This study is important and useful in many ways. Firstly the study can contribute immensely to the young but vibrant oil-gas industry in Ghana and perhaps all over the world. Also there is enormous evidence that high levels of education including university education contribute a lot to productive use of new technologies through teaching and research hence this study will be useful for teaching and research. One may deduce that a well functioning higher education system is vital for development. Thus institutional and human resource development or capacity buildings are necessary for development co-operation (De Gast, 2005). This study will explore the various levels of capacity building coupled with the use of new technologies in the oil industry and how these levels can help in economic development.

Furthermore, the findings of these two selected cases (KNUST and RMU) and their general contribution to economic development will be compared with the HERANA study to help triangulate their findings. This is because though University of Ghana was part of the study, one can argue that the sample was not representative for Ghana. This study will therefore increase the sample size and hence consolidate or otherwise the HERANA findings. In addition, though these

two universities are situated in the same social, political and economic environment just like University of Ghana, their management styles differ hence they can make significant contribution to the HERANA study. Beside the study will provide policy makers with an insight into what the country is doing so far regarding training people for the oil-gas sector and help suggest meaningful ways of collaboration among various stakeholders in providing effective and efficient skills for the oil sector.

### **1.5 Content of the thesis**

The thesis is divided into six chapters. Chapter 1 consist of the background to the study, statement of research problem, research questions and significant of the study. Chapter 2 presents brief information about the oil-gas sector and some basic information about the two universities. Section 2.1 gives information on oil-gas. Sections 2.2 and 2.3 outline short history about KNUST and RMU respectively. 2.4 presents mission statement, academic structure and administration on each of the Universities and 2.5 comes with the regulatory act governing universities in Ghana Chapter 3 provides and discusses the methodology of the study. Section 3.1 focuses on design, sampling technique and instruments. Section 3.2 presents data collection and the various methods employed during data collection. Section 3.3 discusses the methods used in analyzing the data. Section 3.4 gives an insight into how trustworthiness is assured in the study.

Chapter 4 outlines the analytical framework and literature review. Section 4.1 discusses the framework while 4.2 present the relevant literature of the study. Chapter 5 on the other hand highlights and discusses the results of the study, addressing each research question. Section 5.1 provides information on Ministry of Energy, government of Ghana and various policies concerning capacity building and subsequent challenges identified if any. 5.2 presents the contribution of the two universities to capacity building, their strength and whether the academic core in these universities is becoming economic-oriented. 5.3 give an over view on GNPC and international oil companies and their contribution to capacity building with special focus on Tullow Oil and Luk Oil. Finally, Chapter 6 covers conclusion, implications, limitation and recommendations of the study. Sections 6.1 sum-up the important points or issues arising from

chapter 5. Section 6.2 identifies implications of the study while 6.3 discusses limitations and 6.4 provides recommendation for further study in the same or similar area.

## **CHAPTER 2: BASIC INFORMATION**

### **Introduction**

This chapter provides some basic information about the oil sector and the two universities in this study. Section 2.1 presents a short history on the oil and gas sector from the 18<sup>th</sup> century till date. Section 2.2 provides a short history about Kwame Nkrumah University of Science and Technology, its mission statement, academic structure and administration. Similarly, section 2.3 presents the Regional Maritime University's historical background, mission statement, and the administrative structure.

### **2.1 History of oil production in Ghana**

Ghana is famous for its Gold but Oil exploration dates back to the end of the 18<sup>th</sup> century (GNPC, 2013). Initial exploration of petroleum in Ghana started as early as 1896 and wells were drilled in and around Half-Assini as a result of oil seeps found onshore Tano Basin (ibid). Oil was produced from the Saltpond field between 1975 and 1978 (GNPC, 2013). A total of about 3.37MMbo was produced and 14Bcf of gas was flared during the period (ibid). A production platform called 'Mr. Louie' was used and this is still evident at the site (ibid). 'Mr. Louie' is currently maintained and being used by Saltpond Offshore Producing Company Ltd (SOPCL), a joint venture between GNPC and Eternity in 2000. They are currently working on the field. One concern is about monitoring and regulation of the activities of these companies at the site hence there is a need for legislation to control their operations.

The Minerals Commission is responsible for the regulation, monitoring, and management of the utilization of all mineral resources in Ghana as well as coordination and implementation of policies related to mining under the Minerals Commission Act, 1993 (Act 450) (GNPC, 1983). However a statutory body, the Ghana National Petroleum Cooperation (GNPC) was established with Environmental and Petroleum responsibilities in 1983 under the GNPC Law of 1983 (PNDCL 64) to undertake petroleum exploration and production on behalf of the Government (GNPC, 1983) . Since then GNPC has being the main regulatory body responsible for exploration, development, and disposal of petroleum in Ghana (ibid). Since its inception to date,

over 3,000km of 2-D and over 5,000 squared kilometers of 3-D seismic data have been acquired (GNPC, 2013).

The Country has two Cretaceous Sedimentary Basins (Tano and Keta) and two Paleozoic Basins (Saltpond and Voltaian) which have all been explored to some extent. These are sometimes referred to as the four sedimentary basins of Ghana. It is worth noting that there were two world class discoveries in addition to these four marginal ones helping to de-risk a significant portion of Ghana's offshore sedimentary basin (ibid).

Tano is the most explored and significant achievements have been made so far. This exploration was made through the early frontier and limited success was made over the years. Although explorations were made, it was not until 1957 when an oil company from the United Kingdom (UK) discovered an oil and gas field in Ghana. In 1957 an oil company called Independence from UK made the first discovery of oil and gas fields in the Tano Basin. Signal oil explored the Saltpond field offshore within Devonian in 1970 and discovered about forty-five (45) million barrels of oil. Simultaneously Volta petroleum also discovered oil in first offshore Tano well in Volta Tano-ix. Zapata in 1973 in an attempt also fined an offshore gas at Cape Three Point-ix. Phillips Oil Company made a discovery of oil and gas in the North and South Tano from 1978 to 1980. In view of this, Ghana National Petroleum Company (GNPC) acquired 3D seismic over South Tano and appraisal wells were drilled over South Tano from 1959 to 1994. In 1999, Hunt oil drilled West Cape Three Point-2 well near South Discover-ix and encountered 14ft of light oil in the Upper Cretaceous. Tullow Oil signed a package of Deep and Shallow Water Tano Blocks in 2006 (Tullow Oil, 2006). Just about a year after, Mahogany-1 discovered Jubilee Oil Field and Hyedua-1 Oil Company confirmed Jubilee as a World Class Sweet Oil Field (ibid). A lot of effort has been put into the exploration process but the benefit is yet to be derived if local capacity development could be the focus of the country.

## **2.2 Basic Information on Kwame Nkrumah University of Science and Technology (KNUST)**

Kwame Nkrumah University of Science and Technology was established in 1952 to focus and explore the scientific arena in Ghana (KNUST, 2013). Dr. Kwame Nkrumah, the African



personality of the century and a pioneer of African Independence is the founder of the University; hence it was named after him. The University has achieved a lot throughout the years and has contributed greatly to the training of the needed human resource of the country. There are sixteen faculties, seventy-five departments, two schools, nine research centers and six colleges including the College of Engineering (KNUST, 2013).

The College of Engineering has gained a lot of attention in recent times due to the fact that the Faculty of Chemical and Material Engineering are located within it (ibid). The Government of Ghana has a special interest and focus on the Faculty since it houses the key departments offering petroleum-related courses. The three departments, namely Chemical Engineering, Petroleum Engineering and Material Engineering, nevertheless can be considered as very important to Ghanaians owing to the discovery and exploration of oil and gas in the country (ibid). These departments have seen a significant boost in all facets of activities. The Government has provided a modern laboratory to enhance teaching and learning in these areas. Collaborating with other stakeholders in the oil sector such as the International Oil Companies, relevant books for these 'important' programs have been made available to the faculty. These interventions are in connection with Local Content Capacity Building, a national policy in the oil and gas sector.

The University is also collaborating with other universities in Sweden, some colleges in the United Kingdom and local stakeholders in order to achieve the task of training highly competent Ghanaians in the oil industry. In view of this, a three -member delegation from Karlstad University, Sweden held discussions with officials of KNUST to strengthen collaboration in the area of engineering and science (ibid). Other collaborations include the one between Fire Service College in United Kingdom and the Ghana National Fire Service Corporation for MSc/PGDiP in Fire and Safety Engineering (ibid).The departments have also started offering 2year Master Programs leading to MSc or M.Phil (Mater of Science and Philosophy) degrees and 3year Doctorate Programs (PhD Degree). These programs are to prepare qualified chemical, petroleum and material engineers capable of finding solutions to technological problems in the Chemical and Allied Processing Industries in order to satisfy the needs and desires of the Ghanaian economy and society in general. These categories of graduates are considered as part of high-

level income earners identified in the local content capacity building policy document. The Master of Science Program is based on course work with a thesis while the

Master of Philosophy (M.Phil) Program is purely a research-oriented program. The M.Phil students are trained basically to organize research work in the oil and gas sector so as to discover new ideas in the industry and other related areas of exploration (ibid).

### **KNUST's vision and mission, academic structure and administration**

KNUST's mission is captured as follows: KNUST provides an environment for teaching and entrepreneurship training in science and technology for industrial and socio-economic development of Ghana, and other nations in Africa. KNUST also offers service to the community and is opened to attract scholars, industrialists and entrepreneurs from Africa and the international community (ibid).

Their vision is simple and it states: advancing knowledge in science and technology for sustainable development in Africa.

The administrative structure is made up of;

- The Chancellor as the head of administration and is appointed by the Government of Ghana
- The Vice Chancellor is the second in command, appointed by the University Council.
- The Pro-vice Chancellor
- The Registrar's office headed by the Registrar who is the University's chief administrative officer and secretary to the University Council. This office is divided into Academic and student affairs, General administration, Legal and Welfare, Human Resource Development, and University Relations. There are four deputy registrars in charge of each particular division as noted above.
- Dean of students is responsible for student affairs.
- There are also heads of faculties and departments who see to the day to day activities at these levels (ibid).

### **2.3 BASIC INFORMATION ON REGIONAL MARITIME UNIVERSITY (RMU)**

The Regional Maritime University (RMU), formerly the Regional Maritime Academy (RMA) is given the mandate to train quality personnel for the Maritime Industry in West and Central Africa (RMU, 2013). The RMU occupies the premises of the old Ghana Nautical College which was established in 1958 to train people for the formal state shipping corporation (Black Star Line). On 1<sup>st</sup> October 1982, the Government of Ghana promulgated the Regional Maritime Law followed by the signing of the instrument of transfer which handed over the college to the then Ministerial Conference of West and Central Africa States on Maritime Transport (MINCONMAR), now known as Maritime Organization of West and Central Africa (MOWCA) which negotiated for its regionalization (ibid). The College was re-named as the Regional Maritime Academy (RMA) on 26<sup>th</sup> May 1983 with five member states. The RMA was to promote regional co-operation in the marine industry focusing on training to ensure sustainable development in the industry. RMU also maintains the same overall objective with additional responsibility and focuses on the oil industry. The University is jointly owned and funded by Ghana, Cameroon, The Gambia, Liberia and Sierra Leone. It runs Bachelor of Science Degree Programs in Maritime Engineering, Electricals and Electronics, Ports and Shipping Administration as well as Nautical Science (ibid).

The formerly known Academy was pronounced by the former President of Ghana (Mr. John Agyekum Kufour) on 25<sup>th</sup> of October 2007 (RMU, 2013; a respondent from RMU). The university could be said to be timely since it is expected to produce a group of qualified personnel to manage the numerous marine disasters in the sub-regions. In addition the university was also asked to prepare graduates to respond to the offshore fisheries issues, oil and gas as well as fight against narcotics and other forms of marine-related illegal trade (from respondent). In view of these, the university collaborates with other institutions including Ghana National Petroleum Co-operation (GNPC) in order to up-grade their programs to help train engineers with modern technologies and innovative ideas in general maritime and oil-gas industry. The RMU is also mandated since 2010 to organize special programs and training in oil-gas in addition to their traditional programs. They are requested to conduct safety and mandatory courses in offshore oil-gas sector. This special training is organized in collaboration with Sibrima Maritime Training Centre (SMTTC) Global, a world renowned maritime training centre. It is a training intervention

program to ensure Ghanaians participate in all sectors of the nation's oil and gas industry (up-stream, mid-stream and down-stream). The centre will help in training staff of international oil companies in the country (ibid). They also offer training in Basic Offshore Induction and Emergency Training (BOSET) and Tropical-BOSIET (TBOSIET), Minimum Industry Safety Training (MIST) in offshore oil-gas for beginners and various welding-related courses for all categories of Ghanaians, students and workers in the oil industry.

### **RMU's mission and vision, academic structure and administration**

It states its mission as follows: 'To be the best in Africa providing world-class education, research and consultancy in maritime and allied fields to support development in Member States and beyond'. It is also to contribute to the development of the needed human resource in the emerging oil and gas industry in Ghana and the sub-region.

The hallmarks of its operations are:

- Meeting international standards,
- Teamwork and collegiality
- Productivity and discipline
- Accountability and transparency
- Equal opportunity and respect for diversity
- Social and environmental responsibility
- Excellence, creativity and professional integrity (ibid).

The University states its vision as: 'A globally branded University for education, research and consultancy in the maritime and allied fields'.

The RMU's administrative structure is slightly different from the general administrative structure followed by universities in Ghana. As a regional university, most decisions are taken at a level that recognizes all member states (a respondent). In view of this, the administrative structure involves:

- The Board of Governors as the highest policy and decision making body. It comprises of the Ministers responsible for Maritime Affairs from each of the five Member States, the Secretary-General of MOWCA and the Rector of the University.
- The Rector is the Chief Executive of the University. He or she is the head of administration that sees to the day to day affairs of the University. This position is assumed only on merit and not due to political appointment from any Member State. The only body who could consider the prospective occupant of this position is the Board of Governors.
- The Registrar's office which consists of Academic and student affairs section, Legal and Welfare department, General Administration, Human Resource Development and University Relations is managed by the registrar. The deputy registrars are responsible for each of the main divisions and they all work under the supervision of the Registrar.
- Dean of students is accountable for all issues concerning student affairs.
- Deans of faculties are in charge of the well being of the various faculties.
- Heads of departments are responsible for issues at the departmental level (a respondent)

## **CHAPTER 3: METHODOLOGY**

### **Introduction**

This chapter discusses the methodology including the study design. Section 3.1 discuss in detail the study design with a focus on sampling techniques; instruments employed in the study; and the motivation for using them; how the study was introduced to the respondents; and development of the interview questions. Section 3.2 presents data collection methods with special focus on interviews; policy documents; and reflexivity and assurance of confidentiality. Section 3.3 provides an account of methods employed in analyzing data with attention on unitizing data; coding; categorization and discovering patterns and identifying themes: The final section 3.4 presents how trustworthiness in the study is assured with respect to credibility; dependability; confirmability and transferability of the study.

### **3.1 Study design**

A qualitative approach has been employed to investigate capacity building in the Ghanaian oil-gas sector through university education which is considered as the highest level of skill training all over the world. The same method is also used to investigate how the two selected case studies are contributing to general economic development in the country. Qualitative research is normally an interpretative approach employed to understand and explain a social phenomenon (in this case capacity building in the oil and gas sector) in a particular environment (Bryman, 2008 p.366). In other words, one needs to consider the meaning or the interpretation of the phenomenon under study also from the perspective of the participants; not the general notions about it since the participants are selected from the study environment. At the same time, it is difficult for the researcher to only *mirror* what is being studied. Instead he or she is equally engaged in the construction of the social world; hence the phenomenon under study (Hammersley cited in Bryman 2008 p. 382).

A comparative case study design (with similar cases) approach was used. This is because the two universities are located in the same political; social and economic environment. Although both are public universities with the same technical background and nearly similar funding systems, one is a regional university (RMU) while the other (KNUST) is a national science and

technology institution. Lijphart (1975) defined a comparative method as the analysis of a small number of cases entailing at least two observations, but less than twenty. A comparative case study has its root in a case study technique as the name suggested.

A case study approach can be considered as an in-depth and orderly way of studying events, collecting data, analyzing data or information, and reporting findings. It involves an intensive analysis of a single or multiple cases at a time (Bryman, 2008 p.52). Nevertheless, it has its limitations. Some critiques consider it not as effective because it involves a single case, making it difficult to crosscheck facts (Bell, 2005). Case studies mostly rely on descriptive information provided by different people and this can create problems since there is always room for important details to be left out (ibid). A lot of information collected is considered retrospective data and is an issue which is subject to problems of intrinsic memory. Knowledge derived from a case study approach is mostly considered as context-dependent (Flyvbjerg, 2004 p.421). Nonetheless, it is a technique that helps a lot in the field of social sciences. The case study is effective for generalizing using what Karl Popper called falsification which in social science forms part of critical reflexivity. Falsification is one of the most rigorous tests to which a scientific proposition can be subjected: if just one observation does not fit the proposition, it is not considered valid generally, and must therefore be either revised or rejected (Popper, 2005 p.228).

A comparative case study method seeks to improve upon the case study method. It is a method of testing hypothesized empirical relationships between variables in which cases are selected in such a way as to maximize the variance of the independent variables and to minimize the variance of the control variables (Lijphart, 1975 p. 164). Although it is an approach that improves on the 'traditional' case study design', it also has its problems. One problem identified by Lijphart is the weak capacity to sort out rival explanations specifically, the problem of many variables, few cases. However, according to him this can be solved if:

- The number of cases can be increased as much as possible;
- Complexity (property space) can be reduced;
- Comparable cases can be used;
- Analysis can be reduced to only key variables;

- Most similar cases (systems)-design can be used; and
- Most different cases (system)-design can be used.

This study however took some steps to minimize the limitations associated with a comparative study. Firstly, it considered two comparable cases with a similar case design to help improve its credibility. It also uses semi-structured interviews during data compilation. In addition, multiple sources of data collection such as document analysis and interviews were adapted. The use of multiple sources increases confidence in the interpretation of data; it helps to confirm the validity of the study process and reduces bias that may arise from using one method of data collection (Denzin & Lincoln 2000).

- The study employed a purposive sampling technique which is a non-probability method of choosing respondents. According to Gay and Airasian (2000) qualitative studies mostly rely on a purposive selection of respondents to enrich data. This type of sampling or selection helps the researcher to experience multiple points of views on an issue being studied (Manning, 2000). However, to have such an experience the researcher normally begins with an assumption that contextual study is vital and therefore purposely selects a sample(s) which can provide a rich array of information. Nevertheless, O’Leary (2004) argued that, purposive sampling has two major limitations or weaknesses:
  - Non-representativeness; and
  - Unintentional biasness

This study selected respondents with an intention of collecting rich data on capacity building in the oil and gas industry in Ghana; how universities are contributing towards this mandate; Ghana’s policy document regarding the oil sector; institutional policies of KNUST and RMU; the academic core and periphery of the two universities; and externally funded projects in these universities. Twelve (12) respondents were interviewed (one each from Luk Oil, Tullow Oil, the Ministry of Energy and Ghana National Petroleum Cooperation (GNPC). Four participants from each of the two universities were also consulted). The respondents from the Universities included the Dean of Academic Affairs in both KNUST and RMU; the head of externally funded projects



in the two universities; the Pro-Vice chancellor of KNUST and Rector of RMU and the head of the Directorate of Research and Graduate Studies in both schools.

The research was conducted in Ghana within six weeks from 27 January to 10 March 2013. All interview related arrangements and subsequent interviews were done during this period; hence the small sample size.

The main instrument used during the study was data collection. Lincoln and Guba (1985 pp. 44-45) classified data collection as instrument of both human and non-human. The human aspect refers to the person conducting the study (researcher) while the non-human components include questionnaires, checklists, and computers among others. According to them, 'only the human instrument' is capable of grasping and evaluating the meaning of the differential interaction because the intrusion of instruments intervenes in mutual shaping of other elements and that shaping can be appreciated and evaluated only by humans, and because all instruments are value-based and interact with local values but only the human is in a position to identify and take into account those resulting 'biases'. The researcher therefore has an enormous responsibility of grasping and evaluating the meaning of data collected and how the perceive biases are dealt with. As such the researcher in this study:

- Guided the interviews;
- Considered respondents direct values and beliefs;
- Contacted appropriate authorities to clarify issues that were not very clear in the documents; and
- Cross checked the data from interviews with the policy documents.

**Interview Questionnaires'/Protocol:** Specific interviews (questions and sections) were designed to obtain important data on capacity building in the oil-gas sector; university policies; academic core and its periphery; and on externally funded projects in both KNUST and RMU.

**Document Analysis Checklist:** The above mentioned interviews were used as a checklist for the purpose of analyzing policy documents so as to collect relevant data.

### 3.2 Data collection

This section discusses more about how the data collection instruments described above have been used during the study:

Interviews were based on semi-structured interview. A semi-structured interview is an interview schedule that involves general form of questions in which the interviewer can vary the sequence of questioning and ask for more clarification (Bryman, 2008 p.196). This approach of interviewing made the researcher to be:

- Flexible in conducting the interviews;
- Able to control the direction of questioning and length of the interview period; and
- Observe non-verbal communication or behavior of the respondents.

Spradley (1980) identified that the above advantages of interviews are necessary and important in any study. It is worth noting that permission was obtained before interviews were conducted. Prior to the interview, the researcher served KNUST, RMU, Ministry of Energy, Tullow Oil, Luk Oil and GNPC with an introductory letter from the University of Oslo. Authorization letters from the institutions mentioned above were given for the purpose of the study relating to conducting interviews with participants concerned. Appointments with the various respondents were made and all respondents were given the interview schedules. All interviews were held in their respective offices and each section lasted for about one hour forty-five minutes (1:45).

Confidentiality is important in any scientific study. This is a process of assuring respondents to give information freely because they will be kept anonymous and their information will be used only for the purpose for which it was sought. In view of this, respondents were informed that the study was a comparative one and was purely for academic work. Each respondent was identified by a code and sensitive details (information that could affect people's employment) that could trace any participant were omitted. All interviews were conducted in English since English is the official language and all respondents could speak it fluently. All proceedings were audio-taped with the consent of the interviewees. Short notes were also taken manually to supplement for any unintentional gaps.

However, there were a few challenges regarding the interviews. Some respondents have to change the date at the eleventh hour. The issue of getting them to sit continuously for the whole session was a challenge. Nonetheless these were addressed through consultation and therefore some interviews were held after the normal office hours to help limit interaction during the session and increasing concentration on the subject matter.

Apart from the interviews, some documents/records were analyzed. O'Leary (2004) defines document analysis as the 'collection, review, interrogation and analysis of various forms of text as a primary source of data'. Jarvis (1999 p.111) concurred and said the use of documents enables researchers to understand practice and the situation in which practice occurs.

### **3.3 Data analysis**

Manual analysis was adapted because of the limited size data. This was done through transcribing, coding, categorization into themes and sub-themes before arriving at conclusions. Transcriptions were done by unitizing and coding. Unitizing data according to Erlandson et.al (1993 p.117) is a crucial step in transforming interview data into the smallest pieces of information that stand as independent thought in the absence of additional information other than broad understanding of the context. Data was unitized on index cards that were coded to facilitate locating the original source. Codes act as devices to label, separate, compile and organize data (Charmaze 1983 p.186).

Categorization of data into themes and sub-themes was done after unitizing and coding. Categorization helps to bring together provisional categories, those cards that relate to the same content (Lincoln and Guba 1985 p.347). Similarly Bryman (2008 p.554) identifies that '*categorization helps to construct an index of central themes and sub-themes which are then represented in a matrix that closely resembles Statistical Package for Social Sciences (SPSS) spreadsheet with its display of cases and variables*'. The following broad themes were used for the purpose of this study:

- National Policy on universities
- National Policy on capacity building
- KNUST and RMU's Institutional Policies

- KNUST and RMU's academic core and periphery
- Externally funded projects
- Capacity building in the Ministries
- Capacity building in IOC
- Local Content Capacity Building

Each of these broad themes had a sub-theme. After detailed categorization, computations were made; and interpretations and conclusions were also drawn.

### **3.4 Ensuring trustworthiness in the study**

According to LeCompte and Goetz (1982), the case study usually suffers external validity because of the small sample size associated with it. The solution is to assess the quality of case study on trustworthiness and authenticity instead of reliability and validity since external validity is vital in any scientific study (Lincoln and Guba 1985). Bryman (2008 p.377) agreed and identified that trustworthiness comprises four criteria:

- Credibility (similar to internal validity);
- Transferability (similar to external validity);
- Dependability (similar to reliability); and
- Confirm ability (similar to objectivity).

These four (internal validity, external validity, reliability and objectivity) are very important and are dear to researchers in the modern and scientific world. Bryman in the same 2008 book cited above illuminate's authenticity as criteria which address the following issues in a scientific study:

- Fairness of the study: representing different viewpoints among member of social setting
- Ontological authenticity: thus whether the study helps members to arrive at a better understanding of their social setting.
- Educative authenticity: refers to whether the study helps members to appreciate better the perspectives of other members of their social setting

- Catalytic authenticity: whether the study acts as an impetus to members to engage an action to change their circumstances. The following section talks about how trustworthiness was assured during this study (Bryman, 2008 p. 379).

## **Credibility**

The researcher took the following steps to ensure credibility:

- Respondents' views were occasionally rephrased to be sure of the correct capturing of their views.
- Participants were frequently contacted to authenticate their views on emerging issues from other documents and interviews
- Triangulation was undertaken to ascertain that data from interviews were similar to that retrieved from documents
- Each respondent was given the opportunity to listen to the audio recorder in order to validate their information or provide additional information, amend and clarify themselves

## **Transferability**

Transferability can be likened to future studies; however, it is worth noting that this study addresses issues on capacity building in the oil-gas sector and the general economic development solely related to:

- The Ghanaian setting;
- Influences created by respondents' official positions;
- Respondents' attitudes, expectations, opinions and emotions during the interview period;
- Personal biases detected by the researcher; and
- The Ghanaian oil-gas industry and its higher education system.

## **Dependability**

To ensure dependability, the researcher asked four people to read and later held discussion with them. These people criticized, monitored and evaluated the methods employed in this study. Their feedback was considered and used to improve the methodology and style. In addition, my supervisor played an important role during the whole study process.

## **Confirmability**

According to Lincoln and Guba (1985), confirmability helps assure that, findings and interpretation of data are grounded in the context from which they came. Confirmability was assured by taking note of very little observations during the study. Also a study diary was kept where interview schedules, dates and other important information were kept. Audio recordings, transcripts and also detaching oneself from some activities which would otherwise question the objectivity of the study.

## **CHAPTER 4: ANALYTICAL FRAMEWORK AND LITERATURE REVIEW**

### **Introduction**

The analytical framework and the review of the relevant literature are presented in this chapter. Section 4.1 deals with the framework adapted from the HERANA project, the UNDP and the framework of this study while 4.2 consists of the literature review.

### **4.1 Adapting the analytical framework from the HERANA project**

This study adapted the analytical framework developed by the HERANA project which is informed by:

- Lessons from successful practices of linking higher education to economic development in three regions- South Korea, North Carolina (USA) and Finland.
- The influence of three interrelated factors (the nature of the pact; the nature, management, size and institutionalization of externally funded projects; and the nature, size and the continuity of the academic core) on HE's role in contributing to the impact on development. In addition economic development is not limited to economic growth, but encompasses human development, equity-based development and knowledge-based development.
- The indicators (the pact, governance and coordination; institutionalization; and strong academic core) are important frames of reference for analysis.

The HERANA project analytical framework was adapted and modified in order to get some indicators for this study. It is worth noting that not all the indicators of the HERANA project are used in this study. The summary of the analytical framework from HERANA project is presented below to give an overview of this analytical framework to the reader.

The HERANA project analytical framework is summarized in table 1 below.

Table 1: *Summary of the analytical framework for HERANA project.*

	THEME	ISSUES COVERED OR ADDRESSED
1	Overview of the project	<p>Overview of key activities are:</p> <p>Research</p> <p>Advocacy</p> <p>HE and economic development project:</p> <p>Contradictions in the Accra Declaration (1973) that all universities are “development universities” yet no framework provided.</p> <p>Project aims at macro and meso/micro levels</p> <p>Project is in a process</p> <p>Project explored HE and economic development from three successful regions</p> <p>Lessons from successful practices.</p>
2	Analytical premise	<p>Three inter-related factors influencing higher education’s role in contribution to and impact on development:</p> <p>Nature of the pact</p> <p>Nature, management, size and institutionalization of externally funded projects</p>



		<p>Nature, size and continuity of academic core</p> <p>The propositions expressing the influence of aforementioned factors on the possible contribution of HE to development, and the relationship between them</p>
3	Notions of development	<p>Economic growth as development</p> <p>Human development</p> <p>Equity and development</p> <p>Knowledge and development</p>
4	The pact	<p>Definition and characteristics of a pact</p> <p>Notions of HE</p> <p>Actors and relationships which impact the pact</p> <p>Policy, implementation, infrastructure, power and coordination</p> <p>The role of external funders</p> <p>Indicators of the pact, governance and coordination</p>
5	Institutionalization	<p>Loose coupling</p> <p>Institutionalism and institutionalization</p> <p>Indicators of institutionalization</p>
6	The academic core	<p>Indicators of a strong academic core</p>

		Preliminary analysis on typology of projects
7	Main findings	<p>Very weak educational department expected to implement many symbolic policies and steer HE towards contributing to development</p> <p>Pact on importance of education, but no pact on HE, development and knowledge economy</p> <p>Government departments started funding projects in universities with no national coordination</p> <p>National policy reflected traditional or new instrument approach to the role of the university in development, except for Botswana and Mauritius</p> <p>All institutions attempted to institutionalize projects with little or no help from government or funders</p>

Source: CHET 2009- HE and Economic Development; Draft Analytical Framework

The above framework was adapted, and combined with the UNDP framework on capacity building. This was modified to suit this study. An analytical framework may be modified or tailored to suit a particular study. The Department for Communities and Local Government (DCLG) in the UK identified that evaluators may use a framework as a starting point or structure within which they can map out questions that are important to their specific evaluations. Thus the framework and its constituents may be tailored to suit a specific project which is being evaluated or they may simply select relevant questions from the framework (DCLG, 2009 p.5).

These frameworks were adapted because they seem to be indicative and comprehensive for guiding how capacity is built and how universities may contribute to economic development in different environments. An indicative framework helps the researcher to be more concentrated on problems within specific environments. According to the British Government's Department for International Development (DFID), the analytical framework should be indicative rather than prescriptive to help researchers to focus on the main issues which are relevant to their settings and to set locally relevant targets and use appropriate indicators (DFID, 2007).

The HERANA framework also focuses on lessons from successful practices in linking HE to economic development in three regions; South Korea, North Carolina (USA) and Finland. The lessons seem relevant and it appears that, these countries (regions) linked HE and to some extent what I consider as capacity building to specific sectors in the economy which yielded outcomes leading to economic development.

In addition, the UNDP concerned itself with:

- Individual development which refers to skills and competencies of individuals combined with the work ethic of organizations.
- Institutional development involving organizational structure culture and resources; and
- System level development consisting of national and regional policies established in order to regulate institutions.

These frameworks could be considered as appropriate frames of reference in analyzing universities and capacity building in general and particularly in the oil sector.

However it is worth noting that, limitations such as time constraints and limited interest in the oil sector could not allow for effective use of the frameworks and to consider all the issues in the HERANA framework; hence all indicators could not be used. Also regional regulatory policies were not considered in this research.

### **The analytical framework for this study**

The analytical framework for this study consists of five components:

- Analytical point of departure.
- Lessons from successful systems (South Korea, Finland and North Carolina) and HERANA project *findings* on eight African countries (Ghana, Botswana, Kenya, Mauritius, Mozambique, Tanzania, Uganda and South Africa).
- Six inter-related models of development and some factors affecting the developmental process.
- Study propositions.

- Selected and modified analytical indicators.

### **The analytical point of departure**

The analytical point of departure for this study is influenced by three interconnected conditions; policies (national and institutional); institutionalization of externally funded projects; and the strength of the academic core in these selected institutions. In addition, conditions under which capacity is built in various universities in Ghana using the selected cases as a bench mark for the oil sector are also considered. Nevertheless the socio-economic, political and cultural factors could affect these institutions in their efforts to build capacity in general and for the relatively young oil sector. These issues are of serious concern taking the content into consideration.

One needs to be aware of the differences in the political systems when comparing them with those of the developed world. In Africa and for that matter Ghana, the institutional structures established are sometimes not allowed to work. Political figures, people of “powerful status” and even “ordinary people are sometimes tempering with the system. In addition, political parties mostly do not continue projects from previous administrations. Each political party comes with their own vision, establishing new ideologies. This is not good for smooth development since these political parties could be changed every four years. Socio-economic and cultural factors also contribute to the style of governance and how developmental projects are approached generally. African countries depend on donors and development partners when it comes to academic issues including research. These donors have almost all the time set the standards which may not necessarily be compatible with the African setting. The end result is often responsible for non-completion of projects and slow running of academic calendar.

### **Lessons from successful system**

As stated, this study is a combination of capacity building and an attempt to broaden the study from the HERANA project on universities and economic development. It is therefore very important to explore the conditions under which these universities can make enormous and permanent contributions to economic development. In view of this, the study used the HERANA study, the UNDP’s study on capacity building and lessons from successful practices of linking HE education to economic development as points of reference. The findings from ‘best practice’

are listed in box 1, the link between the concepts on capacity building and that of economic development are presented just after the box. The HERANA study on eight African countries found the following:

- There is a contradictory notion of the role of the university. This notion is not resolved due to weak infrastructural power: some people see the University as a tool for development while others are of the view that it should continue its traditional role of teaching and research;
- There is limited or poor co-ordination between government agencies/departments in relation to funding projects in universities;
- There is limited evidence concerning HE, knowledge economy and development in Africa;
- National policies on HE reflect the traditional or new instrumental notion;
- There is a limited attempt to integrate external funding with government priorities and efforts to strengthen the university's academic core;
- The desire for HE to contribute to development was hampered by a weak or absent enabling framework;
- Institutional leadership reflected competing notions of HE.
- Attempts to institutionalize externally funded projects face problems in terms of support from both donors and government;
- At each university there were a number of excellent projects that were managed by outstanding academics.

### **Box 1: Implications of successful HE systems for African countries**

The following implications for African countries were derived from the three successful systems of North Carolina, South Korea and Finland

1. Linking economic and education planning
2. High participation rates with institutional differentiation
3. Building HE on a sound foundation of high –quality, equitable schooling
4. Different roles for private higher education
5. Strong state steering
6. Strong cooperation and network
7. HE linked to regional development
8. HE responsive to labor market demands
9. Positive role HE plays in development

Source: Pillay (2010 p. 30)

Considering the concepts from the UNDP’s capacity building program and the HERANA study on universities and economic development, one could argue that there are some links between some of the concepts. They can therefore be summarized and considered by this research as general models of development as follows:

- Economic Growth as Development model, measures development by using GDP (Maro 2007; Mankiw 2007).
- The Human development model is combined with individual development with an argument that individual development is the same as human development. This is because every investment that is made in an individual human being adds some value and

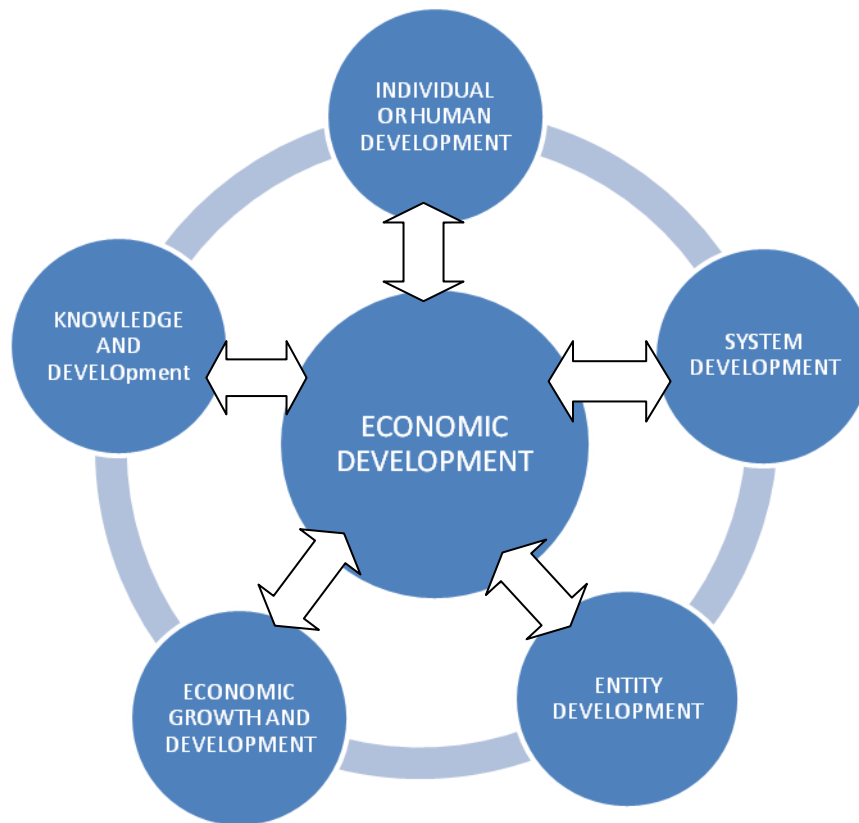
helps improve the person's abilities and capacity. These individuals directly or indirectly will in turn affect other people's life in the community where they live. In short, individual development could help influence several aspect of life including health and education in the particular individual and also society in general. A healthy and educated youth could be considered an asset for every country. In view of this, this study uses the terms interchangeably. It refers to skills and competencies available in each individual, institution and the work ethics that the staff embraces in performing their functions efficiently and effectively within a broader context (UNDP 1997). To measure economic development of humans or individual development, one needs to go beyond GDP. Thus economic growth is not an end in itself but a means to human development (Sen and Anand 1998; CHET 2009). The individual is trained in order to develop and this 'training' is considered in this study as capacity building.

- Institutional, organizational or entity level development model refers to organizational structures and working mechanisms, culture and resources. This is mostly influenced by external factors such as political, economic, social and cultural factors (UNDP, 1997).
- System Level Development consists of national and regional regulatory frameworks and policies that regulate institutions, making them to interact and depend on each other. This is the most complex level in the capacity development process according to UNDP. However it is very important because analysis at this level is comprehensive since it includes all the factors within both entity and individual levels (UNDP 1997 pp. 7-10).
- The Equity and Development Model is base on the idea that equity complements development, hence societies, institutions and even policies with a level playing ground contribute enormously to sustained development (Burton 1997; Mankiw 2007; CHET 2009).
- Knowledge and Development Model is based on the understanding that the capacity to use knowledge effectively allows individuals, enterprises, societies or communities to utilize resources and improve their wellbeing, hence contributing to development (OECD 1996; Leadbeater 1999; Kok Report 2004; ESRC 2005; World Bank 2008:5).

*The six inter-related models of development*

This study uses six inter-related models of development because it combined capacity building or development according to the UNDP with economic development from the HERANA project and some possible factors that affect capacity building towards economic development. The UNDP divided capacity development process in to three levels (individual development, entity and system) while four models of development (economic development, equity and development, human development, economic growth and knowledge and development) were adapted from the HERANA project. However, human development and individual development are considered as the same concept in this study.

Figure 1. Shows a pictorial representation of general models of development because it includes capacity building as well as economic development: This was done by this researcher with the help of ideas from both the HERANA study and that of UNDP’s capacity building.



Source: Author (Palmah Abla Howusu) with ideas from UNDP and HERANA project



### *The five study propositions*

The five propositions considered in this study include the fact that universities make an enormous and sustained contribution to development if:

- Their role as engine for development is explicitly stated in their institutional policies
- National policies reflect their role as engines of development.
- The academic core is stronger and economically-oriented.
- When externally funded projects are institutionalized, they strengthen the academic core hence reflecting significantly in development.
- When the right capacity is built (training is given), it sustainably impacts on development.

### *Indicators for analysis*

The analysis for this study was done using the indicators depicted in Box 2. These indicators were adapted from the UNDP's definition of capacity development (UNDP, 1997) and HERANA project (CHET 2009). They were modified in that some indicators for capacity building were added in order to suit this study. This is because the study is a combination of capacity building in the oil industry and economic development in general.

#### **Box 2: Indicators for analysis**

##### **Capacity building:**

##### **1. Individual Level:**

- Have formal/ informal training and skills
- Be given on-the-job training
- Solve problems
- Participate in decision making process
- Have clear understanding of their roles and functions
- Given adequate incentives and salary
- Should be accountable and provide feedback

- Recognize organizational values and structure

## **2. Entity/organizational/institutional level**

- Access to financial resources
- Access to information
- Have access to good technology
- Good infrastructure
- Good organizational structure
- Clear mission and vision
- Clear goals
- Have clear function
- Adequate resources
- Policies and values

## **3. National system:**

- Regulatory framework
- Global linkage
- Have development partners or donors
- Social structure and values
- Political commitment
- Strong state institutions to promote equity and accountability
- Human resources
- Institutions to absorb qualified human resources
- Encourage women

**Indicators for economic development are divided into four main groups.**

### **National policies, Governance and Coordination:**

- National development framework is in place
- The concept of a knowledge economy features in national policies
- Government vision for universities
- Link between national level economic planning and education planning
- Implementation plans and agencies
- Role of Ministry of Education
- Diversification, consensus and coordination of different government departments involved in HE

- Funding consistency

**Strong Academic core:**

- Ratio of undergraduate to postgraduate enrolments
- Ratio of student enrolments across fields of study
- Percentage of academic staff with PhD degrees
- Research output in terms of staff and student publications (citation index in journals)

**Institutional Policies and Activities:**

**1. Coherence between institutional vision and national development framework/ Institutional engagement around the university's role in contributing to economic development:**

- University leadership's awareness of national policies and strategies on the role of universities in economic development
- University's plan reflects aspects of national development framework
- Institutional leadership vision of the two universities
  
- Institutional policies with regard to university's role in contributing to economic development

**2. Teaching programs are becoming more economically oriented**

- New programs are developed in response to external needs for training
- Increase in student enrolments in the oil sector and other fields that are considered to be of high economic relevance
- Attempts to attract funding for skills development
- Use of information and communication technologies to prepare students for both national and knowledge economy
- Involvement of external stakeholders in teaching, learning and curriculum development

**3. Research activities:**

- Increase in funding for research
- Strong strategic management or data oriented

**Externally Funded Projects institutionalized and sustained by Universities:**

- University's policy on project funding
- University's contribution to/or benefit from projects
- Structures are in place to manage project funding

- Management of projects related to the University governance structure
- Projects related to mission or strategic plan of the University
- Management of projects going through central university administration
- Attempts to ensure projects sustainability

This framework is a result of combining ideas from UNDP's capacity development or building and also from the HERANA project. It appears to contain too many issues and perhaps looking at capacity development and economic development from a more holistic approach. However:

- The study did not use the 'pact' from HERANA analytical framework; instead it used 'national policies', governance and coordination;
- It also focused on both the lessons from the three regions (Finland, South Korea and North Carolina) and the findings from the study of the eight African countries (Ghana, Botswana, Tanzania, Mozambique, South Africa, Uganda, Kenya and Mauritius);
- The HERANA project and UNDP's findings provided a strong bench-mark for comparing the findings of this study;
- It is worth noting that the UNDP's framework was used at the simplest level (three levels)

## **4.2 Literature review**

Considering the topic 'The Role of Public Universities towards Capacity Building in the Oil sector and their general Economic Development', the term 'economic development' needs to be distinguished from 'economic growth'. These terms are used interchangeably although they are not the same. This study drew a thin line between them by linking the two, to models of development and capacity building to help understand the differences. Models of development and capacity building consist of: Individual or Human development; Systems development; Entity development; Economic growth as development; Knowledge based development and Equity based development (UNDP 1997; CHET 2009). Important to this study is the connection between each model of development and higher education.

Distinguishing between economic growth and economic development, Shaffer, Deller and Marcouiller (2004) stated in their work on *Community Economics: Linking Theory and Practice*

that; growth means “changing the factors of production but probably having the same output with income distributed the same way”. Development according to them means that, there is a technical and institutional change in the way production and distribution is done or increased in order to achieve a goal. There may be a change in technology, institutions, cultural/social framework, specifically, changes in attitudes and values of the population. Development is long, purposeful and permanent (Shaffer et al 2004 p. 4).

The relationship between the two concepts is that economic growth (measured using GDP) measures only the increase in a country’s economic output. Mankiw (2007 p.508) affirms this in his publication, *Principles of Economics* and stated that ‘it is natural to look at a country’s GDP when judging whether its economy is doing well or not. In the same vein Maro (2007) elaborates that GDP, as a standard indicator used to measure a country’s economic performance and often seen as an indicator of well-being is widely used. However, GDP has weaknesses in measuring economic development (Mankiw, 2007; Maro, P. 2007; HERANA 2009). Arguing further, Maro (2007) identified that GDP was never intended to measure well-being (development) because it fails to distinguish between cost and benefits, productive activities and destructive ones, or sustainable and unsustainable practices. Similarly the HERANA project reported that the relatively high GDP growth rate in the eight African countries studied was not commensurate with social outcomes. High levels of poverty and inequality are still lingering in Africa. There is a relationship between education and GDP. Robert Merton Solow’s work though done long time ago, is crucial for understanding the commencement of the empirical literature on education’s contribution to GDP. Solow (1957; 1971) ascribed the growth in GDP to three sources:

- i. Increase in the stock of physical capital, such as machines and building that are used to produce goods and services;
- ii. Increase in size of labor force; and
- iii. A residual representing all other factors including education

Solow identified the residual-technical progress and noted that increasing levels of education were one of the factors that contribute to technical progress. His findings activated the need to understand the role of education in economic growth in its profundity. On how much education contributes to GDP, the study of Denison (1985) on ‘*Trends in American Economic Growth*,

1929-1982' illuminates that between 1929 and 1982, increasing levels of education were the source of 16 percent of growth of total potential output in the non-residential business sector and 30 percent growth in the productivity of people employed in the US. Similarly, a World Bank sponsored study on HE and Economic Development in Africa conducted by David Bloom, David Canning, and Kevin Chan, examined the impact of tertiary education on GDP. Their study suggests that increasing tertiary education may be important in promoting faster technological catch-up and improving a country's ability to maximize its GDP. Their results show that given Sub-Saharan Africa's current production level which is below its production possibility frontier; increasing tertiary education could maximize the rate of technological understanding (Bloom et al 2006).The notion of economic growth views development as simply a country's growth in GDP.

Arguably though, education makes significant contribution to economic growth hence economic development. Education could bring about entrepreneurship, improvement in the individual income and health, bring more revenue into the country and gradually reduces poverty (due to both individual income and expansion of revenue). Thus, countries that are able to manage and control their revenue systems well are able to bring a lot of developments such as good roads, schools, hospital and a more hygienic shopping centers or markets to the benefits of their citizenry. These developments could lead to more employment for the youth, bridge the gap between the rich and the poor hence could be considered as economic growth. In short, economic development occurs when economic growth leads to internal employment, reduction in poverty, inequality and general well being of the people.

### ***Individual or Human development model***

Human development takes place when there is an enabling environment in which people can develop their full potential and lead productive lives in accordance with their needs and interest (UNDP, 2010). UNDP stated that people are the real wealth of nations and therefore development is about expanding their choices and making sure that there are conditions promoting them to lead valued lives. Human development is linked to economic growth in that growth is a necessary condition for human development because it helps expand people's

choices (UNDP 2010; CHET 2009). Human development is not limited to economic growth but it is focus on seven broad themes, according to UNDP as follows:

- Social progress: Ensuring greater access to knowledge, better nutrition and health services.
- Economics: It is considered as a means to reduce inequality and improve levels of human development.
- Efficiency: It is concerned with resources and their availability. Human development is pro-growth and productivity as long as growth directly benefits the poor, women and other marginalized groups.
- Equity: It involves economic growth and other development parameters.
- Participation and freedom: Concerned with empowerment, democratic governance, gender equality, civil and political rights, and cultural liberty, particularly for marginalized groups.
- Sustainability: The future generations in ecological, economic and social terms.
- Human security: Daily security against threats such as hunger, famine, conflict and joblessness.

In view of this, human development is measured by the Human Development Index (HDI), Gender-related Development Index (GDI), Gender Empowerment Measure (GEM), and Human Poverty Index (HPI). The four indices measuring human development are explained by UNDP (2010) as follows:

- Human Development Index: Provides a composite measure of three dimensions of human development namely long and healthy life (measured by life expectancy), being educated (measured by adult literacy and gross enrolment in education), and having a decent standard of living (measured by incomes at purchasing power parity [PPP]).
- Human Poverty Index: It measures the deprivation in the three basic dimensions captured in human development index (long and healthy life, knowledge and decent standard of living).
- Gender-related Development Index: Measures achievements in basic capabilities as HDI but considers inequality in achievement between men and women.

- Gender Empowerment Measure: It evaluates progress in advancing women's standing in political and economic forums and examines the extent to which women and men are able to actively participate in decision-making.

Human development can be related to substantive freedom necessary for individuals to lead a desired life, hence poverty is seen as a deprivation of a person's capability towards a fruitful life (Sen and Anand, 1998). Higher Education is indirectly related to the four indices above and hence human development through the knowledge factor. It empowers people with knowledge that can be traded through employment hence for better wages or salaries (CHET, 2009). The average earnings of individuals are closely related to their educational attainment (ibid).

However both the HERANA project and UNDP seems to affirm that no African country has achieved high levels of human development in terms of the UNDP's definition. According to the HERANA study only Mauritius has achieved medium level human development. In the 2014 UNDP development report Ghana is 138 out of 187 countries with comparable data (UNDP, 2014). The country could be said to spend not much of her income on education since between 2005 and 2012, she spent only 8.2% of her GDP on all educational activities (UNDP, 2014).

### ***Institutional, organizational or entity level development model***

Institutional or entity level development refers to organizations' structures and working mechanisms, cultures and resources. The culture and values in any organization or institution determine the progress of these institutions. Also highly educated people are most likely to adapt to new skills and different organizational cultures. Good values coupled with the right resources could lead to a right attitude to work, hence contributing enormously to development. This is mostly influenced by external factors such as political, economic, social and cultural factors (UNDP, 1997).



### ***System level development model***

This model as stated before consists of national and regional regulatory frameworks and policies that regulate the institutions and how these institutions inter-relate, interact and depend on each other. Systems with well defined policies and regulatory frameworks could promote economic development. When nations create an enabling environment with the right institutions to check non performance and corruption among other things, it generally reflects in the lives of the citizenry. Although this is the most complex level in the capacity development process according to UNDP, it is very important because, analysis at this level is comprehensive since it includes all the factors at both entity and individual levels (UNDP 1998 pp 7-10).

### ***Equity based development model***

Burton (1997) argued that equity complements prosperity or development. He stressed that equitable distribution is not only ethically appealing but also good for sustainable development. It therefore means that societies, institutions and policies which have level playing ground contribute more to sustain growth and development. Mankiw (2007) identified that markets are perceived as good ways of bringing equity and efficiency in allocation of resources. Efficiency to him means society getting maximum benefits from its scarce resources while equity refers to the fair distribution of those benefits. However markets mostly fail to achieve the equity goal for society so governments improve equity through public policies such as income tax and welfare system (Mankiw, 2007). HERANA project also identified that equity enables societies to maximize the opportunities for innovation and investment. When greater number of a population is educated, their perception about equity issues may change and they could promote equity base policies. With increase opportunities for the under privilege in society, these people could also contribute to development.

However the HERANA project found that most African countries are not committed to mainstreaming of equity in development. It was noted that only Mauritius from the sample of eight had its social and economic policies highly associated to growth with equity. Like some other African countries, Ghana is battling with issues regarding equity.

### ***Knowledge based development model***

On knowledge base development, the Economic and Social Research Council (ESRC) stated that economic success is based on effective utilization of intangible assets as knowledge, skills and innovation potential as key resources for competitive advantage (ESRC 2005).

Leadbeater and Demos argue that the Knowledge based Economy (KE) is not based on description of high tech industries only but also describe a set of new sources of competitive advantage which can apply to all sectors, companies and all regions from agriculture and retailing to software and biotechnology (Leadbeater, C. & Demos, L. 1999).

Other organizations identified that the role of knowledge (compared with natural resources, physical capital and low skill labor) has taken on greater importance although the pace may be different. Currently all OECD countries or economies are moving towards knowledge based economy (OECD, 1996).

Similarly, The Department of Trade and Industry (DTI) views knowledge economy in their white paper as an economy in which the generation and exploitation of knowledge has come to play a dominant part in creation of wealth. It is about the most effective use and exploitation of all types of knowledge in all manner of economic activities (DTI, 1998).

Also the knowledge economy justifies an increased commitment to research and development (R&D). It covers every aspect of contemporary economy where knowledge is at the heart of value added, from high tech manufacturing and ICTs through knowledge intensive services to the obviously creative industries such as media and architecture (Kok Report, 2004).

In the 2008 publication about the '*Building Knowledge Economies*' the World Bank explained that; the capacity to use knowledge effectively allows individuals, enterprises and communities to utilize resources and improve their well-being, thereby contributing to development. According to them, knowledge acts as a driver of competitiveness and productivity, facilitator of welfare and environment and as an enabler of institutions and governance. In view of this they developed the analytical framework in which the following issues were addressed:

- The labor force should comprise of educated and skilled workers who are able to continuously upgrade and adapt their skills to create and use knowledge efficiently. Education and training systems include primary, secondary education, vocational, and lifelong experience.
- A modern and adequate information infrastructure will facilitate the effective communication, dissemination and processing of information and knowledge. Information Communication Technologies (ICTs)-including telephone, television and radio networks are essential for information-based economies.
- The country's institutional regime and the set of economic incentives it creates should allow for the efficient mobilization and allocation of resources, stimulate entrepreneurship and induce the creation, dissemination and efficient use of knowledge.
- An effective innovative system is composed of firms, universities, research centers, consultants, and other organizations that keep up with new knowledge and technologies that tap into the growing stock of global knowledge and assimilate and adapt it to local needs (World Bank, 2008).

### *'Development University' in Africa'*

There is increasing evidence that, higher education is becoming at least necessary, if not sufficient condition for development. The notion of higher education as an 'engine' for development is not new in Africa (CHET, 2009). Several people including international organizations argued that universities must be considered as engine for socio-economic development (UNESCO 1998). However this dream can be realized only if universities in Africa can shift from the idea of producing graduates for civil service to focusing on training of graduates (capacity building) to be able to adapt to changing patterns of development in the economy (CHET, 2009). Nevertheless, this shift cannot be done in a vacuum. It is partly dependent on the national and institutional policies, the academic core and its periphery, and institutionalization of externally funded projects within the university (ibid).

## National and Institutional policy

According to Gornitzka (1999 p.10), *'public policy is a public statement of an objective and the kind of instrument that will be used to achieve it'*. It is carefully formulated in order to achieve a goal hence consisting of policy formulation, policy implementation, policy evaluation, and feedback and policy adaption' (CHET, 2009 p.19). Public policies also involved government capabilities or important mechanisms towards achieving the stated goal. One may think that, the policy process is always simple and rational but it is rather complicated (Pressman and Wildavsky, 1973). In view of this, policy analysis should always focus on studying the interactive aspect of the whole process (Gornitzka et al 2005). Policies (national and institutional) are essential in higher education sector for the following reasons:

- Serve as road map for steering higher education according to German Federal Ministry of Education and Research (2004 p.13).
- Grant academic autonomy and management freedom, preventing government interference in tertiary education sometimes (ibid).
- It promotes inter-university competition (Yamamoto, 2004).
- It also fosters accountability in university management (Mortimer, 1972).
- It increases diversity of the higher education system (Van Vught, 2008).

However in most African countries, policies have not being able to promote regional and national developments not because of the traditional view on policy failure which is normally referred to as lack of resources (Obanya, 1999; McLaughlin, 1998 p.70). Multiple factors are responsible when it comes to the explanation of higher education policy failure (Garn, 1999 p.435). The process is hindered due to organizational context, linkages between multiple sites, phases of policy process, mobilization of resources and multifaceted conceptualization of power (ibid). According to Jansen (2001), political symbolism (policies are simply symbolic gesture rather than substantive actions) is also responsible for policy failure in Africa. The HERANA project agreed and stated that; *'[...] a lot of higher education policies are symbolic, sometimes written by foreign consultants and there is insufficient political will, or infra-structural power to negotiate trade-offs'* (CHET, 2009 p.21).

In addition, higher educational policies in Africa are largely shaped by development agencies like the World Bank and UNESCO. Sometimes the directives such as reduction in higher education funding and the concentration on primary education from these agencies have negative effect on higher education (Obanya, 1999; Brock-Utne, 2000; Sawyer, 2002; and Bloom et.al 2006). Another factor is the issue concerning the fact that national policies in Africa are not normally consistent with economic needs (Obanya, 1999; CHET, 2007). The absent of harmonization among government ministries, institutions and academic programs is yet another concern (World Bank, 2007; CHET, 2009). Meanwhile for a university to make the most important contribution in a society which is measured by the quality of knowledge it generates and the impact on graduates, it must have a responsive policy (Sawyer, 2002). Thus higher education must be well informed by expectations from the outside world in order to adopt the necessary style in responding to the needs of society while preparing students for the job market (Teichler, 1999). Sound policies on self-monitoring and evaluation which are informed by societal expectations for example can help universities to achieve their goal in society (Yamanoi, 1999).

### **Academic core and the periphery**

Academic core in this review refers to teaching (in terms of degree programs) and research (basic in nature). Periphery on the other hand includes activities beyond the academic core which help in transforming the university and its survival (Clark, 2008). The term '*extended periphery*' is used by the HERANA project to refer to all the teaching and research related activities situated outside the domains of the academic core. Programs such as lifelong learning: special projects funded by third parties; specialized research centers (applied in nature); and consultancies done by the university are the examples in this category. A research-oriented academic culture leads to improvement in the quality of teaching of degree programs hence contributing to capacity building and linking to the job market when it comes to the development of new skills (Reiko, 2001). This is because the findings from the research help to add value to teaching and vice-versa. However several problems affect the academic core in Africa. One major problem is the migration of the educated to developed countries in search of better conditions of service (brain drain). This was recently re-affirmed by Network of African Science Academics Conference (NASAC) in Italy during the G8+5 summit in July 2009. They noted that, African universities

have been affected the by brain drain problem for several decades such that they are now faced with inadequate trained staff since some of her trained scientists for instance are working in developed countries.

In addition, university research in Africa is normally retarded by a practice of building its research activities into loans and credit project. This is a practice which prevents both government and universities in Africa from borrowing purposely for research. It limits both the commitment to research and institutionalization of research projects hence contributing to the poor infrastructure and strong capacity towards research planning in related ministries (UNESCO, 1991). Related to this problem is the control of research programs by funding agencies. UNESCO agreed that partnership between funding agencies and African researchers are sometimes doubtful such that it affects them negatively. However, most of them have no alternative when it comes to improving their careers hence their commitment (ibid).

### **Institutionalization of externally funded projects in the University**

It is necessary to institutionalize development-related projects within the University. This is because; the degree at which these projects are able to fit into the organizational setting of the University is paramount to university's role in development since universities are special institutions (CHET, 2009 p.28). Institutions consist of collection of enduring rules and organized practices. These rules are derived from collective identities depicted in meaningful structures and resources (Olsen, 2007). Thus peoples' behaviors are driven by laws, rules and practices since universities are obliged to act according to prescribed laws and laid down rules (CHET, 2009 p. 30). These behaviors depend on structures, resources, and the degree and form of institutionalization of development related projects (ibid). Universities institutionalized projects if the projects are related and feeds into teaching, curriculum development, postgraduate training and publications (ibid). Nevertheless, there are some impediments that were identified by the HERANA project when it comes to institutionalization of projects in universities including those in Africa as follows:

- Loose coupling within the University. Institutionalization of projects can be affected by both internal and external loose coupling. Internal loose coupling refers to the operational

link between the university academic staff and administration while external loose coupling deals with the operational links between university authorities and government and other stakeholders such as donors (CHET, 2009).

- The strength of Ministry of Education and coordination between other ministries dealing with higher education (ibid).
- Agencies and foundations who contribute to the funding of the project could also affect the institutionalization process when they fail to take into account the specificity of universities as special institutions in training functions aligned to the economy (ibid; Castle, 2001).
- Unfulfilled donor promises especially in Africa. The G8 summit observed in 2009 that less than 30% of the aid promised had actually been released (CHET, 2009 p.22).

In short, for universities to consider themselves as engines of development and train the ‘right’ human resource, all the above named concerns should be taken into consideration (CHET, 2009). However, universities can contribute differently when it comes to quality of graduates they produce and the role they play towards national (economic) development. In their study, the HERANA project identified five roles a university can play towards economic development namely:

- Traditional view of Development: The University is only viewed as a producer of human resource for civil service.
- Institutional view: The University is considered as a self governing institution where they are autonomous during decision making process.
- New Instrument view: The University is focused on producing skilled professionals such as doctors, nurses, agricultural specialist, and teachers among others for the purpose of meeting societal needs.
- Service Enterprise view: The University is market oriented and responding to the needs of society.
- Engine of Development: The University is considered as the ‘electricity’ for development in the knowledge-economy.

Considering these five roles of the University, it is important to identify that universities can contribute meaningfully to economic development and are able to do this more sustainably if they are seen as engines of development. Thus at this level, universities are able to consider all aspects of the economy including the civil service.

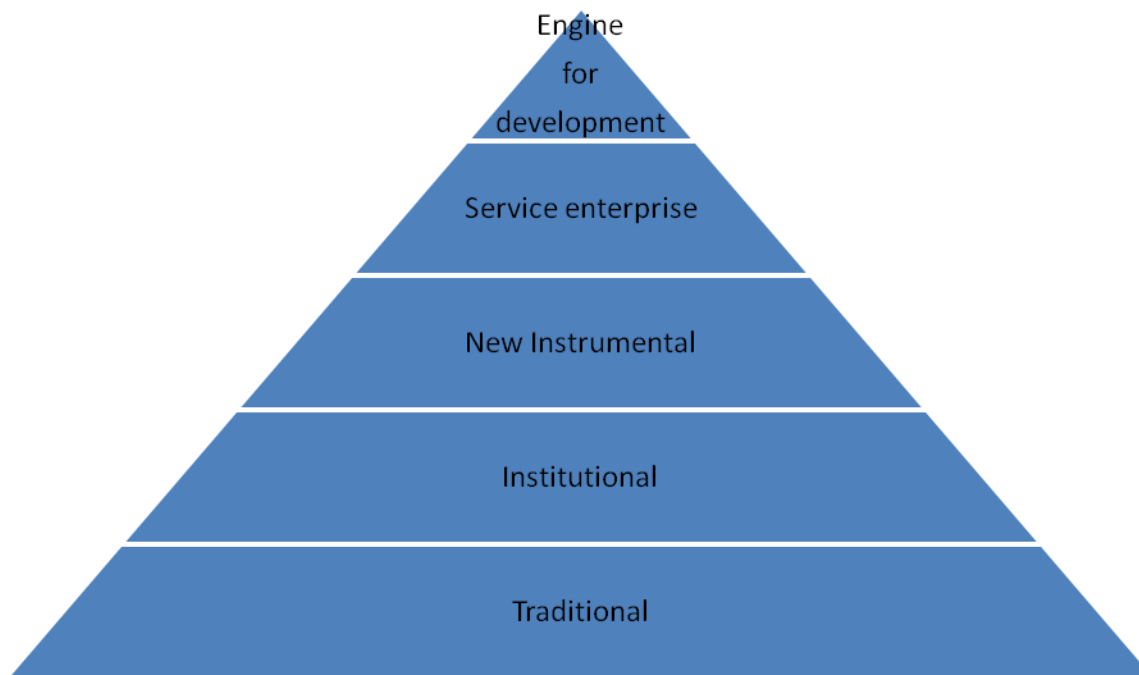


Figure 2: A diagrammatic representation of the five functions (roles) of the University.

Source: Idea from the HERANA Project (CHET, 2009).

Additionally, Manuel Castle (2009) identified six functions of a university. For him, these functions can be merged in different ways in the entire university system. However he emphasized that one needs to be conscious in articulating these different functions to avoid downplaying any of them. In other words, they all seem vital. He also argued that, the notion of public or private universities does not really matter since both are geared towards public interest. The most important things according to him are how flexible, bureaucratic and manageable the institution is. On technology, he identified that, technological transformation should be addressed



with all seriousness noting e-learning as a 'necessary evil' in all universities. The following are his six functions of the University without any particular regard to the order:

- *To produce values and social legitimating*: All the major universities in the world according to him started as theology schools in order to produce values and acceptable ways of living
- *To train the labor force*: The University emerges as professional university especially in medicine, law and engineering which are critical for development during industrialization.
- *To elect the elite*: The University establishes a social stratification in society and makes sure that; the elites go through selection process.
- *To produce scientific knowledge*: This is to develop certain specific industries that were very important for the country.
- *Entrepreneurial universities*: These universities focus on innovation and the connection between the world of science and technology and that of the business world.
- *General universities*: They are universities which elevate the level of education of the population at large.

Some writers identified Africa as making the attempt to link university education to development though not explicitly. Sawyer (2002) for example noted that, African countries started placing an emphasis on universities as necessary institutions for promoting development from the post colonial era. However, development agencies which collaborate with Africa for several decades focused and emphasized primary and secondary education as optimal areas for necessary development. One can conveniently state that, international bodies related to development have encouraged African governments to neglect higher education as necessary for economic development (Bloom et al 2006: i).

According to Bloom et. al (2006), lack of empirical evidence linking HE to economic development is one other reason for the neglect. Another view is that HE may bring social unrest and political instability. There is also a lack of evidence that HE yields social benefits over and above the benefits that accrue to students themselves (Psacharopoulos and Patrinos 2002).

On the other hand, some World Bank studies have identified that the analytical tool used in the earlier studies which emphasized enormous returns for primary education than secondary and tertiary education was deficient, in that it was based on only one dimension of returns to HE- the private returns. Based on the findings by Bloom et.al (2006), many people questioned the practicability of the earlier findings:

*Traditional rate of return analysis focuses solely on the financial reward accrued by the individuals and the tax revenues they generate. It neglects the broader benefits which advanced education brings through entrepreneurship, job creation, good economic and political governance and the effect of highly educated cadre of workers on a nation's health and social fabric. It also ignores the positive impact of research (as a core tertiary activity) on economies (Bloom et.al 2006: p.17).*

These findings link with donor directive about what levels of education to invest in were partly responsible for the neglect. Meanwhile, other studies (Wolfe, 2004; Bramwell and Wolfe 2008; Hansen and Lehmann 2006; Bloom et.al 2006; World Bank 2008) on HE identified a lot of social, public, economic, as well as private benefits. Their studies suggest that, HE can generally produce both public (including economic and social) and private benefits as follows:

Table 2. Benefits of Higher Education.

<b>PUBLIC</b>	<b>PRIVATE</b>
Increased Tax Revenue	Higher salaries and Benefits
<i>Economic</i>	
Greater productivity	Employment
Increased workforce flexibility	Higher savings level
Decreased reliance on government	Improved working conditions
Financial support for others	Personal or professional mobility
Reduces crime rates	
<i>Social</i>	
Giving or community service	Improved health or life expectancy
Increased charitable	Improved quality of life for offspring
Increased quality of civic life	Better consumer decision status
Social cohesion	More hobbies and leisure activities

Appreciation of diversity	Increased personal status
Improved ability to adapt to and use technology	

Similarly, donor governments and development partners or organizations have recently realized that all levels of education for capacity building are important for economic development and have started documenting on the role of tertiary or higher education in economic development. Individual and national capacity building or human resource development is relevant in order for full benefits of the roles of higher education in economic development. One organization that is recently in agreement with higher level human resource development is the World Bank which for several years promoted primary education and have also influenced other organizations to follow suit. The Bank has come to the realization of the important role higher education play in economic development. The following are some documentation (starting from the recent) on the shift from their original position:

- Tertiary Education for Growth in Sub-Saharan Africa: In 2008, the World Bank noted that, private and social returns for education have increasingly been high. Private returns to tertiary education in low-income countries have risen appreciably such that each additional year of education yields 10 percent to 15 percent in form of higher wages. Moreover, micro studies at the level of firms are identifying connections between skill training and higher productivity while macro data seems to confirm that research and development (R&D) add value to productivity just as quality education does. Meanwhile their earlier research found high returns for primary education than secondary or tertiary education (World Bank 2008: xxi).
- Quality Assurance of Higher Education in Sub-Saharan Africa: Higher Education was identified as a critical tool to achieving the Millennium Development Goals in Africa (World Bank 2007).
- Constructing Knowledge Societies: In 2002, higher education's role was stressed towards building technical and professional capacity and strengthening primary and secondary education.

- Higher Education in Developing Countries: These countries need to consider university education in order to be part of the world economy where knowledge is critically taken into consideration (World Bank, 2000).
- Knowledge for Development (1999): Third world countries need to emphasize knowledge production at tertiary level in order to narrow the income gap between rich and poor countries (World Bank, 1999).

Considering all these shifts, some African countries such as Ethiopia and Uganda embarked on higher education reforms (Bloom et.al, 2006 pp.10-13). Ethiopian Parliament for example in June 2003, endorsed autonomy at the university level, introducing new degree courses which focus on the country's economy and encouraging development of private universities. They also introduced Quality and Relevance Assurance Agency. The shift also led to the birth of Southern Africa Regional Universities (SARUA).

Furthermore, it is difficult to end the discussion on linking higher education to economic development without reaffirming Pundy Pillay's work on "*lessons from three successful systems on linking higher education to economic development: implications for Africa*" (Pillay, 2010). His work was produced within the frame work of the HERANA project in three countries (Finland, North Carolina and South Korea) and some of his findings are already mentioned on page eight (p.8) of this review.

This literature review is useful for this study because it helps to establish the institutional and national impressions on the role of universities in economic development and for that matter the cases in consideration. It is also important in that, it will assists when it comes to linking higher education to economic development as a frame of reference. In addition, it provides an idea about capacity building (human resource development). In short, this literature review was done in connection with the topic under study.

## **Chapter 5: Results, Analysis and Discussion**

### **Introduction**

This chapter presents and discusses the findings on each of the study questions. Section 5.1 addresses three questions: (i) the national efforts towards capacity building as depicted in the Local Content policy document; (ii) the role of Universities regarding capacity building in the oil-gas sector; and (iii) how are the two selected cases (RMU and KNUST) helping to develop human resources needed for oil-gas sector? Section 5.2 presents the findings while Section 5.3 analyzes and discusses these three questions. Section 5.4 focuses on the Stakeholders and their level of involvement in capacity building in the oil-gas sector. It also presents how the oil companies are responding to human resource development in the hydrocarbons industry. Section 5.5 concentrates on the findings of stakeholder involvement in the oil-gas sector. Section 5.6 analyzes and discusses the findings of the questions in section 5.5. Section 5.7 illuminates how RMU and KNUST are contributing to general economic development in the country with a special focus on oil-gas economic related issues. It also analyzes and discusses the findings about the involvement of RMU and KNUST in the general economic development.

#### **5.1 Questions, three questions were addressed:**

##### **i). what is the national policy on capacity building (human resource development) in the oil-gas sector?**

Two sources of data were used to address this question:

- Interview with a representative from the Ministry of Energy
- Analysis of national policy document called “Local Content and Local Participation Bill” regarding the oil-gas sector.

The interview was used as a checklist for analysing the national policy in the oil-gas sector. The analysis focused on whether Ghana has a policy document serving as a frame of reference concerning the oil industry with a special focus on local capacity building.

**ii).What does the Government expect from Universities regarding capacity building in the oil-gas sector?**

**iii). How are the two selected cases (RMU and KNUST) helping to develop the needed human resources for the oil-gas sector?**

Interview was used in order to elicit data for the purpose of analyzing question two and three. Two each of the following from the two universities were considered: Deans of students, heads of externally funded projects, and heads of the research directorate. In addition, the Pro Vice Chancellor of KNUST and the Rector of RMU were also consulted. Also, the respondent from Ministry of Energy also helped throw more light on question two.

The following sections (5.2 and 5.3) present the results and discussion concerning these three questions.

## **5.2 Presentation of findings:**

### **Ministry of Energy and Local Content document (National Policy in oil and gas industry) analysis.**

The findings are summary of the interview data and information from the documents.

After the discovery of oil in Ghana, the government of Ghana in consultation with the Ministry of Energy realized that there was a need to empower Ghanaians to fully participate and benefit from this natural resource and its related spill-off companies. In view of this, the government in consultation with Ministry of Energy formulated and adopted a policy document named “Local Content and Local Participation Policy” (LCLPP, 2009). This policy document is now considered as the national policy document which is supposed to guide the oil and industry. In fact, “*it is now at the implementation stage*” (a respondent from the Ministry of Energy). This document is considered due to the fact that, it was perceived to help build local capacity. Thus according to the Ministry of Energy respondent, the policy document has an inbuilt ‘nursery’ capacity building aspect hence is good because there was a need to build capacity from scratch. In other words, there was a need to empower Ghanaians to understand the fundamentals and

equip them with basic skills to be able to take advantage of the oil sector. However, this empowering goal could only be realized through policy implementation. Having realized that policy implementation is the key in order to achieve any meaningful goal, the government identified the Ministry of Education as the main actor in the policy implementation process. However, due to its agency, a multidimensional approach was adopted in order to facilitate the implementation process so as to produce the necessary skills within the shortest period (a respondent from the Ministry of Energy). The Public Relations Officer (P.R.O) of the Ministry of Energy said the following ministries and companies (with specific roles) were identified to help the Ministry of Education towards effective implementation:

- Ministry of Energy- to direct and collaborate with all other sectors and provide technical advice;
- Ministry of Justice and Attorney General's Department-to help come out with the necessary laws and regulatory framework within which the actors can act to promote peaceful and enabling environment;
- Ministry of Finance and Economic Planning- to promote and facilitate the financial regulatory framework;
- Ministry of Environment- to help design laws that could promote environmental friendliness and enforce training;
- International Oil Companies (IOCs) – to collaborate with other sectors including universities and also help train the needed human resources for the oil sector;
- Ghana National Petroleum Corporation (GNPC) – to supervise and regulate the activities of all oil companies in the country. Also act as an advisor to the universities and help in developing their syllabus for the sector in order to facilitate the training process. In addition, GNPC is to actively take part in capacity building. Thus, train her employees and take part in other educational support projects such as provision of schools and provision of scholarships to deserving Ghanaian students.
- Ghana Revenue Authority- responsible for collecting revenue, educating customers and enforcement of revenue related laws; and
- Sector Governance and Vocational and Technical Institutions- To help train both the lower and middle level income earners for the sector.

The main problem in the implementation process was funding. However the government in collaboration with the Ministry of Energy secured a thirty-eight million dollar (\$38M) loan from the World Bank (LCLP, 2009 p. 3; P.R.O, Ministry of Energy). These funds which were released through the Oil and Gas Capacity Building Project (OGCBP) in December 2010 led to the establishment of a project geared towards building local capacity and capabilities needed in support of Ghana's oil and gas industry (P.R.O, Ministry of Energy). The project has two components:

- Institutional development and sector management which focuses on improved management and regulation and increased transparency;
- Provision of technical and professional skills to Ghanaian workers needed by the petroleum sector which focuses on enhancing technical skills in the sector. This is being done through the support of vocational training schools, Polytechnics and some selected universities including Kwame Nkrumah University of Science and Technology and Regional Maritime University (P.R.O, Ministry of Energy).

Professional training is considered at three levels from the Local Content and Local Participation Policy document:

- Lower Level Income Earners: involves cleaners, messengers welders and other workers whose qualification is below that of Vocational, Technical and Polytechnic Institutions (LCLP, 2009 p.10; P.R.O, Ministry of Energy);
- Middle Level Income Earners: Graduates from the various Vocational, Technical institutions and Polytechnics in the country. It also include technicians who will provide maintenance services (P.R.O, Ministry of Energy) ;
- High Level Income Earners: Refers to all categories of graduates from the various universities (P.R.O, Ministry of Energy; LCLP, 2009 pp. 9-11).

However, it is worth noting that Ghana as a country is not concentrating much on the lower level income category. This is because the country wants to produce a group of highly skilled and knowledgeable people for the hydrocarbons (oil) industry. To do this successfully, local content policy is being implemented simultaneously at the various ministries and institutions concerned



and at various levels with much concentration on middle and high level capacity building from the World Bank fund (P.R.O, Ministry of Energy). Additionally, the Ministry of Education through the Ghana Education Trust Fund (GET-Fund) is supporting some selected technical institutions including those found in the oil producing districts to be able to absorb more students offering courses in the petro-chemical engineering departments. Expansion and up-grading of laboratories, and provision and installation of modern equipment (technology) to all departments doing petroleum related courses are ongoing (P.R.O, Ministry of Energy). A new university is also being built in Takoradi in the Western Region where exploration and drilling are taking place. There is also a program founded and built by Jubilee partners who are determine to provide industrial training to both students and Ghanaian workers. This program is called “Jubilee Technical Training Centre (JTTC)” and it is located within Takoradi Polytechnic (GNPC, 2013). The Jubilee Partners also offer support to small scale and medium enterprises (SMEs) in the oil and gas sector. This is to help them acquire the requisite skills to operate effectively. GNPC is also offering scholarships to brilliant but needy students within some selected districts in the Western Region (ibid).

To give legal backing to the Local Content and Local Participation Policy, an LCLP Regulation 2013 (L.I 2204) was passed by Ghana’s Parliament on 16<sup>th</sup> July 2013 (GNPC, 2013; LCLP Regulation, 2013). The purpose of the regulation is to promote value addition and job creation through the use of local expertise, goods and services. Equally important was the issue of local capacity development in order to achieve maximum local employment and in-country spending of oil revenue. In addition, the regulation will ensure transparent monitoring system to meet the objectives of government’s economic development in the hydrocarbons sector (ibid). In short, Ghana currently has a policy document for the oil industry namely Local Content and Local Participatory Policy with Legal backing since July 2013.

### **Kwame Nkrumah University of Science and Technology (KNUST)**

The University was established in 1952 with the purpose of exploring the scientific arena in Ghana. Started as a noble institution with a specific focus, it grew considerably over the years and currently, it has two schools, nine research centers, sixteen faculties, seventy-five departments and six colleges including the College of Engineering (KNUST, 2013).

The College of Engineering has gained a lot of attention in recent times because the Faculty of Chemical and Material Engineering is located within it (ibid). The Government of Ghana has a special interest and focus on the Faculty since it houses the key departments that offer petroleum-related courses (a respondent). The three departments namely, Department of Chemical Engineering, Department of Petroleum Engineering and Department of Material Engineering can nevertheless be considered as very important to Ghanaians owing to the discovery and exploration of oil and gas in the country. These departments have seen significant boost in all facets of activities. This was simply put by some respondents as: ‘*currently the college of engineering has seen a lot of improvements*’. The Government has provided a modern laboratory to enhance teaching and learning in these areas. Collaborating with other stakeholders in the oil sector such as the International Oil Companies, relevant books for these ‘important’ programs have been made available to these faculties (respondents). These interventions are in connection with Local Content and Local Participation Capacity Building: the main aim of the national policy in the hydrocarbons industry.

The University is also collaborating with a University in Sweden, some colleges in the United Kingdom and local stakeholders in order to achieve the task of training highly competent Ghanaians in the oil industry. In view of this, a three-member delegation from Karlstad University, Sweden held discussions with officials of Kwame Nkrumah University of Science and Technology to strengthen their collaboration in the area of engineering and science (KNUST, 2013). Other collaborations include the one between Fire Service College in United Kingdom and the Ghana National Fire Service Corporation for MSc/PGDiP in Fire and Safety Engineering. The departments have also started offering 2-year Masters Programs leading to MSc (Master of Science) or MPhil (Master of Science and Philosophy) degrees and 3-year Doctorate Programs or PhD Degrees (KNUST, 2013). These programs are intended to prepare qualified chemical, petroleum and material engineers capable of finding solutions to technological problems in the Chemical and Allied Processing Industries in order to satisfy the needs and desires of the Ghanaian economy and society in general. These categories of graduates are considered as part of high-level income earners identified in the local content capacity building policy document. The Master of Science Program is based on course work plus a thesis while the Master of Philosophy Program is purely a research-oriented program. The MPhil

students are train basically to organize research work in the oil and gas sector so as to discover new ideas in the industry and other related areas of exploration (KNUST, 2013).

### **Regional Maritime University (RMU)**

Established as the Ghana Nautical College in 1958, to train people for the erstwhile state shipping corporation (Black Star Line), the college has seen a lot of transformation over the years (RMU, 2013). In 1982 for example, the Government of Ghana promulgated the Regional Maritime Law, 1982 followed by the signing of the Instrument of Transfer which handed the college over to the then Ministerial Conference of West and Central Africa States on Maritime Transport (MINCONMAR), now known as Maritime Organization of West and Central Africa (MOWCA) which negotiated for its regionalization (RMU, 2013). The College was re-named as the Regional Maritime Academy (RMA) in May 1983 with five member states. It runs Bachelor of Science Degree Programs in Maritime Engineering, Electricals and Electronics, Ports and Shipping Administration as well as Nautical Science (RMU, 2013; a respondent).

The Regional Maritime University (RMU), formerly the Regional Maritime Academy (RMA) is given the mandate to train quality personnel for the Maritime Industry in West and Central Africa. The RMU which occupies the premises of the formerly known Academy was pronounced by the former President of Ghana (Mr. John Akyekum Kufour) in 2007 (RMU, 2013). The university could be said to be timely since it will train a group of qualify personnel to manage the numerous marine disasters in the sub-regions. In addition, the university was also required to prepare graduates to manage the offshore fisheries, oil and gas as well as fight against narcotics and other forms of illegal marine trade. Thus , partly due to the emergence of oil and gas in commercial quantities in Ghana and also based on the fact that most economies in West and Central Africa depend on marine transport (RMU, 2013).

Since then, the University collaborates with other institutions including GNPC in order to upgrade their programs to help train engineers with modern technologies and innovative ideas in general maritime and oil-gas industry. This is because the RMU was mandated from 2010 to organize special programs and training in oil-gas in addition to their traditional programs (RMU, 2013). They are to conduct safety and mandatory courses in offshore oil-gas sector. This special

training is organized in collaboration with the Sibrima Maritime Training Centre (SMTTC) Global, a world renowned maritime training centre with 22-years of experience (ibid). It is a training intervention program to ensure Ghanaians participate in all sectors of the nation's oil and gas industry (up-stream, mid-stream and down-stream). The centre will help in training staff of international oil companies in the country. They also offer training in Basic Offshore Induction and Emergency Training (BOSIET) and Tropical-BOSIET (TBOSIET), Minimum Industry Safety Training (MIST) in offshore oil-gas for beginners and various welding related courses for all categories of Ghanaian students and workers in the hydrocarbons industry (ibid).

### **Expectations from Ghanaian Universities and how they are responding**

Universities in Ghana including KNUST and RMU are expected to train students regarding all aspects of the economy including the oil-gas industry through teaching and research. However, KNUST and RMU are among the few institutions which are selected to collaborate with the Ministry of Energy with a special focus on the hydrocarbons industry in the country (P.R.O, Ministry of Energy). These institutions are uniquely selected for the purpose of producing a well-trained local workforce for the industry. They are expected to do this through teaching and research as a "proper" response to recent changes in the Ghanaian economy with regard to the oil industry. In order to realize this dream, GNPC has been in collaboration with these institutions including the recent signing of an agreement with the global publishing research and consultancy firm, Oxford Business Group (OBG) on behalf of government in September 2014. This is to enable both students and faculty members to access OBG's library reports on emerging economies and to broaden their scope about research (Ghana Web). This may be considered as political involvement. In addition, it is also to enable the country to link with other Knowledge Economies. However, one may argue that political commitment will be realized as a matter of time. Consistency in signing some of these agreements could help improve global linkage in the oil and gas industry.

It is worth noting that OBG's agreement is to add to the efforts of similar companies (Technip and Schlumberger) who are already helping to provide educational resources and general assistance in the oil industry (ibid). Universities in Ghana generally concentrate on teaching to the detriment of research due mainly to the high numbers admitted at the Bachelors and Masters

levels and also funding of research. This is due partly to the high numbers from the Secondary Schools who are eager to access university education but with relatively few Universities in the country. In addition, there is difficulty when it comes to research funding because most of Ghana's loans for the educational sector comes with conditions about what the money should be used for without recognition of research from the donors (Ghana Web, 2014). Meanwhile, one is not expecting the general trend of not doing much research to affect the oil-gas sector hence some of these agreements.

However, this researcher found only a few publications in the oil industry. This could be related to lack of clear connection between the national policy and university internal values, resources and policies including their vision and mission. There is a need to link university internal policies with the national LCLPP to enhance more collaboration. It is important to mention that the Faculties (Departments) offering petroleum-related courses are not necessarily affected by the influx of the high number of students like other faculties such as humanities. Nevertheless, one should be careful not to think they don't have any problem that will affect them because the main problem of doing research in Africa and for that matter Ghana is not only about numbers but also funding. However, it is not clear whether, inadequate publications in the oil industry could be associated with donor restriction, inadequate funding or because the oil and gas industry is a new sector and the academia are now settling down. Also, it is difficult to state whether it is becoming the norm for universities in Ghana to be regarded as "only teaching" universities especially when it comes to the oil-gas sector. This is because the oil industry is relatively young in Ghana and also there are some collaboration going on to do more research in the oil-gas sector. These collaborations may be said to be important in order to help train students at the MPhil and the PhD levels to help equip them with research skills.

Some projects that are officially funded from stakeholder and donor support are being managed by experts and are not directly under the management of the two universities. Examples are the scholarship project and the local capacity building project which are concurrently running at various levels (P.R.O, Ministry of Energy; GNPC, 2013). Management of research-related collaborations and projects that are about to be established are yet to be determined. However, when asked whether they have any special policy about the type of people who will supervise some of these projects, the respondents agreed verbally that the projects are technically oriented

and therefore they need expert from the hydrocarbons industry to manage them properly. Meanwhile, there is no documentation to this effect.

### **5.3 Analysis and Discussions**

The national policy framework within which Ghana's oil is to be managed is code named the 'Local Content and Local Participation policy document (LCLP, 2009). According to the document, local capacity building is of outmost interest in the oil-gas sector. This capacity building is to start from 'scratch'; thus there is an in built 'nursery' capacity building aspect of the bill. The dilemma is now about the definition of the word 'scratch' since there are different levels of capacity building coupled with different educational levels (Basic, Secondary, and Tertiary). The question is where in the educational system is the training starting from? Ideally, one may think that this training is to start from the Basic or Primary level, considering it as the lowest level of education in the country. However, this seems not to be the meaning of the definition of 'scratch' in the LCLP policy document. In addition, one can argue that there are some problems with the bill. The three main problems perceived by this writer are about the:

- In built nursery aspect of the bill;
- Regulation four within the bill;
- Money for implementation of the bill.

#### **In built nursery aspect of the bill**

This phase of the local content bill insists that training or capacity building should start from 'scratch'. What is not very clear here is the level of training referred to as 'scratch'. Thus various interpretations can be given to the phrase 'from scratch'. The fundamental meaning considering educational levels as stated before could be the basic level where the child's capacity building starts from the very beginning. Training from this level is normally referred to as the 'foundation' on which general capacity is built in life.

Nevertheless, neither primary education nor secondary schooling is considered and focused on within the bill or during the preliminary implementation stages, perhaps due to the focus on middle and high level capacity building. However, it is interesting to note that, most intelligent

children are able to identify their capabilities early enough at the basic level of education and only pursue their dreams. It is also worth noting that Science and Petro-chemical engineering courses are normally undertaken by students who have a strong academic standing. This is one reason why only few students venture into the sciences. One concern is, if the students are not adequately trained at the early stages (Primary and Secondary levels) in order to make up their minds before going to the Universities, how is the country going to get the best brains to enter into the Petro-Chemical field? It can therefore be stated that, if care is not taken, the trend of very “few students” doing these courses may continue and that would not be good for the country given the fact that a lot of money is being spent on these departments and the expectation is that, Ghanaians will take advantage of the opportunities in the oil sector. Meanwhile the GNPC’s scholarship scheme in the Western Region is offered at the basic level (students Junior High level and who are entering Senior High Schools). Is this an attempt to include the basic schools in the implementation stage of the LCLP and if so, is it enough? Interestingly, the main concentration of the bill is on Institutional development, sector management-focusing on regulations and transparency, and enhancing technical and professional skills (LCLP, 2009). This is important since transparency enhance accountability.

As much as I agree with on-the-job training of workers because it will help workers to train and have access to good technology and new ideas as part of internal capacity building, one could also argue about the importance of concentrating on young people so as to replace these workers when they retired. We should not forget to train our children in order to take over from us. This simply means that, if local participation is to be encouraged, young people should be the main focus of the nation not only at the Vocational, Technical or the University levels but also from the very beginning of their education or career.

#### **Regulation Four of the bill**

The Local Content Bill as mentioned above has good intentions for both indigenous Ghanaians as well as foreigners. However, Regulation Four of the Bill has a clause that could lead to corruption and therefore negatively affect indigenous Ghanaians in the near future. Regulation Four seems to give a lot of discretionary powers to the Petroleum Commission and the Minister of Energy (LCLP 2009 Pp. 6-7; L.I, 2204). In view of this section of the bill, the Minister of

Energy for example is given the mandate to determine the individuals who qualify to obtain an operating license or enter into any agreement in the oil sector. The fear is that, as this may promote international participation hence global linkage, it may affect local participation if some people have to take money before giving license to operators. Consequently, it will affect the nation (social structure and values) as these perceive corruption will endanger operations and subsequently affect accountability in the sector. This aspect of the bill has being a major concern for some including private companies operating in the sector (LCLPP, 2009; LI, 2204). The advocates of this bill refer to it as a ‘win-win’ for both indigenous and foreign companies (ibid). Nevertheless, I think if nothing is done about this aspect of the bill, Ghanaians may regret it in the near future. Accountability could be problematic if nothing is done about this regulation. How can serious decisions about obtaining a license rest on one man’s shoulder?

### **Funding or Money for Implementation**

Money is important in every policy implementation process. Ghana like many African countries is referred to as a ‘developing country’. Thus among other things, the country is not in good financial standing to execute some projects on its own without borrowing from development partners or donors. As stated earlier, Ghana has already started borrowing in this regard but one may wonder how much the country can borrow in order to accomplish the capacity building aspect of the Local Content Bill. Training of quality personnel normally is capital intensive due to the duration and quality of training involve. This is not different regarding high level capacity building. An argument could be raised about the fact that, the Universities and Vocational training centers which are responsible for training medium and high level capacity, are already in existence. Meanwhile it is interesting also to note that, these schools have various challenges including non-payment of lecturers’ allowances.

This is the main reason why the polytechnics which are supposed to be the main contributors to the training of personnel for the oil sector apart from the Universities are currently closed per the polytechnics Act which states that, it is necessary for a school to be closed down after 21 days of continuous strike action (Ghana Web, 2014). Initially, the National Labor Commission (NLC) was trying to persuade the Polytechnic teachers to go back to the classroom but it seems that they have lost the battle since the two months strike action of the Polytechnic Teachers Association of



Ghana (POTAG) was declared legal by an Accra Human Rights Court in July 2014 as legal (Ghana Web, 2014). POTAG has been on an indefinite strike since 15<sup>th</sup> May 2014 over outstanding arrears in its book and research allowances. The National Labor Commission (NLC) went to court to enforce its directive for polytechnic teachers to call off their strike, as well as enforce its ruling in the disparity between Government and POTAG over the scrapping of the research and book allowances. The NLC had directed that POTAG return to work while arbitration procedures are initiated to address their concerns, but POTAG disregarded the ruling, leading to a court action (ibid). Government indicated its intention to scrap the payment of book and research allowances to tertiary institution lecturers last year. Instead, it announced the setting up of a National Research Fund to support research (ibid).

The dilemma of tertiary students and their teachers are normally compounded by politicians. Establishment of a National Research Fund to support research may be a very good idea but must the existing allowances be scrapped immediately without any concrete action towards that initiative? In short, it may be difficult to train human resources for the oil industry if these kinds of “political decisions” are taken without any proper agreement with the lecturers. This is because even if the World Bank and other donors are able to provide all the funds needed for capacity building in the oil sector, and the schools are closed down due to one political decision or the other, how will the human resources be trained?

### **Placement of graduates from the technical schools**

The placement of students from the Polytechnics has being the concern of students and their parents over the years (Ghana Web, 2013). Students from the Polytechnics normally have problems with their starting scale on the pay roll after they are able to find work upon completion of their studies. Some people think that, the graduates from the Universities have better qualifications and therefore should earn a higher salary than those from the Polytechnics (Ghana Web, 2013). In fact, this could be said to be the “mind set” of many Ghanaians since polytechnics have been placed under middle income earners in the issues regarding the oil sector perhaps because many Ghanaians think polytechnics produce substandard graduates. Although the oil and gas industry may be considered as more technically oriented and polytechnics are suppose to have an upper hand, this does not seem to be true from the Ghanaian perspective

when it comes to income levels. To avoid this dilemma, several qualified students who may be trained in the oil industry may prefer going to the University to do any course (mostly courses in humanities) rather than doing technical courses at the Polytechnics. If this issue is not resolved, the nation is bound to lose the brains that would have taken up these technical training to facilitate local participation in the oil-gas sector to other fields. In a related development, students who are willing to take up technical training at all cost, would prefer to go to the Universities to avoid the dilemma of placement after school, increasing the numbers and putting pressure on the facilities that may be due to the high influx of students which may be as a result of placement irregularities. Thus, it will be difficult to accommodate all the students as the numbers increase in these departments. This could contribute not only to limited access but also to the quality of education in the oil industry. One may argue that, since these courses are more practically and research oriented, small class size may be the ideal. General quality of education in the country could be affected due to the high numbers.

Quality is very important when it comes to middle and high level capacity building since these people will be expected to occupy sensitive positions, perform effectively and efficiently to avoid explosions due to human error. This is because it is believed generally that human error could be minimized if not avoided if knowledgeable or experts handle problems in every sector. It could therefore be argued that the country needs highly skilled professionals at the Vocational, Technical or the University levels where students are being trained. Thus, there is a need for a strong academic core at these levels of education. A strong academic core according to CHET (2009) consists of academic staffs that have a PhD or professorial positions. The question then is does the country or the Universities have the strong academic core to train middle and high level skills in the oil sector? Political commitment is strongly needed to encourage academic staff to get PhDs because doctoral academic work is mainly about research work. So if politicians are not ready to invest money in this area, universities and individuals will be handicapped. This is because; many people cannot afford to pay fees to do PhD considering the present economy. It must however be noted that, many academic staff are taking advantage of the institutional training component of the LCLP bill to up-grade themselves. Many of them are now doing their PhDs in order to meet this standard.

#### 5.4 Questions:

**i) Who are the main stakeholders involved in capacity building in the oil-gas sector and what are their roles?**

**ii) How are the stakeholders and the oil companies responding to capacity building in the oil-gas sector?**

One participant (Public Relations Officer) from the Ministry of Energy was interviewed while one respondent each from GNPC, Tullow Oil, and Luk Oil, were the focus for data collection, taking the two questions above into consideration. Sections 5.5 and 5.6 present findings and discussions of these questions respectively.

#### **5.5 Presentation of Findings**

Apart from Ministry of Education, the following Ministries and Companies were identified by the P.R.O of Ministry of Energy as stakeholders with special focus in the oil-gas sector:

Ministry of Energy- To direct and collaborate with all other sectors and help give technical advice;

Ministry of Justice and Attorney Generals Department-To help come out with the necessary laws and regulatory frame work within which the actors can act to promote peace and an enabling environment;

Ministry of Finance and Economic Planning- To promote and facilitate the financial regulatory frame work;

Ministry of Environment- To help come out with laws that will promote environmental friendliness and help in training;

International Oil Companies (IOCs) - Collaborate with other sectors including universities and also help to train the needed human resource for the oil sector;

Ghana National Petroleum Corporation (GNPC) – to supervise and regulate the activities of all oil companies in the country. Also act as an advisor to the universities and help in developing their syllabus for the sector in order to facilitate the training process. In addition, GNPC is to actively take part in capacity building. Thus, train her employees and take part in other educational support projects such as provision of schools and scholarships to deserving Ghanaian students;

Ghana Revenue Authority- Responsible for collecting revenue, educating customers and enforcement of revenue related laws;

Sector Governance and Vocational and Technical Institutions- To help train both the lower and middle level income earners for the sector.

### **International Oil Companies and GNPC**

Tullow Oil Ghana Ltd and Luk Oil are two international oil companies taking part in the exploration and drilling process. As part of the contract agreement, they are required by law to help train the requisite human resources needed for the oil sector among other social responsibilities. The Local Content and Local Participation Policy document is clear on how employment, training and transfer of technology should be done by GNPC and the international oil companies. Articles 5.4 to 5.7 of the policy document elaborated on the employment, training and technology transfer components of the policy. It states:

#### *5.4 Employment and Training*

*“An Operator in the petroleum sub-sector shall ensure that opportunities are given as far as is possible for the employment of Ghanaians having the requisite expertise or qualifications in the various levels of the operations. The Operator shall, within twelve months after the grant of a license (or effective date of a Petroleum Agreement), submit to the relevant Regulatory Agency for approval, a detailed Annual Recruitment and Training Program for recruitment and training of citizens... where Ghanaians are not employed because of their lack of training, the Operator shall ensure that every reasonable effort is made within a reasonable time to supply such training locally or elsewhere” (LCLPP, 2009 pp. 8-9).*

In view of this aspect of the policy or the law, Ghanaians could be said to be given the priority when it come to employment and training. And the law seems to be binding employers in this regard. However the challenge may be where a lot of people do not even have the basic skills to work in this sector currently, it only a law that may be applied in future. Although the law is binding operators to train such people, the monitoring of these operators could be problematic. In addition, the operators are to do this training within “a reasonable time”. This I think is too open and operators could manipulate the system. A reasonable time could be any time including as long as even ten years. A specific time frame such as one, two or more years could have being binding more.

Relating to employment and training are issues concerning technology transfer to Ghanaians. This is very important to ensure that the Ghanaian worker is able to ascend and occupy a top management position. The operators are bind to transfer technological skills along the training period. They are supposed to do this transfer while carrying out petroleum operations in the country (p.10). Meanwhile, general capacity development in the oil industry is vital to the government as much as on-the-job training. Thus apart from how on-the-job training noted above should be done, the policy has a special section for local capacity development that includes students as follows:

#### *5.6 Local Capability Development*

*“In order to ensure competitiveness of Ghanaians in the provision of the full range of services required in the oil and gas industry, the local training and technical institutions will be supported by both Government and the petroleum operators to develop the requisite capacity to international standards to be able to train Ghanaians to comparable high levels as required by the industry in drilling and support services, marine, catering and housekeeping, supplies and other support services. This measure will focus on all aspects of training, including the following:*

- (i) Lower skill artisanal training such as welding, catering services;*
- (ii) Middle-level skill training of technicians to provide maintenance services, offshore and on shore drilling etc.;*
- (iii) High level skill training including general management, engineering design, procurement and business strategy development” (p. 10).*

These levels of training were also identified by the PRO of the Ministry of Energy but with different terminologies as low-income, middle-income and high-income earners. Although, the policy does not explicitly state the level the country will be more focus on, the PRO of the Ministry of Energy was able to state it as middle and high income level. This is quite important for one to be able to speculate the positions Ghanaians may be occupying in future. Managerial positions by her citizenry may help the country to be more in control of the oil industry.

Knowledge based sustainable economic development in the oil industry should ensure equality in the sector. In view of this, the policy made provision for gender equality in article 5.7 as “*While Government will provide equal opportunities for all citizens of the Republic of Ghana, the participation of women in the oil and gas industry will be actively encouraged.*” (p. 11-12). However, one would have like the policy to be more specific when it comes to gender issues and also other general concerns. Encouragement is good but the specific process through which it will be done is the main concern of this writer. How will it be done? Is it through scholarships or quota scheme for girls? In short, it will be difficult for women to take the government to task when they realize that they are not being “encouraged” enough. Specific programs or policies such as the quota scheme for girls would have helped the women to monitor and take government to task.

When respondents from these oil companies (Tullow and Luk) were asked whether they are contributing to and supporting training or capacity building programs in the oil and gas sector in order to triangulate and ascertain the truth , their answer was: ‘*Yes we support capacity building and have different programs such as short, middle and long term training for Ghanaians*’(respondents from Tullow and Luk oil Companies).

**Short Term Training Program:** It is a training program which lasts for one to three months on-the-job training for personnel in the company and sometimes other workers from outside are considered. It involves seminars and other similar training sections in order to equip workers with the necessary skills about new technology, give them information that enhance effective performance. For example seminars for Insurance companies and some selected IT companies are all part of the implementation process (respondents from Tullow and Luk Oil Companies).

**Middle Term Program:** This consists of courses which last for six months for both workers within the companies and other personnel from sister companies in the sector. During these courses, personnel are encouraged to engage in problem solving and exchange ideas through group work.

**Long Term Program:** It involves a scholarship package meant to assist qualified Ghanaians who are studying in the petro-chemical industry. It is mainly for graduate study in some leading Universities in the United Kingdom and France.

One such scheme is the Tullow Group Scholarship Scheme (TGSS). The TGSS forms a key part of Tullow's overall approach to education and capacity building which is meant to promote Vocational Training, Technical Training and Post Graduate Training in the industry. The scheme is to promote local participation in the oil and gas industry and in other related sectors that promote economic diversification in order to address both existing industry skill gaps and national capacity building in the sector. In September 2012, the scheme attracted nearly 7000 applicants out of which about 75 people were rigorously selected to benefit from the scheme (Tullow, 2012).

According to the Chief Executive Officer of Tullow Oil Ghana Ltd, *the TGSS is about developing local talent for the oil and gas industry and other economic sectors in developing countries including Ghana.* The scheme started operation in 2011 in partnership with the British Council (an internationally recognised service provider in the area of scholarship management and partnership brokerage in higher education). The choice of a reputable third party to administer the scholarship is to ensure independence and fairness. Twenty-four Ghanaians benefited in 2011 to pursue their master level studies in the United Kingdom (Tullow, 2013). Similar programs are also being organized by Luk Oil (Respondent).

## 5.6 Analysis and Discussion

Several Ministries and Companies were identified as stakeholders in Ghana's oil-gas sector with specific responsibilities. Some of these stakeholders such as IOCs as noted above are collaborating with other sectors including the Universities in order to help train human resources for the oil industry in Ghana. These stakeholders are also engage in institutional development

through on-the-job-training for workers to help them access new technology in the sector. The IOCs also organize short, middle and long term programs for all their employees including Ghanaians to help sharpen their skills through seminars and scholarship packages to study in the United Kingdom. Thus individual level capacity building could be said to be taking place. Nevertheless, the IOCs are bound by law to organise these training programs. The content of these seminars could be monitored if there is constant collaboration between the Ministry of Energy, GNPC and the IOCS. In addition, the GNPC is to some extent collaborating with the Universities in relation to changes in the curriculum to provide advice regarding the appropriate courses at the highest level of capacity building or human resource development. However, one would have expected that there is some level of collaboration between the Sector Governance and Vocational Training Institutions in the country and GNPC since they are also mandated to train middle level income earners. Thus, there is no written document sighted by this writer at the time of data collection in this regard.

Another area is collaboration between Ministries. The stakeholder Ministries such as Ministry of Finance and Economic Planning, Ministry of Justice and Attorney Generals Department, and Ministry of Energy should collaborate with the Ghana Revenue Authority. A clear and explicitly stated and written documentation will help promote sharing of ideas towards achievement of the goals especially those concerning capacity building. There is no doubt that some level of collaboration is ongoing, but serious institutions such as Ministries should enter into written agreements since different peoples occupy these positions at different times. The Ministry of Education on the other hand should be in regular partnership with the GNPC and the Universities in order to develop coherent curriculum towards capacity building in Ghana's oil-gas industry.

It is worth noting that the LCLP policy concentrates mainly on institutional development and sector management, focusing on regulation and transparency, and enhancing technical and professional skills in the oil-gas sector. There is not much emphasis on spin-off companies from the oil sector. The spin-off companies which may be created as a result of periphery activities from the sector will in a long term need other related skills which may not directly be developed in the Petro-chemical and Engineering courses or departments. Thus other fields are also equally important. Although the oil industry needs the requisite human resources, one should not lose the sight of the fact that, too much emphasis on the Petroleum-related courses to the detriment of the



other fields could be disastrous because the indirect jobs (as a result of periphery activities) may be more than the direct ones (those linked directly to the hydrocarbons industry). In addition, engineers in the hydrocarbons field may need other workers including secretaries, to work with. It will also be difficult to even train hydrocarbon workers without the qualified set of teachers. In short there is a need for a 'holistic' approach to human resource development in order to benefit from all angles of the oil industry. Related to this holistic human resource development is a concern about whether the country is establishing new institutions and industries to absorb qualified personnel (human resources). Unemployment has been the main concern of majority of youth in Ghana. Some people think this problem will be minimized with the oil discovery. However, if care is not taken the unemployment rate may even go up since the country is not establishing any new industry for the skill labor to be absorbed in the country. The oil industry is of no exception. This is not good for a proper economic development. The country should therefore make frantic efforts to set-up new institutions and industry in order to reduce unemployment.

One question that could be asked is whether women are encouraged to participate in the oil industry or not. As much as one agrees that there is open access for any qualified student (both men and women) to venture into the oil-gas sector, it could also be argued that women should be motivated through the quota system to help them venture more in order to promote equality in the sector. Nationally, the LCLP Policy has made provision for women participation in the oil sector (LCLPP, 2009 p. 11-12; LCLPL, 2013). However, it was not clear if there is university internal policy to promote equality in the sector. The quota system may actually promote everybody's interest but at the moment since women participation is low, it is good this system is used to encourage them.

### 5.7 Question

**How are the two selected case studies (RMU and KNUST) contributing to general economic development in the country?**

## 5.8 Presentation of Findings, Analysis and Discussion

On this question, one can state that, skills development in the hydrocarbon industry is ongoing. Also some level of collaboration is going on among the oil companies and these universities. For example, there is collaboration among Kwame Nkrumah University of Science and Technology, Regional Maritime University, Tullow and Luk Oil Ghana Ltd to supply books and other equipment to support human resources development. The companies supply books on Geology and Geo physics as part of their assistance to help train quality geologists and geophysicists in both universities. All these are aimed at training a group of knowledgeable graduates who are suppose to work in the oil industry and contribute generally to the economy through taxes and institutional development (Respondents from the Oil Companies). The two universities are also contributing to some extent to knowledge production through teaching and research activities in the oil industry. According to the respondents from these universities, human resource or graduates from these universities are helping in their respective sectors of the economy. They also mention that their products are all over the country contributing their quota to national development. Nevertheless, for universities to contribute sustainably to economic development, the HERANA project argued that:

There is a need for a pact (policy document) about the importance of knowledge in development and about the special role universities are to play in this regard;

Greater coordination among the ever increasing number of actors and agencies;

University development activities must strengthen the academic core's capacity rather than weaken it; and

The academic core needs to be supported in terms of knowledge production (CHET, 2011 p.xxiv).

Thus, sustainable development goes beyond the production of graduates to fill vacancies within an economy. The main problem here is about specific policy documents (the pact) concerning the importance of knowledge and the university's role in development. While there is no documentation connecting knowledge and the university's role, it is difficult if not too early for

one to conclude about sustainability of economic development in the oil-gas sector in Ghana. Policy documentation as noted above is important for the purpose of continuity among other reasons in every sector. However, as at the time of this study there are no specific written policies about importance of knowledge production connecting with the University's role in development let alone talking about documentation linking to knowledge economy. Although, there are no written documents regarding knowledge production in the oil industry and the knowledge economy, it can be said that there are visible efforts by both universities and the country to link with some companies from Norway, as well as collaborating with countries like United Kingdom and Sweden which may be considered as having some experience in the hydrocarbon industry and are also linked to knowledge economy.

Coordination among stakeholders (actors and agencies) is another concern when it comes to economic development. This is important to avoid repetition of roles while promoting sharing of ideas in order to propel the oil-gas industry to a higher level. The two universities are to some extent are collaborating with some of the stakeholders such as GNPC, Ministry of Energy, Ministry of Education, and the IOCs. Meanwhile, there is a need to be more focused and include other stakeholders such as the Ministry of Environment and some other firms which are doing business in the oil-gas industry. This expansion of scope to include other companies and firms may help link graduates during internship and could promote research in the industry. The Universities may also enter into research agreements with some of these firms and companies in order to help equip the graduates with research skills and also to improve their financial status. However, care must be taken because strengthening of the academic core should be of the outmost interest in any knowledge production. This is because the universities' development activities must help build up the capacity of the academic core: who are helping in training human resources for the oil industry (CHET, 2011 p.xxiv). More importantly, there is a need to have well established institutional linkages between these two universities and the oil industry.

## **Chapter 6: Conclusion, Implications, Limitations, and Recommendations**

### **Introduction**

This chapter presents the study conclusion, implications, limitations and recommendations. Section 6.1 summarizes all the important points from the project including some salient points from chapter 5. Section 6.2 presents implications of the study, Section 6.3 identifies some limitations of the study, and section 6.4 provides some recommendations while the last section (6.5) suggests some areas that could be considered in future research.

### **Section 6.1 Conclusion**

The aim of this study is to explore capacity building in the hydrocarbons industry and how universities are contributing to economic development particularly in the oil and gas sector. In view of these, the following research questions were the focus of this study:

- What is the national policy on capacity building (human resource development) in the oil-gas sector or industry?
- Who are the main stakeholders involved in capacity building in the oil-gas sector and what are their roles?
- How are the stakeholders and the oil companies responding to capacity building in the oil industry?
- What does the government expect from universities regarding capacity building in the oil-gas sector?
- How are the two selected cases (RMU and KNUST) helping to develop the human resource needed for the oil-gas sector through teaching and research activities?
- How are the two selected cases (RMU and KNUST) contributing to economic development especially in the country?

The study however found out the following as answers to the research questions:

## **National Policy**

There is an adopted policy document which is referred to in the industry parlance as “Local Content and Local Participatory Policy”. This is the policy document guiding operations and capacity building programs in the oil and gas industry in Ghana at the moment. The LCLP Policy has received legal backing when a legislative instrument was passed by the Parliament of Ghana to regulate operations in the oil industry since July 2014. The LI 2204 together with the policy document (LCLPP) are the Laws guiding Ghana’s oil industry.

## **Stakeholder and their roles**

Ministry of Education is the main stakeholder in the policy implementation process. The main duty for Ministry of Education is to help train human resource for the oil industry. However, the following Ministries are to help in their various capacities and special interest.

- Ministry of Energy- To direct and collaborate with all other sectors and help give technical advice;
- Ministry of Justice and Attorney Generals Department-To help come out with the necessary laws and regulatory frame work within which the actors can act to promote peace and an enabling environment;
- Ministry of Finance and Economic Planning- To promote and facilitate the financial regulatory frame work;
- Ministry of Environment- To help come out with laws that will promote environmental friendliness and help in training;
- International Oil Companies (IOCs) - Collaborate with other sectors including universities and also help train the needed human resource for the oil sector;
- Ghana National Petroleum Corporation (GNPC) - Supervise and regulate the activities of all oil companies in the country. Also act as an advisor to the universities and help in developing their syllabus in the sector in order to facilitate the training process;
- Ghana Revenue Authority- Responsible for collecting revenue, educating customers and enforcement of revenue related laws;

- Sector Governance and Vocational and Technical Institutions- To help train both the lower and middle level income earners for the sector.

### **Stakeholder response to capacity building**

All the stakeholders are currently taking part in the capacity building process with different interest mostly regarding the on-the-job-training. Nevertheless some of the stakeholders especially the Ministries are having challenges since they don't have enough funding. Funding is identified as the main problem during this policy implementation process. Since local capacity building is inbuilt in the LCLPP, one could argue that, capacity building at these Ministries may suffer due to inadequate funding. Notwithstanding this, all the Ministries are at the moment depending on the loan from the World Bank (P.R.O, Ministry of Energy). Two group of stakeholders that are recognized by this writer as taking part explicitly in capacity building programs apart of the internal training of their workers are the IOCs and GNPC. The IOCs are supporting the selected universities with relevant logistics and some modern technologies while GNPC is helping some selected brilliant but needy students in selected districts.

### **How the two Universities are responding to capacity building**

The expectation of government and all Ghanaians concerning university education is to train the needed human resource for the oil sector and also for other aspects of the economy. Universities try to do this task mainly through teaching and research. Teaching is basically on-going with the supply of some teaching materials from both Government and some international oil companies to the departments that offer petroleum-related programs. Thus, it can be said that, these departments are not having much problems regarding teaching material. However, this does not mean that they don't have any problem. Some of the books and the computers are still not sufficient for students while the main problem may be related to research funding. As stated earlier, a lot of publications were not sighted by this writer in the field of research. Nevertheless, conclusions should be carefully drawn since the oil industry is relatively young. Meanwhile this does not mean research activities should not be undertaken. Research should be given equal attention as teaching since the oil industry could expand better through research oriented

teaching. Research activities will also help contribute to effective and quality teaching. There is therefore a need to do more research work in the oil sector.

### **Contributions towards economic development by KNUST and RMU**

Universities generally train human resource for various sectors of the economy. As much as one agree that these individuals help to build the economy, it is important to note that this is not enough if the country want to do well economically in the current knowledge economy. Policy documentation is important in order to connect knowledge production and economic development. There were no clear policy documents connecting university education to economic development in these two universities at the time of data collection. Meanwhile, this is very important towards sustainable economic development. Documentation in this regard will help specify actors' roles, and help to organized properly to be more data-based, manage properly and link research work (knowledge production) to knowledge economy. This link could be said to be very weak since there is no special policy within these universities to connect the oil sector and economic development.

However, as noted earlier, there is national policy on capacity building and this is central to this study since it could help regulate the sector and how capacity is built at the national level. This policy may be referred to as a frame of reference which is important in every successful sector. This frame of reference could be referred to as "a policy" in organizational study. Policies can be formulated or adopted from other countries. However, the content of the adopted policy should be able to fit into the context where implementation is going to take place. The objectives, the goals and the aims of this new context are very necessary since different countries have different objectives, goals and aims depending on a particular sector and interest. The hydrocarbons industry (oil-gas sector) is one area that is gaining a lot of attention globally in recent times due to its importance.

Interestingly, while countries like Norway may prefer to formulate policies based on their interest, aims and objectives, most African countries are mainly adopting policies from the developed world. As much as one agrees with policy adaptation, the context of implementation should be the concern for all. In Africa, the general management, capacity training and how the

citizenry will benefit are increasingly becoming the focus due to perceived mismanagement in some African countries such as Nigeria (Ghana web, 2013).

One policy document that is becoming popular in Africa and all over the globe is the Local Content Policy Document. This document is mainly focused on how the hydrocarbons industry will be beneficial to the citizenry in general hence its focus on capacity training (development). Many countries including Ghana are currently using this policy document with some modification since it seems to be “beneficial to everybody”. However, it is important to note that, the policy could be beneficial depending on other factors (political environment and economic capacity of the countries) including the style and focus in the implementation process. As much as one agrees with the LCLP Policy, the context (country) and its available resources for implementation should be of concern to all.

Policy implementation is generally capital intensive (a lot of money is needed during the process) due to its various stages hence funding could be identified by this study as the main challenge for most developing countries during the policy implementation process. Funding was the major challenge in Ghana when the LCLP Policy was to kick start. Apart from funding of the LCLPP in Ghana, the following are some problems identified by this writer during the implementation process:

- Week coordination between Ministries, IOCs and the Universities;
- Regulation Four of the bill which gave a lot of powers to the Minister of Energy to decide whether one is qualified for a license or not;
- The in-built nursery component of the bill coupled with its unclear starting point with regards to the phrase “from scratch” when it comes to capacity building;
- Lack of proper recognition or placement of graduates from the technical institutions including the polytechnics;
- Inadequate collaboration between GNPC and Vocational Training Institutions;
- Lack of documentation between stakeholder Ministries;
- Lack of attention on spin-off companies in the oil industry in Ghana;
- Inadequate research in the oil industry in Ghana.



Policies can either work or not work depending partly on the implementation process. The various stages considered during implementation, the institutions involved and their approach is relevant to effectiveness of the policy. Higher level education including university education is not only important but necessary in the Ghanaian context since the main concentration of the country is on middle and high level capacity development. Universities are considered as partners in order to achieve this goal since some studies identified higher education as capable of producing both public and private benefits (Bloom et.al 2006; World Bank, 2007).

This study considered two universities (KNUST and RMU) because they are in collaboration with the Ministry of Energy when it comes to capacity development in the oil industry. In view of this, there is teaching and some research going on in the Departments that offer Petro-Chemical courses. However this writer did not find a lot of publications as expected. As much as one agrees with the fact that some research and collaboration with other institutions such as those with international oil companies, universities from other countries, and other publishing firms including OBG are ongoing, there is more to be done. This is because research is very important in the oil sector if the industry will excel both locally and internationally. Thus the academic core in the oil sector needs to be encouraged, funded, and motivated to engage in more research work. Students taking the Masters Programs may be linked to the various sectors within the industry to learn and do more research.

However, to be able to do effective research the national policy must be clear on the role of universities in knowledge production, there should be more coordination among the actors in the oil industry, and industry development oriented research should aim at strengthening the academic staff to enhance sustainable development. Nevertheless, it may be too early to conclude that the two universities are non productive regarding the oil and gas industry because of inadequate research.

## **Section 6.2 Implications for Ghana**

Universities are currently considered mostly in the developed countries as engines for economic development. This is because they help in individual development by providing individuals with skills to be able to fit in-to both the local and the international economy (world) through teaching and research. Research in these countries is given equal or almost equal attention as teaching. Individual development could lead to human development if the individual skills are used

properly. Thus, if every individual is motivated or encouraged to function well within their immediate institutional and organizational structures coupled with friendly external (political, social, economic and cultural) environment, they would add some value to themselves, the institutions they work for and contribute towards general economic development. This individual improvement may contribute to institutional or organizational growth not only in the oil industry but also growth in the general economy of a country: hence regional development if there are appropriate regulatory frameworks and policies can get a face lift. This growth could happen if the institutions in a particular sector such as those in the oil industry could interact, relate, and sometimes depend on each other by shearing ideas, objectives, and common visions with the aim of strengthening each other. This was clear in the training programs organized by the International Oil Companies. In doing all these, equity and equality must be the key focus in the oil industry in order to enhance development in the petroleum sector. Thus, the Local Content and Local Participatory policy may help improve the wellbeing of Ghanaians only if:

- The political and economic environment allows its proper implementation; Politicians are responsible in controlling the economy of countries all over the world. In order for Ghanaians to fully benefit from the LCLPP, there is a need for politicians to enact good economic policies. Policies that will generate internal capital in order to minimize loans from abroad;
- There is sufficient funding towards the implementation of LCLPP: The country should consistently provide funding towards university education and research work;
- There is more focus on the youth or young people since they are the future of the country: The youth should be the main focus of the training process in order to take up leadership positions in the oil sector;
- There are strong institutions and most importantly if the institutions are allowed to function without any political hindrance;
- Women are encouraged through specific policies that will be binding higher education system and the government. It is only with specific policies that will help women to take the government on and demand accountability if they feel they are not treated well.
- More universities are built to promote equal access.

- The Universities are seen as engines of sustainable economic development: Universities should be well equipped and consistently funded to be able to function as engines of growth and sustainable development;
- Higher level education will be economically oriented by responding to the needs of the Ghanaian economy but with caution in order not to neglect the academic core: Thus research activities should be economic oriented but with a focus on the academic core.
- There is more collaboration between all stakeholder Ministries, Universities and Technical-based Institutions which are also needed in the capacity building process within the oil industry. Clear policies in this regard may help;
- Concentrate more on the spin-off companies since indirect jobs in the hydrocarbons sector seems to be more than the direct jobs:
- Motivate and pay lectures properly to reduce if not stop the strike actions and closure of higher level institutions;
- The transfer gap could be bridged by linking the Petro-Chemical Departments to the industrial community.

### **6.3 Limitation**

The following are some limitations of this study:

- The study considered capacity building at the individual level with the help from institutions (University level education and other relevant stakeholders) without much emphasis on the external factors such as political and economic environment of the country. Success of a program in most developing countries depends on the political party in power though this notion is not the best; practically it is what pertains in most African countries. Thus for a more detail analysis of this LCLPP and capacity building in the oil sector, the political environment is as important as the economy of the country. Also since universities generally in the country depend on funding from the state for their daily activities including research, it is important to consider the national economy;
- This study also limited the policy analysis to the LCLPP in the oil industry. Nevertheless, the LCLP policy may be in relation to other important policies such as those concerning the political party in power. Thus for a comprehensive understanding of the LCLP, the

study should have considered the policy of the Political Party in power, the national policy and the policies governing the internal operations of universities;

- Adopting the HERANA analytical frame work but using it from a more narrowed perspective: This was a challenge since this framework has a particular focus but has to be modified to suit this study.
- The oil industry being a relatively young sector in Ghana does not have a lot of contextual literature. This is evident in chapter 2 where only few references were made during the historical background presentation of this study. Also it is evident in the literature review where the focus was more on policy documents instead of contextual academic literature.

#### **Section 6.4 Recommendations**

In view of the study conclusions, implications and limitations, the following recommendations could help capacity training in the oil industry:

- The Government of Ghana or Ministry of Energy should define what is meant by the phrase “from scratch” in the LCLPP. A specific starting point is important for “proper” policy implementation;
- Funding should be provided for more research in the oil industry;
- Since funding for the implementation process is problematic, diversified sources of funding of universities could help both the oil industry and the universities. This may be done by establishing an Off-Shore Educational Trust Fund (OSET-Fund). Five percent of the Oil revenue could be used to establish an educational fund in addition to the GET-fund (Ghana Education Trust Fund). Since research is very important in the oil industry, 50% of this fund could be used to support research activities in the industry while the other half may be used for infrastructural provision towards capacity training;
- Ministries and Institutions should be given legal backing and therefore should be allowed to function: Politicians should not interfere with institutions to enable them act on their own without hindrance;
- Universities should formulate policies connecting them to the oil and gas industry. Harmonization of these policies with LCLPP is equally important;

- Faculty start-up in the hydrocarbons departments is yet another option. This could help improve the curriculum, and funding of research. Additionally, it could be a step towards expansion of industries where skilled workers or personnel may be employed to help reduce unemployment.

### **Section 6.5 Future research**

Future research could consider the following areas:

- Capacity building in which the Local Content and Local Participation Bill will be combined with the national policy, political party policy and university internal policy;
- Doing a quantitative or mix method study to know the exact number of graduates that are trained and where they are functioning in the economy;
- A follow up studies on these two universities (KNUST and RMU) to find out if they are becoming productive in terms of doing more research in the hydrocarbons industry.

## REFERENCES

- Amaeshi, K.M.; Adi, B.C.; Ogbecchie, C.; and Amao, O.O. (2006). Corporate Social Responsibility in Nigeria. In the Journal of Corporate Citizenship. Vol. 2006. No. 24, December 2006, pp 83-99(17). Greenleaf Publishing in association with GSE Research.
- Angula, N. (2003). Engendering the contribution of Human Capital Development and Knowledge Management: Where lies the challenge? A contribution to Forum on Human Capital Development and Knowledge Management for Economic Growth with Equity- Windhoek, January, 29-31. 2003.
- Apter, D.E. (1985). "The Gold Coast in Transition". In: The Review of Politics. Vol. 9. No. 3, July 1957. United States: University of Notre Dame du lac.
- Bell, J. (2005). *Doing your research project: a guide for first-time researchers in education, health and social sciences*. Berkshire: Open University Press.
- Berudez-Lugo, O. (2013). 'The Minerals Industry of Ghana'. In: *The Mineral Yearbook*. Department of Interior. Washington, D.C: U.S. Geological Survey. Pp 17.2-17.6.
- Bloom, D., Canning, D., and Chan, K. (2006). *Higher Education and Economic Development in Africa*. Washington D.C: The World Bank.
- Bramwell, A. and Wolfe, D. A. (2008). "Universities and regional economic development: the entrepreneurial University of Waterloo". In: Research Policy, Vol. 37 pp1175-1187, Doi: 10.1016/j.respol.2008.04.16.
- Brock-Utne, B. (2000). *Whose Education for All? The Re-colonization of African Mind*. New York/London: Falmer Press.
- Bryman, A. (2008). *Social Research Methods*. Oxford: Oxford University Press.
- Burton, I. (1997). "Vulnerability and Adaptive response in the context of Climate and Climate Change", Climatic Change: 36 (1-2): 185-196.

Castells, M. (2001). Universities as dynamic systems of contradictory functions. In: Johan Muller, Nico Cloete and Shireen Badat (eds.). *Challenges of globalization. South African debates with Manuel Castells*. Cape Town: Maskew Miller Longman.

Castells, M. (2009). The Role of Universities in Development, the Economy and Society: Transcript of lectures given at UWC. Available at: <http://chet.org.za> [Accessed on 14th December 2013].

Charmaz, K. (1983). "The grounded theory method: an explanation and interpretation". In: R.M. Emerson (ed.), *Contemporary Field Research: A collection of Readings*. Boston: Little Brown.

CHET, (2009). Higher Education and Economic Development: Draft Analytical Framework. Available at: <http://chet.org.za> [Accessed on 1st September 2013].

CHET, (2007). Concept Document: Establish a Higher Education Expertise Network in Africa (HEENA) Research, Teaching, Data and Advocacy. Available at: <http://chet.org.za> [Accessed on 1st of September 2013].

Clark, B. (2008). Delineating the Character of the Entrepreneurial University. In: Clark B, *On Higher Education: Selected Writings, 1956-2006*. Baltimore: John Hopkins University Press.

Clark, B.R. (1983). *The higher education system: academic organization in cross-national perspective*. Berkeley: University of California Press.

Cloete, N., Bailey, T. and Maassen, P. (2011), *Synthesis Report on Universities and Economic Development' in Africa*. Wynberg: CHET.

De Gast, W.J. (2005). The vision, policies and programs of sample of Northern donors regarding the support for HE development in the South. Paper prepared for the Nuffic conference on "A Changing Landscape- Making support to HE and research in developing countries more effective" held in the Hauge, the Netherlands, 23-25 May 2005. Available at: <http://www.nuffic.nl> [Accessed on 20th of June 2013].

Denison, E. (1985). *Trends in American Economic Growth, 1929-1982*. Washington: Brookings Institution Press.

Denzin, N.K. and Lincoln, Y. S. (2000). *Handbook of Qualitative Research*. Thousand Oaks, California: Sage.

Department for Communities and Local Government-UK. (2009). An Analytical Framework for Community Empowerment Evaluation. Available at: <http://www.sqw.co.uk> [Accessed on 4th of June 2013].

Department For International Development (DFID) Resource Centre-UK (2007). Feasibility and Potential Role of Common Analytical Framework for Health. Available at: <http://www.hlfhealthmdgs.org/Documents/070619CommonAnalyticalFramework.pdf> [Accessed on 1st of December 2013].

Department for Trade and Industry-UK (1998). *Our Competitive Future: Building Knowledge-driven Economy*. London: Cm4176.

Erlandson, D, Harris, E., Skipper, B. and Allen, S. (1993). *Doing Naturalistic Inquiry: A Guide to Methods*. Newbury Park, CA: Sage Publications.

ESRC. (2005). Knowledge Economy in the UK. Available at: <http://www.esrcsocietytoday.ac.uk> [Accessed on 4th of July 2013].

Gay, L. R., and Airasian., P. (2000). *Educational research: Competencies for analysis and application*. Upper Saddle River, NJ: Prentice-Hall, Inc.

German Federal Ministry of Education and Research (2004). Facts and Figures. Available at: <http://www.bmbf.de> [Accessed on 2<sup>nd</sup> January 2014].

Ghana Expo (2014). ). Polytechnics Closed Over POTAG Strike. Regional News of Wednesday 11<sup>th</sup> June 2014. Available at [www.ghanaexpo.com](http://www.ghanaexpo.com) [Accessed on 2<sup>nd</sup> November 2014].



Ghana Web (2014). Polytechnics Closed Over POTAG Strike. Regional News of Wednesday 11<sup>th</sup> June 2014. Available at [www.ghanaweb.com](http://www.ghanaweb.com) [Accessed on 2<sup>nd</sup> November 2014].

Ghana Web (2014). The Constitution of the Republic of Ghana. Available at [www.ghanaweb.com](http://www.ghanaweb.com) [Accessed on 20<sup>th</sup> of May 2014].

Ghana Web (2013). Placement of Polytechnic Student. News Item. Available at [www.ghanaweb.com](http://www.ghanaweb.com) [Accessed on 22<sup>nd</sup> November 2013].

Gilberthorpe, E.; Hilson, G. (2014). *Natural Resources Extraction and Indigenous Livelihood: Development, Challenges in an Era of Globalization*. England: Ashgate Publishing Limited.

GNPC, (2013). The Role of GNPC in Local Content Development in Ghana's Oil and Gas Industry. A Lecture presented by Benjamin Owusu-Ansah at the 5<sup>th</sup> Ghana Summit Conference and Exhibition. GNPC. Available at: [www.cwceghana.com](http://www.cwceghana.com) [Accessed on 22<sup>nd</sup> of November 2014].

Gornitzka, Å. (1999). Governmental Policies and organizational change in higher education. In: Higher Education. Vol. 38, pp. 5-31.

Gornitzka, Å., Kogan, M. and Amaral, A (eds.) (2005). *Reform and Change in Higher Education. Analyzing Policy Implementation*. Dordrecht: Springer.

Gyimah Brempong, K., Paddison, O. and Matiku, W. (2006). HE and Economic Growth in Africa: The Journal of Development Studies: A Quarterly Journal Devoted to Economic, Political and Social Development, Vol. 42 No. 3.

Hansen, J.A. and Lehmann, M. (2006). Agents of Change: Universities as Development Hub. Journal of Cleaner Products, 14 (19-11). 820-829.

Hilson, G.M. (2006). The Socio-Economic Impacts and Artisanal and Small-scale Mining in Developing Countries. CRC Press. Available at: [www.books.google.no](http://www.books.google.no) [Accessed on 1<sup>st</sup> of November 2013].

Jarvis, P. (1999). *The Practitioner Researcher: Developing Theory from Practice*. San Francisco, CA: Jossey-Brass.

Karl, T.L. (1997). *The Paradox of Plenty*. California: University of California Press.

Kok, W. et al. (2004). Facing the Challenge, The Lisbon Strategy for Growth and Employment. Report from the High Level Group. Brussels: European Commission. Available at: [http://www.unic.pt/images/stories/publicacoes200801/kok\\_report\\_en.pdf](http://www.unic.pt/images/stories/publicacoes200801/kok_report_en.pdf) [Accessed on 3rd June 2014].

LCLPP, (2009). Local Content and Local Participation in Petroleum Activities- A Policy Framework. Final Draft, version 2, 4<sup>th</sup> November 2009. Available at: [www.g-rap.org](http://www.g-rap.org) [Accessed on 20<sup>th</sup> of June 2013].

LCLP Regulation, (2013). Local Content and Local Participation Regulation 2013 (LI 2204). Available at: [www.reportingoilandgas.org](http://www.reportingoilandgas.org) [Accessed on 1<sup>st</sup> October 2014].

Leadbeater, C., Demos, L. (1999). New Measure for the New Economy. Report presented at International Symposium on Measuring and Reporting Intellectual Capital: Experience, Issues and Prospects, Amsterdam, 9-11 June 1999.

LeCompte, M. D., Goetz, J. P. (1982). "Problems of Reliability and Validity in Ethnographic Research." *Review of Educational Research*, Vol. 52, No.1: 31-60.

Li, K. Hou, B. Wang, L. and Cui, Y. (2014). "Application of Carbon Nanocatalysts in Upgrading Heavy Crude Oil Assisted with Microwave Heating", *Nano Letters*, (2014) DOI: 10.1021/nl500484d. Available at: [www.cugb.edu.cn](http://www.cugb.edu.cn) [Accessed on July 2nd 2013].

Lincoln, Y., and Guba, E. (1985). *Naturalistic inquiry*. New York: Sage

Mankiw, N. G. (2007). *Principles of Economics*. South-Western: Webmaster

Manning, K. (2000). *Rituals, Ceremonies and Cultural Meaning in Higher Education*. Westport, CT: Greenwood Publishing Group, Inc.

Maro, P. (2007). The European Environmental Bureau briefing document: ideas for overcoming the limitations of GDP as a progress indicator. Available at: [www.eeb.org](http://www.eeb.org) [Accessed on 2<sup>nd</sup> May 2013].

McCaskie, T.C. (2008). The United States, Ghana and Oil: Global and Local Perspective. In: Oxford Journal Vol. 107(428):313-332. Oxford: Oxford University Press.

McLaughlin, W.M. (1998). Listening and learning from the field: tales of policy implementation and situated practice. In: *The Roots of Educational Change*. Standford University: Springer.

Mortimer, K. P. (1972). *Accountability in Higher Education*. Washington, D.C., American Association for Higher Education.

Obanya, P. (1998). A Three-Pronged Approach to Transforming African Universities: Inherited Knowledge, Received Knowledge and Tertiary Education. In: *Futures* Vol. 30(7), 381-691.

Organization for Economic Co-operation and Development (OECD). (2005). The Paris Declaration on Aid Effectiveness. Available at: [www.oecd.org](http://www.oecd.org) [Accessed on 1st of November 2013].

O’Leary, Z. (2004). *The Essential Guide to Doing Research*. London: Sage.

Olsen, J. P. (2007). The Institutional Dynamics of the (European) University. In: Maassen P.A. M and Olsen J. (eds). *University Dynamics and European Integration*. Oslo. Springer.

Pillay, P. (2010). Linking HE and economic development : Implications for Africa from Three successful systems. Wynberg: CHET

Pressman, J.L., and Wildavsky, A. (1973). *Implementation*. Los Angeles: University of California Press Ltd.

Psacharopoulos, G., and Patrinos, H. A. (2002). Returns to Investment in Education: A Further Update. World Bank Policy Research Working Paper No. 0-2465.

Reiko, Y. (2001). University reform in the post-massification era in Japan: analysis of government education policy for the 21<sup>st</sup> century. Higher Education Policy. Vol. 4 (4) December 2001, pp. 277-291.

Reindorf, C.C. (2007). *History of Gold Coast and Asante*. Ghana. University Press

Ross, M. (2003). Natural Resources, Conflicts and Conflicts Resolution: Uncovering the Mechanisms. In Journal of Conflict Resolution. August 2005. 49:508-537.

Sawadago, G. (1994). The Future Mission and Roles of the American Universities. A paper Prepared for the Donors to Africa Education. Working Group on HE constituted under the Donors to African Education (DAE).

Sawyer, S. (2004). *Crude Chronicle: Indigenous Politics, Multinational Oil and Neoliberalism*. Dureim, NC: Duke University Press.

Sen, A., and Anand, S. (1998). "Consumption and Human Development: Concepts and Issues. "Background Paper for the Human Development Report" 1998. New York: Human Development Report Office.

Shaffer, R., Deller, S. C and Marcouiller, D. W. (2004). *Community Economics: Linking Theory and Practice*. Ames, Iowa: Blackwell Publishing.

Solow, M. R. (2010). Stories about Economics and Technology," The European Journal of History of Economic Thought, Taylor & Francis Journal, Vol. 17(5), pp 1113-1126.

Solow, M. R (1979). "Alternative Approaches to Macroeconomic Theory: A Partial Review, W. A. Mackintosh Lecture 1979," Working Papers 335. Queen's University, Department of Economics.

Solow, M. R. (1957). The Solow Residual, Technical Change and Aggregate Production function. The Journal of Post Keynesian Economics Vol. 23, No. 2000-2

Spradley, J.P. (1980). *Participant Observation*. Orlando, FL: Harcourt, Inc.

Teichler, U. (1999). Higher education policy and the world of work: changing conditions and challenges, Higher Education Policy. Vol 12, pp. 285-312.

UNCLOS (1982). United Nations Convention on the Law of the Sea. Overview and Full text. Available at [www.un.org](http://www.un.org) [Accessed on 3<sup>rd</sup> of June 2013].

UNDP, (2010). Human Development Index (HDI)- 2009 Rankings. Available at: <http://hdr.undp.org>. [Accessed on 3<sup>rd</sup> of October 2013].

UNDP, (2014). Human Development Report. Sustaining Human Progress, Reducing Vulnerability and Building Resilience. Available at: <http://www.hdr.undp.org> [Accessed on 26 of August 2014].

UNDP, (1997). Capacity Development and Governance Division, UNDP; and Capacity Development, Occasional Series Vol. 1, No. 1 May 2000. Canadian International Development Agency.

UNESCO, (1998). *Higher Education in Africa: Achievements, Challenges and Prospects*. Dakar, Senegal: Regional Office for Education in Africa and UNESCO Regional Office.

UNESCO, (1991). Strengthening Educational Research in Developing Countries. Report of Seminar held at the Royal Swedish Academy of Science, Stockholm, 12-14 September 1991.

Van Vught, F. (2008). Mission Diversity and Reputation in Higher Education. Higher Education Policy Vol. 21, pp. 151-174.

Wolfe, D. A. (2004). *The Role of Universities in Regional Development and Cluster Formation*. Centre for International Studies. Canada: University of Toronto Press.

World Bank (2008). *Accelerating Catch-up: Tertiary Education for Growth in Sub-Saharan Africa*. Washington, D.C: The World Bank.

World Bank, (2003). *Pakistan development policy review: a new dawn*. Washington D. C: The World Bank.

World Bank (2002). *Constructing Knowledge Societies: New Challenges for Tertiary Education*. Washington, D.C: The World Bank.

World Bank/UNESCO, (2000). *Higher Education in developing countries. Peril and Promise. Report of the Independent World Bank/UNESCO. Task Force*. Washington D. C: The World Bank.

Yamamoto, K. (2004). Corporatization of national universities in Japan: revolution for governance or Rhetoric of downsizing. *Financial Accountability and Management*. 20 (2): 153-181. Available at: [www.researchgate.net/publication/247635812\\_Corporatization\\_of-National\\_Universities](http://www.researchgate.net/publication/247635812_Corporatization_of-National_Universities) [Accessed on 1st of May 2013].

Yamanoi, A. (1999). Assessment of research in universities. *Science and Technology*. Vol. 49 (11) pp. 573-574.

## **INTERNET SOURCES**

[www.minerals.usgs.gov](http://www.minerals.usgs.gov)

[www.ucprs.edu](http://www.ucprs.edu)

[www.gnpcghana.com](http://www.gnpcghana.com)

<http://polisci.berkeley.edu>

<http://www.uio.no>

[www.duo.uio](http://www.duo.uio)

[www.knust.edu.gh](http://www.knust.edu.gh)

[www.rmu.edu.gh](http://www.rmu.edu.gh)

[www.ghanaweb.com.gh](http://www.ghanaweb.com.gh)

[www.ghanaexpo.com](http://www.ghanaexpo.com)

[www.ghanaweb.com](http://www.ghanaweb.com)

[www.tallowoil.com](http://www.tallowoil.com)

[www.lukoil.com](http://www.lukoil.com)

## **Appendix**

### Appendix A

#### **Interview Guide or Protocol**

1. Does Ghana have any policy documentation guiding the hydrocarbons industry?
2. If yes, why the specific document?
3. Is there any program towards training of the indigenous people?
4. Is there any specific focus of this program?
5. How is the decision making process like when it comes to the oil sector?
6. Does the country collaborate with other countries?
7. Does the institution collaborate with other institutions and Universities within and outside the country?
8. Who are your development partners or donors?
9. To what extent is the party in power committed?
10. Who are the stakeholders in the oil-gas sector?
11. Do you have any specific role for the stakeholders?
12. Do you have access to any funding? What type of funding?
13. Is there free flow of information within the organization/institution? What is the process?
14. Do you use computers and Mobil phones at the work place? Why?
15. How many people use these technologies within the Institution?
16. Do you have any special internal policies apart from what the country has?
17. Is there any effort to establish new industries in the hydrocarbons industry?
18. How many women do you have currently doing Petro-chemical courses?
19. Any special policy to encourage girls to take up the challenge of doing engineering courses?
20. Is there any policy in place towards the management of externally funded project?