

**DURBAN UNIVERSITY OF TECHNOLOGY**



**EXPLORING THE SOCIO-ECONOMIC ROLE OF THE PETROLEUM REFINING  
INDUSTRY IN THE DEMOCRATIC REPUBLIC OF CONGO: A CASE STUDY OF  
THE CONGOLESE COMPANY OF OIL REFINING INDUSTRIES (SOCIR)**

By

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## **ABSTRACT**

Constant change through global competition, technological advances and socio-economic improvement, permeates the contemporary environment in the world including certain African countries. Oil refineries are in constant progress with regards to modernisation and development. Many oil refineries all over the world are operating according to the expected scope of oil products to be produced and supplied, in line with the objectives of meeting domestic and international demand. The Democratic Republic of Congo (DRC) has one oil refinery only named Congolese Company of Oil Refining Industries (SOCIR), which has become less productive, uncompetitive, inefficient and unable to achieve its socio-economic roles or goals of supplying the country with oil products and of contributing to national socio-economic development.

This study aimed to explore the socio-economic role of the petroleum refining industry in the DRC, through the case study of the SOCIR. The objectives of the study were to evaluate the factors affecting the socio-economic development in the DRC; identify the challenges experienced by SOCIR in the macro-environment; and explore the socio-economic effects the upgrading of SOCIR could have on the socio-economic situation in the DRC.

In order to achieve these objectives, the study was undertaken as a quantitative survey combined with qualitative in-depth interviews to provide better understanding of the information obtained from the survey. The quantitative study was conducted on administrative personnel, academics, students, and public and private participants involved in the oil and gas industry in the DRC. Hundred participants were selected for the quantitative survey and five in-depth interviews were conducted to discuss the findings and results obtained through the quantitative study. The macro-environment variables of the PESTIE model were used to accomplish the aim and objectives of this study.

The result of this study revealed that most factors affecting the socio-economic development of the DRC are related to the PESTIE instabilities, lack of economic diversity and constant national and regional ethnic or armed conflicts that are fuelled by multiple interests linked to natural mineral resources. The ageing of SOCIR infrastructure, the lack of financial capital and the lack of investments for human capital development were identified as the main challenges experienced by SOCIR.

Furthermore, it was highlighted that if SOCIR upgraded with new efficient processing technology, it could increase its capacity of production, contribute on reducing the effects of total dependency on imports of all needs for petroleum products and prevent the country from exporting the total oil output, contribute on supplying the country with sufficient quality and quantity of clean oil products, and promote the oil and gas industry development and integration. The results of this study also indicated that SOCIR development could play a key role leading to economic diversity and growth with direct, indirect and induced impacts of massive job creation and contribute on reducing unemployment, poverty and inequality of many Congolese which are living under the poverty datum line.

The study revealed that the outcome of the oil and gas industry integrated and developed through SOCIR modernisation strategy could steer the socio-economic change and transformation in the country. It is recommended to the government of DRC to constantly review, monitor and implement policies and regulations that could promote the oil and gas industry development in the country. The results of the study should also influence policy-makers and decision-makers on formulating innovative and creative policies, setting programmes, methods and interventions, which will enable the development of the oil and gas industry.

## DECLARATION

I..... hereby declare that this thesis, titled, *Exploring the socio-economic role of the petroleum refining industry in the Democratic Republic of Congo: A case study of the Congolese company of oil refining industries (SOCIR)*, is my original work, and has not previously been submitted either in part, or in its entirety, for a degree at any other university. This thesis is being submitted in fulfilment of the requirements for Master's Degree in Public Management and Economics, in the Faculty of Management Sciences. I also further declare that this work does not in any way, infringe or violate the rights of others, as all the sources cited or quoted by me, are indicated and acknowledged by means of a comprehensive list of references.

.....

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Date: MAY 2017

## **DEDICATION**

To my God, the Lord Jesus-Christ, Winners Chapel International Durban, my mother, brothers and sisters, all the Tanzala's family and to all of you.

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## ACRONYMS

AAPG	American Association of Petroleum Geologists
ANAPI	Agence Nationale pour la Promotion des Investissements: (Congolese National Agency for Investment Promotion)
ARA	African Refiners Association
AVEC	Added Value Engineering Consultants
BPD (bpd)	Barrel Per Day
CIA	Central Intelligence Agency
COHYDRO	Congolaise des Hydrocarbures (Congolese company of Hydrocarbons)
CRS	Corporate Social Responsibility
DR Congo (DRC)	Democratic Republic of Congo
EPRI	Economic Policy Research Institute
ERM	Environmental Resources Management
GDP	Gross Domestic Production
IMF	International Monetary Fund
IPAD DR Congo	Infrastructure Partnerships for African Development Oil and Gas Forum Democratic Republic of Congo
IPG	Petroleum and Gas Institute
IPIECA	International Petroleum Industry Environmental Conservation Association
LPG	Liquefied Petroleum Gas
NGO	Non-Governmental Organisation
OEC:	Observatory of Economic Complexity
OPEC	Organisation of the Petroleum Exporting Countries
PESTIE	Political, Economic, Social, Technological, International and Ecological

PPP Law	Public Private Partnership Law
PSA	Production Share Agreement
PSD	Private Sector Development
SAPIA	South African Petroleum Industry Association
SOCIR	Societe Congolaise des Industries de Raffinage: (Congolese Company of oil Refinery's Industries)
PCA	Principal Component Analysis
UDI	Unilateral Declaration of independence
UNEP	United Nations Environment Programme
TANECO	Russia's company of oil Refinery and Petrochemicals Production Complex, Russia

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## **CHAPTER 1: INTRODUCTION**

### **1.1 INTRODUCTION**

This chapter provides an overview of the study. It introduces the research topic, describes the background, states the research problem, outlines the context and presents the significance of the study. The socio-economic role of the Congolese company of oil refining industries (SOCIR) in the Democratic Republic of Congo (DRC) is described in order to give an overview of the country's petroleum industry in which the study was conducted. The problem under study, the aim, the research objectives and questions are presented as well. This chapter briefly describes the research conceptual framework, limitation and delimitation of the study, research methodology and the significance of the study. The ethical considerations and definitions of concepts related to petroleum and gas industry are also provided and explained in this chapter.

### **1.2 BACKGROUND**

The DR Congo, henceforth DRC, is considered to hold considerable crude oil reserves, located mainly in Bas-Congo province, along its Atlantic Ocean Coastline, the Central Basin, the Albertine Graben and the Tanganyika Graben, (IPAD DRC: Infrastructure Partnerships for African Development Oil and Gas Forum Democratic Republic of Congo, 2013). Further crude oil discovery is expected and the imperative to invest in refining of oil is becoming inevitable. However, the DRC's oil industry disintegration; SOCIR's technology inefficiency, incompatibility, unproductivity and non-competitiveness; as well as confusion and ambiguity on the negotiation and implementation of PSA (Production Share Agreement) adversely affect the economy.

From a general economic point of view, the answer to the various socio-economic crises namely poverty, inequality, unemployment and low economic growth, health and education deterioration affecting the DRC has to be through industrialising industries of natural mineral resources (local processing industry of raw materials), as well as innovation, modernisation and development of existing socio-economic infrastructure (SAPIA report, 2014: 21-25). Therefore, upgrading the oil refinery industry, increasing its capacity of production per barrel per day (bpd), and

integrating the petroleum industry in the DRC are expected to be important for seeking multi-sectorial industrial expansion and economic diversification. Considering the influence of oil refineries and oil products over the industrialisation process and its effect on the socio-economic development around the world, SOCIR needs to be modernised or upgraded to be efficient and compatible with refining of local and international crude oils. It has to meet the needs of a changing marketplace and an increasing demand for quantity and quality of petroleum products (ERM report, 2008-2009: 190-192).

### **1.3 PROBLEM STATEMENT**

The oil and gas industry influences the world socio-economic activities in different ways. Explicitly, oil is having a direct and indirect influence on every other commodity in the local or international markets. Therefore, it is critical to identify challenges and opportunities in considering the oil industry operations through technological innovation to maintain national economic balance and need for sustainable development. In the DRC, SOCIR, as any other refinery worldwide, should justify its existence by contributing to socio-economic improvement, producing a range of products that as closely as possible match the oil products demanded on the local market, and by optimising the value of those products in relation to the cost of crude oil and refining expenses. SOCIR was commissioned 51 years ago, but the refinery has remained non-operational for long and closed its operations since 1998 (Licenstore, 2015).

The country's entire oil output continues to be exported due to the lack of appropriate processing technology, while the DRC remains totally dependent on oil products imports. Multiple challenges have affected SOCIR operations; these include the ageing of infrastructure, traditional oil technologies usage and financial constraints, which are the dominant causes of the current crisis, (Bafala, 2006: 136-145) and (Augood, 2010). Discontinued or antiquated equipment used by SOCIR appears challenging to maintain as replacement parts for the machines or plants are more difficult to obtain than would be the case for modern recently commissioned plants. The socio-economic crisis that arises from the colonial economic model and the lack of economic diversity which exists in the DRC, and the lack of processing industry for

natural mineral resources are the key aspects among many others that critically affect the country.

This crisis has led to societal disparities involving high rates of poverty and unemployment, inequality, degradation of people's lifestyle, education and health deprivation, suburbanisation, lack of food and malnutrition (Jauch and Muchena, 2011: 1). The economic crisis includes the on-going colonial economic dependency and the lack of economic diversity, existing technological infrastructure inefficiency to produce competitive products for national needs, lack of investments for basic socio-economic transformation, lack of industrialising industries for natural mineral resources refinement and obsolete companies which provide low production, no job creation and no implementation of Corporate Social Responsibility (CRS) values.

The challenges to SOCIR and oil industry development in the DRC, additionally include the political or government deficiency in providing and implementing attractive and viable legislation, strategies and policies that promote real industrial development of the oil sector, as well as other economic sectors; and also the weak public services capacity to ensure credible service delivery or facilities to the people (CIA World Factbook, 2014). Furthermore, the lack of information regarding oil refinery's socio-economic effects from oil industry development, contract secrecy and corruption around the oil fields are some of the issues that this study expects to investigate.

The inefficiency of oil refineries in Africa (particularly in the DRC) means that governments have failed to meet any of the standards by which modern refineries are managed and failed to contribute to socio-economic or environmental development. According to AVEC (2015), the core issues affecting the African refineries ability to meet their goals are related to efficiency, logistics, markets, and management. The rationale of the study is that the DRC has considerable crude oil reserves, but has a crisis of non-operational petroleum refining industry, which means it cannot efficiently, and economically process local or imported crudes oil. This keeps the country dependent on import of oil products and export of the entire crude oil output to be refined elsewhere without transparency.

Export revenues from crude oil which should help to develop the oil industry and other economic sectors are used to import petroleum products' needs. However, the

factors affecting the socio-economic development in the DR Congo include many aspects that are relevant to macro-environment variables, as it will be described further below in Chapter Two.

#### **1.4 AIM OF THE STUDY**

The aim of this study is to explore the socio-economic role of the oil refining industry in the DRC through SOCIR.

#### **1.5 OBJECTIVES OF THE STUDY**

The research objectives are as follows:

1. Evaluating the factors affecting the socio-economic development in the DRC.
2. Evaluating the challenges experienced by SOCIR in the macro-environment.
3. Identifying the socio-economic effects, the upgrading of SOCIR could have on the socio-economic situation in the DRC.

#### **1.6 RESEARCH QUESTIONS**

The researcher will attempt to answer to the following questions:

1. What are the factors affecting the socio-economic development in the DRC?
2. What are the challenges experienced by SOCIR in the macro-environment?
3. What would be the socio-economic effects of SOCIR upgrade in the DRC?

#### **1.7 CONCEPTUAL FRAMEWORK**

According to Smit (2011: 64-65), the relevant theory or framework that is consistent with the purpose and objectives of the study focuses on the business environments. The social, economic and CSR theories will also be discussed in this study. The macro-environment variables (PESTIE model) are used in this study to assess the factors affecting the socio-economic development in the DRC, to evaluate the challenges affecting the SOCIR operations and to identify the socio-economic effects the upgrading of SOCIR would have on the socio-economic situation in the DRC. The research will analyse the socio-economic roles of SOCIR by referring to the DR Congo's business framework or environment, local economic environment, social environment and regional trade environment.

The main concern for the DRC's business framework that the study will investigate involves the lack of implementing the mechanism stated by the constitution or by the Public Private Partnership law for the safety of investments and business operation in the country, given that many instabilities relevant to the PESTIE framework or to the weaknesses of democratic institutions in the DRC are affecting the business environment and the socio-economic development process. Therefore, such as it will be described further down in Chapter Two, the business framework in the DRC is modelled under the appellation of Public Private Partnership Law (PPP Law), (Wapo, 2014). Thus, the study will also look at several challenges affecting the business framework process in the DRC, which comprise the facts that are relevant to the lack of Corporate Social Responsibility values (CSR) implementation, the dearth of policies implementation for the existing model, the privation of credible unions and accountability for social, economic and environmental safety or improvement, and the absence of regulations and policies enforcement.

## **1.8. LIMITATIONS OF THE STUDY**

The researcher is based in South Africa and the research was conducted in the DRC. Therefore, most important costs were incurred in terms of transport and accommodation. Furthermore, managers, public and private participants find it difficult to make time to participate in this study.

## **1.9 DELIMITATIONS OF THE STUDY**

Therefore, this study focuses only on the factors affecting the socio-economic development in the DRC, the challenges experienced by SOCIR in the business environment and the identification of socio-economic effects the upgrading of SOCIR could have in the DRC. The researcher has focused only on the assessment of macro-environment variables including political, economic, social, technological, international and ecological factors. Thus, the delimitations of the study were specifically confined and limited to SOCIR only, the only one oil refinery within the DRC's midstream oil industry's configuration. The upstream and downstream oil sectors will not be effectively explored, only certain information related to SOCIR crisis linked to upstream and downstream oil and gas industry will be considered for this study. The DRC has only one oil refinery, the findings could therefore, not be generalised to the entire oil and gas industry in the country.



## **1.10 RESEARCH METHODOLOGY**

Evaluating the socio-economic impacts of SOCIR in the DRC requires both quantitative and qualitative measurements of the influences of a proposed SOCIR upgrading project in the country. A mixed methods approach is chosen for this study, to achieve a clearer view of the aim and objectives defined which can be reached with the combining of both quantitative and qualitative data, than if either were applied on their own (Creswell, 2015: 14-15). Together, challenges and effects of SOCIR upgrade on the community are quantifiable.

However, evaluating community perceptions about challenges and effects of SOCIR development requires also the use of mixed methods, which are proficient in revealing often complex and unpredictable socio-economic values.

## **1.11 SIGNIFICANCE OF THE STUDY**

The findings of this study could assist as a useful source of information to the government of DRC, to different petroleum corporate groups and communities, in terms of socio-economic impacts the upgrading of SOCIR would have in the process of managing effort that could improve Congolese socio-economic issues. This study will also alert the government of DRC, Congolese community, public and private investors about the industrialising industries effects the SOCIR upgrade could provide for the oil industry integration and for socio-economic activities development; and for them to understand as well the necessity of improving the macro-environment factors that are challenging the socio-economic development process in the DRC.

The assessment of the socio-economic role of the oil refining industry (SOCIR) is designed to assist the government of the DRC and community members of the oil industry in making wise decisions that could promote long-term economic growth and sustainability, including reducing unemployment, poverty and inequalities among community groups, as well as encouraging the positive impacts associated with the development (economic prosperity, a healthy community, and social well-being). As an example, a proposed development of SOCIR may increase direct, indirect and induced employment in the community and create amplified demand for more

affordable socio-economic infrastructure such as housing, health and educational, road and transportation system and public services improvement and development.

## **1.12 DEFINITION OF CONCEPTS RELATING TO PETROLEUM INDUSTRY**

According to Creswell (2009: 51), definition of a theory is still valid today. Therefore, the necessity of defining and describing concepts relative to the petroleum industry or petroleum refining industry consists of clarifying the understanding of benefits or threats linked to socio-economic effects the oil industry development could have in the country's development process. For that reason, the following key concepts need to be significantly clarified for improved understanding of the study process:

- Petroleum or crude oil,
- Oil industry,
- Oil refinery, petroleum refinery or oil refining industry,
- Petroleum products,
- Socio-economic, and
- Macro-environment.

The petroleum concept (crude oils and its characteristics), is the main component that led to the existing of the worldwide oil industry. Basil (2015: 1318-1320) and United Nations report (2007: 2), stated that crude oil has had profound socio-economic impacts on the world civilisation than any particular natural resource in recorded history and it has become a very significant component in developing communities, describing politics, rhetoric and diplomacy of states.

Therefore, the contemporary social, economic, technological and ecological environments are mostly driven by oil industry operations development which involve upstream (exploration and production of crude oil and natural gas) and downstream (transportation, storage-tank, refining operations and distribution or marketing of petroleum products). Therefore, the existing of oil refinery industry, which is a fundamental key to obtaining hydrocarbons, play a major role between both upstream industry and downstream industry (James, 2007: 2). For this purpose, it is essential to define concepts that relate to petroleum and petroleum industry, before exploring the socio-economic impacts of oil refinery in the economic development process.

### **1.12.1 Petroleum or Crude Oil**

There are several definitions of petroleum. Crude oil is the essential of petroleum business activities worldwide. Presently, more than 150 crude grades are treated, and many of these are streams blended from two or more fields (James, 2007: 16). The word petroleum derives from Latin *petra*, meaning rock and *oleum*, meaning oil. Nashaat (2013: 6), define crude oil as a naturally occurring liquid originated in formations in the earth containing of a complex mixture of hydrocarbons of numerous lengths with compound and small quantities of materials such as oxygen, nitrogen, sulphur, salt and water.

The American Association of Petroleum Geologists (AAPG, 2015), has described crude oil as a yellow-to-black mixture of gaseous, thick, combustible, solid and liquid hydrocarbons that arises naturally beneath the earth's surface, which can be segregated into elements including fuel, gasoline, kerosene, natural gas, naphtha, paraffin wax, asphalt and lubricating oils and is used as raw material for extensive diversity of derivative products. Oil is ordinarily distinguished from dark black to brown, although it may be even greenish or yellowish but differs critically in appearance, depending on its configuration and where it can be found in its form (Nashaat, 2013: 6).

Thus, commonly, crude oil may be well-understood as a liquid combination of hydrocarbons which exist in an appropriate rock layers and can be dug up and processed to produce fuels including diesel oil, petrol, paraffin and other oil or chemical products used as raw materials and energy to support social and economic environment transformation. Further, several types of crude oil correspond between two grades: light and heavy crude oils. Sections further below will clarify with more details about the lighter and heavier characteristics of crude oil.

### **1.12.2 Petroleum Industry**

The oil and gas industry is generally defined following the facilities and operations systems used in the oil and gas industry production stream. Therefore, the relevant broad theories about petroleum industry relate to the global development of operations involving three sectors, including upstream, midstream and downstream (Devold, 2013: 4). This study will essentially focus on the midstream sector.

The midstream operations mainly consist of refining a wide variety of finished, high quality and fully processed valuable products that are shipping to downstream; and the downstream involves the business of transporting, storing, marketing and distributing oil products to the customers (Canadian Fuels Association, 2013: 10). According to IBISWorld (2016), the Oil and Gas Field Services Industry is an important other subsector in the oil and gas industry. The oil and gas field services industry provides support services on oil and gas fields operations on a contract basis to companies involved in oil and gas activities.

Furthermore, the oil and gas field services industry also involves companies that make available services required by the international oil and gas industry to discover or explore, extract and transport crude oil and natural gas from the earth to the processing plant (refinery), intellectual property, infrastructure, equipment and finally to the consumer. Indeed, petroleum industry worldwide represents the most essential environment for socio-economic and business activities development.

### **1.12.3 Petroleum Refinery, Oil Refinery or Oil Refining Industry**

According to OPEC (2013: 37), the method from end to end which crude oil is refined and processed to eliminate unusable constituents is known as REFINING. The refinery or refining industry is the process that involves separation, purification and treatment of crude oil into marketable petroleum products. The main purpose or role of oil refinery is to transform the low valued crude oil into high valued oil products in as efficiently, profitably and environmentally sound way as possible (Nashaat, 2013: 13). The refining process can be included in the downstream as well as in the midstream sectors.

It normally refers to the treating of crude oil, which also involves the purifying, and processing of raw natural gas, as well as transportation or supply of products and the marketing resulting from crude oil and natural gas (OPEC, 2013: 37). The refining process makes available products such as gasoline or petrol, kerosene, jet fuel, diesel oil, heating oil, fuel oils, lubricants, waxes, asphalt, natural gas, and liquefied petroleum gas (LPG) as well as quite a lot of hundreds of petrochemical products. Bargarett (2014: 3) and Smit (2011: 66-67), defined the petroleum refinery as a competitive internal, micro-environment or industry, which is often depicted as a chain of activities that must be performed to create a product or service from its

inputs and sells its products or services to customers and builds or manages its relationships with customers, suppliers, and competitors. Therefore, the oil refinery interacts directly with different other organisations and impacts its ability to achieve its socio-economic goals. Economically, refineries are categorised as simple or complex. It is stated that refinery economies are about making money, and some refineries make more money than others, just because of the assembly of processing units or technologies infrastructure installed (William, 2008: 193). As no two crude oils are the same, each refinery is unique and not all refineries are created equal (James, 2007: 16-17).

The basic statement relevant to simple or complex refineries is that, the simple and very simple oil refining industries have very limited capacity to change the composition of the crude oil input and have the lowest margins and are often operated by small, niche players; while, the complex or very complex refineries are characterised by important advanced upgrading capacity and great level of integration. The upgraded processing plants are proficient, compatible and efficient to change the configuration of crude oil input, taking low-value, heavy oils and changing them into high-value products, supplying the marginal barrel and realising their profits from the base margins (James, 2007: 17).

#### **1.12.4 Petroleum Products and Socio-economic Perspectives**

Petroleum products are the components that come from the refining process (distillation) of crude oil. Nashaat (2013: 14-17), has argued that oil processing begins with crude oil refinement, followed by subsequent distillation such as catalytic reforming, chemical treating, hydro-treating, hydrocracking, fluid catalytic cracking and thermal cracking to produce a varied diversity of oil products. According to James (2007: 18-19), the main products of the refinery include fuel oil, gasoline and other products, which are considered as commodities.

Producing petroleum products depends on factors such as refinery configuration, which involve the type of crude oil most available to the refinery, the market requirements for certain products having specifications enforced by the law, the refinery facility that has to work in accordance with environmental and health regulation and by laws. Also, other important factors including geographical location, products demands, local products specifications and prices and crude available for

the refinery are defining the significant types of oil products to be processed by the refinery. Furthermore, according to Nashaat (2013: 8), the key outcome of the petroleum refining industry fall into three most important classifications: Fuels (Jet fuel, Motor gasoline, distilled fuel oil and Diesel, Residual fuel oil, Liquefied Petroleum Gas, Kerosene and coke), Finished nonfuel (Petroleum wax, Solvent, greases, , Lubricating oils, Asphalt and Coke), and Chemical industry feed stocks (Naptha, Propylene, Ethane, Propane, Butane, Ethylene, Butylene, Toluene, Butadiene, Benzene and Xylene).

Therefore, according to Jechura (2016: 19) and Nashaat (2013: 5), there are specifications of over 2000 individual refinery products that can be routed from various upgraded refinery units. Thus, from crude oil, there are many products that are socio-economically profitable for energy use, chemical products for various related industries, for agro industrial expansion, and for sustainable economic development.

#### **1.12.5 Socio-economic Concept**

According to Mukanova (2013: 32-36), the socio-economic concept and content refers to a qualitative social and economic growth of a certain region, country, province or area involving the integrated development of factors such as trade, health, education, industry, politics, housing, agriculture, transportation, communal services, and tourism and recreational development; the environment as a basis for sustainable development, social institutions, scientific information and innovative development. Therefore, the main outcome from socio-economic development perspective is the change in the quality of life of the major community.

According to Smit (2011: 71-77), socio-economic growth and change are as well a function of macro-environment and organisations implications for potential business development. Thus, change and growth, if well managed by both public and private partners, can pose major opportunities for the socio-economic well-being and reduce the risks of negative effects. According to Liebenberg (2010: 206-207) and Hoskins (2012: 129-147), socio-economic improvement, change and satisfaction involve as well the implementation of corporate social responsibility (CSR) values, together with the respect of human rights and socio-economic rights that offer more equitable

distribution of socio-economic resources and services with equal access and non-discrimination in relation to socio-economic benefits.

The very significant additional and key factor to socio-economic development concept involve the theory of Corporate Social Responsibility (CSR) consideration, which comprise constituents that include issues such as environmental, labour and human rights and socio-economic rights abuses, development and anti-corruption aspects which also are external to the business or corporation environment (Adeyeye, 2012: 7-13). The section 2.6.1 further down will discuss and explain much more about CSR matters.

#### **1.12.6 Macro-environment**

The macro-environment is one of the key factors of the business environment composition which have variables that affect directly and indirectly the petroleum and gas industry (Bargorett, 2014: 3) and Smit (2011: 65, 71). The economic, macro-economic or micro-economic factors contain components that are relevant to production, agro-industrial complex, inflation, employment, trade, transport, services, tourism, economic growth, technology, scientific information and innovative development. Therefore, according to Fourie (2009: 12-18) and Varian (2010: 332), the macro-environment concept involves also socio-economics or the social economics concept that is relevant to social sciences, which studies how economic activities affect and are shaped by the social process.

According to Smit (2011: 64), the composition of the business environment involves every economic sector, including the oil industry sector which might be influenced by the Macro, Market and Micro-environments stability or instability. Indeed, exploring the socio-economic role of the petroleum refining industry in the DRC (evaluating the factors affecting the socio-economic development in the DRC, evaluating the challenges experienced by SOCIR in the macro-environment and identifying the socio-economic effects the upgrading of SOCIR would have on the socio-economic situation in the DRC) is examined and explained according to the factors comprising the business environment, and particularly the macro-environment factors. Thus, for this study, the macro-environment factors that are defined under the PESTIE framework are discussed in line with the aim and objectives of this study, which have already been presented in the preceding sections.

Clarifications are provided further down as well concerning the choice made by means of using only the PESTIE variables as external factors to oil and gas industry, which affect to a greater or lesser extent the socio-economic situation in the DRC.

### **1.13 DISSERTATION STRUCTURE**

The structure of this dissertation is as follows:

Chapter 1 introduces areas such as the scope, background, problem statement, aim and purpose, objectives, and rationale of the study. The research question, conceptual framework and contribution of the study are also presented in this chapter.

Chapter 2 focuses on the existing related literature that sets the theoretical basis for the research model through factors affecting or promoting the entire oil industry development. It provides information on the role of petroleum refining industry in the country's development process and how it affects the socio-economic fabric of the DRC. In addition, the chapter examines the effects of the petroleum refining industry on the the macro- and micro-environments.

Chapter 3 incorporates the steps and approach followed to achieve the aim and objectives of this study, which involve the methods and techniques used to solve the research questions.

Chapter 4 comprises the analysis and interpretation of research findings.

Chapter 5 provides the conclusion, recommendations and future targets, that is, gaps for further research in the petroleum industry field.

### **1.14 SUMMARY OF THE CHAPTER**

This introductory chapter has pointed out the scope and ways to understand and achieve this study's process, which is to explore the socio-economic role of the petroleum refining industry in the DRC. The PESTIE framework analysis was foregrounded as the as the most appropriate in providing an understanding of factors affecting the socio-economic development in the DR Congo and challenges experienced by SOCIR in the macro-environment. The PESTIE framework was also identified as relevant in analysing the socio-economic effects the upgrading of



SOCIR could have on the socio-economic situation in the DRC. The understanding of factors that could beneficiate the sound effects of investing in natural mineral resources processing industries modernisation such as SOCIR, could lead to wise decision making, which will lead to improving the socio-economic well-being of Congolese community now and into the future and create more effective and progressive opportunities for new investment attractions, industrial infrastructure development and economic diversity or expansion in the country. In this chapter, it has been highlighted that the study is limited to SOCIR and the DRC's oil and gas industry development. The next chapter will attempt to provide the pre-assumption to the awareness of the problem such as defined and from the analysis of the PESTIE theoretical framework that is relevant to literature review. It will present the literature review appropriate to this study's aim and objectives. Furthermore, it will examine the pertinent theories that are similar and relevant to the problems or issues described in this study.

## **CHAPTER 2: GENERAL LITERATURE REVIEW**

### **2.1 INTRODUCTION**

Chapter 1 defined the scope of the study, the background as well as the research problem, aim and objectives, research questions, conceptual framework, research method, significance of the study, chapter synopsis and a brief chapter summary. This chapter intends to review the available literature in order to gain an understanding of the socio-economic roles of the petroleum refining industry in the DRC, which is discussed through the case study of SOCIR.

Through the business environment theories, the study will explore and explain factors affecting the socio-economic development in the DRC, the challenges experienced by SOCIR in the macro-environment and identifying the socio-economic effects the upgrading of SOCIR could have on the socio-economic situation in the DRC. This chapter will highlight pertinent views from other researchers concerning the effects of upgrading the oil refinery or developing the oil and gas industry, the factors that challenge or promote SOCIR modernisation, and various policies in place to improve socio-economic operations in the country.

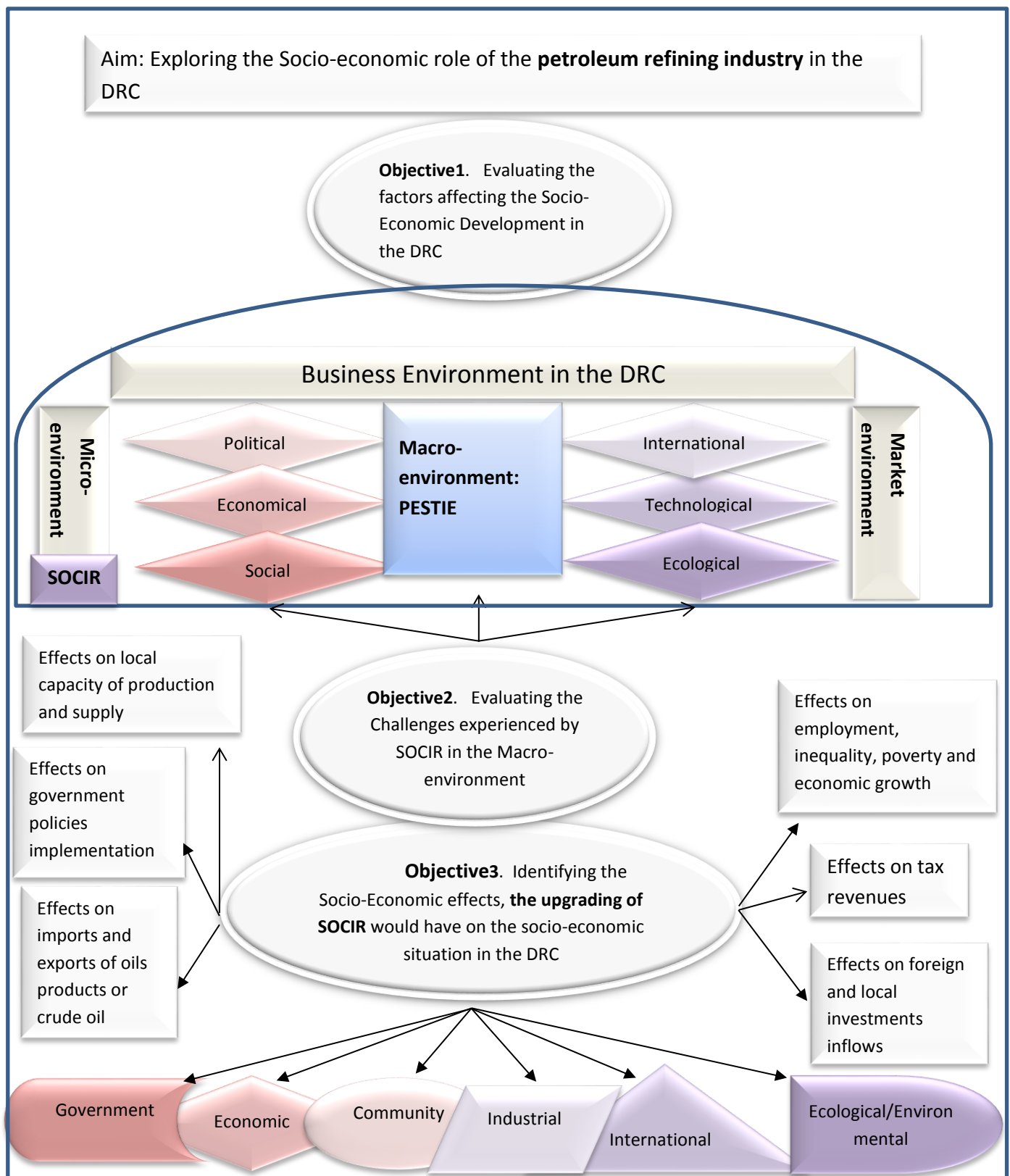
### **2.2 PETROLEUM INDUSTRY IN THE DRC**

It is essential at this stage to start releasing a basic understanding of the structure and concepts that will be significantly considered in the study process (e.g. petroleum and petroleum industry, petroleum refining industry and petroleum products) before attempting the description of socio-economic roles of the oil refinery and its marketable products in the country's development process.

#### **2.2.1 Conceptual framework applicable to the study**

Figure 2.1 below encapsulates the concise structure of this chapter, which consists of describing the aim, and objectives that have already been defined and reviewing of social, economic, macro-environment, and oil and gas industries theories.

**Figure 2.1: Conceptual framework applicable to the study**



**Source:** self-generated by the researcher

The above structure design explains and defines the course that will contribute on the development of this study. It will govern the nature of available literature review that is relevant to the aim and objectives of the study, including the business environment theory, which involve the macro-environment variables that create specific opportunities and threats in the oil industry or to several other organisations. Indeed, the success or decline of any organisation depends not only on the macro-environment factors, but also on additional variables comprising the micro-environment and the market environment.

The objective of measuring these variables in the context of SOCIR development is to minimise potential threats from the PESTIE instability, and to develop strategies in such a way that it can deal with competition in the oil industry. Unfortunately, the market and micro-environments variables are not relevant for this study and will not implicate further discussion. In this chapter, the emphasis is on understanding the influence and changes caused by the PESTIE variables in the oil industry, which have more direct, as well as indirect effects on the oil and gas activities in the DRC.

The PESTIE impacts on the oil and gas industry are examined because they represent the uncontrollable and unstable forces that affect to a greater or lesser extent the well-being of any organisation. Therefore, changes from the macro-environment factors, if well-managed can pose major opportunities for the petroleum and gas industry development; if not well-managed, the same changes can cause major threats to the oil and gas industry decline.

According to Smit (2011: 65), the influence of the PESTIE factors on the oil and gas industry are explained as follows:

- **Political environment:** Includes government policies, its political participation and regulations guidelines as the most important component affecting the oil and gas industry development or crises in the country;
- **Economic environment:** Comprises aspects such as fiscal policy of the ruling government, recessions, monetary and exchange rate, which guide the oil and gas industry's operations and management decisions to invest in new projects or to upgrade the existing investment to a new competitive standard;
- **Social environment:** Consists of people's lifestyles, urbanisation, practices, behaviours or habits, and standard values that are shaped by culture, and

which are mostly impacted by oil and gas operations in the country, through the fluctuation of oil and gas products prices;

- **Technological environment:** Involves dynamics aspects which are frequently liable to the speed of modernisation, innovation, change and transformation, refineries' technologies are required to provide to modern society more friendly and environmentally oil products that comply with the international environmental regulations;
- **International environment:** Includes issues through which foreign and local tendencies and actions that drive the oil and gas industry and the market environment; and
- **Ecological environment:** Comprises aspects which include natural resources such as quality of air, and climate change or environmental well-being, fauna and flora, mineral resources and access to quality water.

## **2.2.2 The Socio-economic role of SOCIR in the DRC**

SOCIR as a key player of the DRC's oil industry and economy was expected to contribute and promote the socio-economic situation of the country through double dimensions: Economic dimension and Social dimension. But the indication involving the role that SOCIR should play in the socio-economic environment of the DRC will be displayed in Table 2.3 below, which describes the socio-economic factors that could promote the effects of SOCIR upgrade in the DRC.

Therefore, the economic and social roles are explained as follows:

### **❖ Economic dimension**

The depiction of the economic role is referred to as a value chain approach in which SOCIR should play double roles, including primary and secondary activities. The primary activities are those activities that lead directly to the processing or production of oil products or services. In this case, the primary activities include crude oil refinement process which comprises the process of separation, conversion and purification (treatment) of crude oil into marketable petroleum products. Transportation and storage of oil products are services that are considered to be part of the secondary activities.

The secondary activities include all activities that support the primary activities to ensure that petroleum products can indeed be manufactured (Smit, 2011: 67). The secondary activities consist of:

- Procurement (purchasing for the organisation, such as the purchasing of stationary);
- Human resource management (all activities from the recruitment of employees, to training and development as well as compensating them);
- Technological development (such as the new and modern equipment, hardware, software, procedures and technical knowledge required to transform the organisation's resources into final products).
- Infrastructure (which ties the various parts of the organisation together such as its department of finance, operations, marketing, administration and general management).

According to Williams (2014: 3) and Smit (2011: 64), the micro-environment factors in this study refer to SOCIR's resources and capabilities, goals and values, structures and systems. Furthermore, the role played by SOCIR in the market environment, should be close to proximity of oil industry's competitive environment where its sources, inputs and sells its products to customers and where it manages and builds its relationships with competitors, suppliers and customers in the business environment. With regards to SOCIR non-operational condition or due to the challenges that led to it breakdown, SOCIR has not fulfilled its primary and secondary roles of providing the country with its products. Therefore, SOCIR has failed to promote socio-economic activities development in the DRC. Furthermore, it has been unsuccessful in stimulating national socio-economic change and diversity.

#### ❖ **Social dimension**

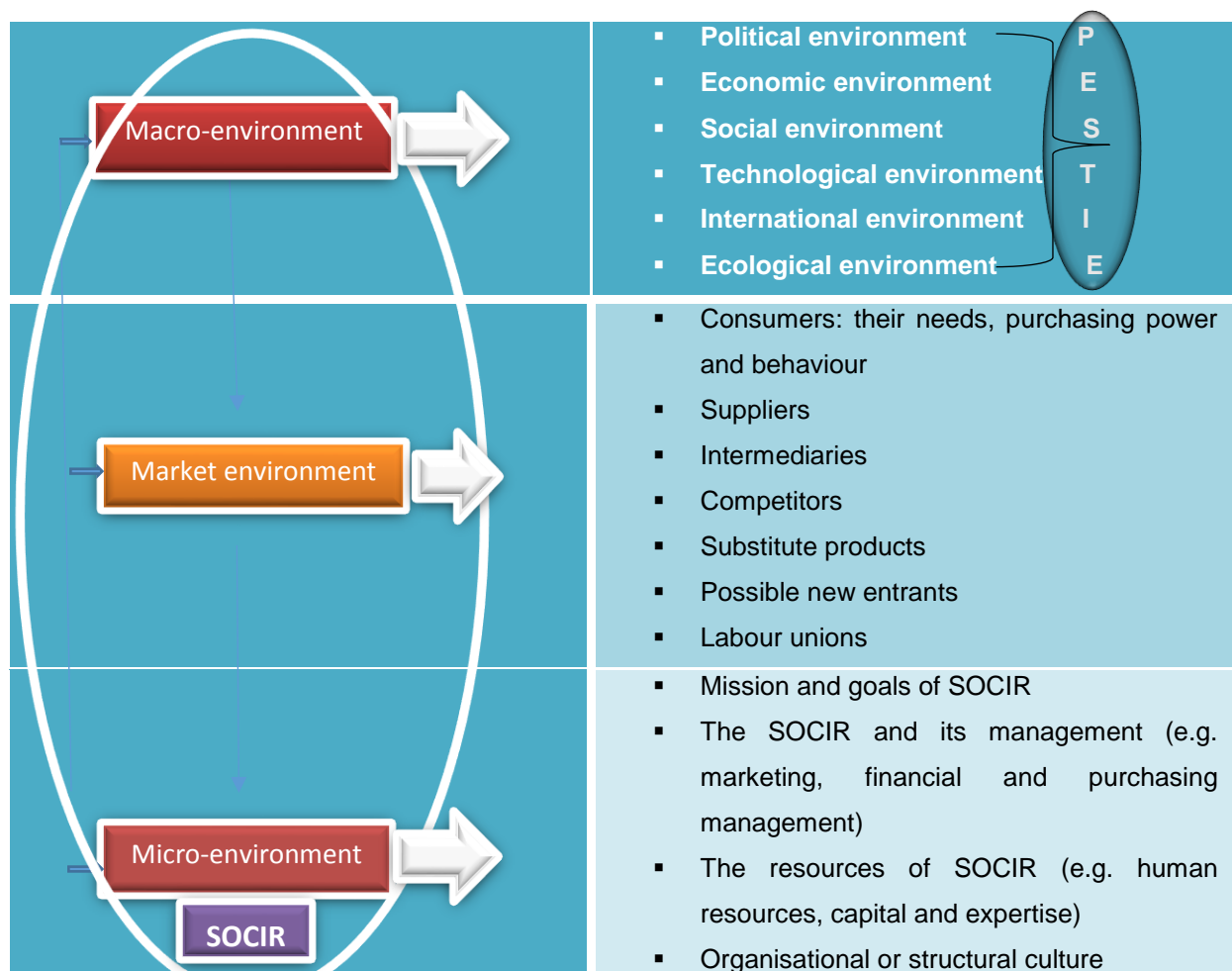
The depiction of the social role played by SOCIR should be referring to the consideration and implementation of CSR values. According to Adeyeye (2012: 7-13) and Hoskins (2012: 63), SOCIR was expected to promote a fundamental relationship between its business and society, through posing actions that affect societal expectations. According to Sage publications, Inc (2012: 10), SOCIR and other related industries were likely to prove their commitment to society's value on social, economic and environmental goals over their actions.

Unfortunately, SOCIR challenges and breakdown situations have indicated sufficiently that its social role had not been fulfilled. Additional clarification concerning the social role of SOCIR including CSR values in the oil and gas industry development is provided in Section 2.6.2.

## 2.3 BUSINESS ENVIRONMENT IN THE DRC

Many factors influence or affect the socio-economic situation and most of them are included in the business environment framework presented below. Figure 2.2 below outlines the business environment composition and discloses the choice made on the macro-environment factors that are perceived as some of the key components of the business environment affecting the oil and gas industry.

**Figure 2.2: Business environment and factors affecting the socio-economic development in the DRC**



**Source:** Adapted and modified from Smit (2011: 64). *Management principles: A contemporary edition for Africa*.

The researcher has selected the PESTIE framework because it plays a critical role in the process of conducting and evaluating internal business operations within the petroleum and gas industry field, and particularly for the oil refinery operations that depend on factors involving political, economic, social, technological, ecological, local and international market factors that are relative to oils and oil products fluctuation costs or prices, which affect to a greater or lesser extent local and international economies. Furthermore, the macro-environment analysis enables the oil and gas industry to improve policies that match with its internal resources and abilities to manage the opportunities or risks that exist from the external environment (Williams, 2014: 3).

The PESTIE factors also influence the oil and gas industry directly as well as indirectly through the impact of interest rates on financial management or guideline regulation with which human resource management have to fulfil (Smit, 2011: 71). The market and micro-environments and their respective variables are not discussed in this study because they are not relevant for the aim and objectives defined, but they are also very significant components that directly or indirectly affect the oil industry, and particularly the oil refinery in terms of business operations.

However, concerning the micro-environment, there is need to understand the socio-economic role played by SOCIR as the internal or micro-environment within the oil industry and for socio-economic development of the DRC, which should be depicted as the main chain of activities that must be performed to refine oil products and provide good service delivery to the country (Smit, 2011: 66-67).

### **2.3.1 Background of natural mineral resources in the DRC**

According to Litvinoff (2012: 4), over 50 countries worldwide, including the DRC, are demarcated as natural resource-rich. In sub-Saharan Africa, approximately half of the inhabitants live in mineral-rich and oil countries, yet most of such countries have underprivileged and poor levels of human lifestyle improvement, due to several reasons, including the lack or weak capacity of processing industries and of poor institutional capacity unable to enforce existing laws and regulations that could lead to transform natural resources in sustainable wealth (Demissie, 2014: 2).



The expression “resource curse” is used for countries such as DRC to describe the way oil and resource-rich developing countries experience adversative economic, environmental and social consequences from oil and other natural minerals resources exploration and production (Litvinoff, 2012: 4). The UNEP report (United Nations Environment Program for development study 2011) has confirmed that DRC is widely depicted as the wealthiest country in the world in terms of natural resources with an estimated \$24 trillion (US dollars) in natural minerals, and petroleum is among the most top 5. Manjolo (2012), as well has stated that DRC has variety of potential mineral wealth which include petroleum, uranium, gold, coltan, copper, cobalt, cadmium, industrial and gem diamonds, zinc, silver, manganese, tin, bauxite, germanium, iron ore radium and coal, vast hydropower potential and as well as timber.

It is also stated that the country contains insurmountable potential for economic prosperity through its raw minerals and its potential GDP output measured in minerals, which is more than Europe and the United States’ current GDP combined (Nora, 2013). The DRC is the second largest producer of diamonds, comprising 30% of worldwide diamond production. The country produces 70% of the world’s coltan and contains the world’s largest cobalt reservation (Nora, 2013). Concerning oilfields, Pauw (City Press, 2014), stated that the DRC oilfields are the largest in sub-Saharan Africa and have been found in the Lake Albert Rift Basin, which straddles the DRC -Uganda border.

The field contains an estimated over 2 billion barrels of oil, and that the country has crude oil assets (reserves) that are subsequent to Angola's in southern Africa, which was evaluated at 180 million barrels (29 million m<sup>3</sup>) reserves in 2013 (CIA World Factbook, 2015). The DRC is still experiencing major socio-economic crisis and challenges, although it is one of African Central countries known as the potential richest country by its various natural mineral resources. According to Demissie (2014: 3), the poor institutional capacity, the volatile prices of natural resources, and the negative link that exists between natural resource capital and human capital investment could be the main causes of socio-economic poor performance condition of major population of the DRC.

### **2.3.2 Business framework in the DRC**

In view of the business environment in the DRC, a safe and promising business framework was delivered since 2002 by the government, with a new investment code, which planned to support and protects investments, and other laws steering to favour the business expansion in the country. The investment code sets parameters of management among domestic and alien investors and makes straightforward the approval procedure which results in the grant of tax benefits and customs (ANAPI, 2012).

The DRC constitution provides mechanisms for the safety of investments, which is well implemented in Public-Private Partnership law (PPP Law). Freedom of trade and industry for all sectors has been liberalised and opened to all investors regardless of their nationalities. Investors are therefore free to establish in the area of their choice be it mining, oil, industrial, food processing or any other and they are also free to settle in any part of the national territory and to develop their activities without any limitation.

The main objective of the PPP Law is to attract important funds for investments in order to achieve the country's construction and growth program, the effects of which guaranties for emergence by the perspective for 2030, are quite a lot and readily accessible. It should be elucidated that this new investment scheme is part of a vast reform process of the legal and statutory framework of hydrocarbons, mines, electricity, agriculture and insurance. According to Wapo (2014), the new PPP legal framework includes the following five core conditions from which investors are expected to comply with:

- For the very specific and strategic field, investment worth shall not be less than the corresponding to Congolese Francs of one billion US Dollars;
- Managing the social and environmental promises or clauses;
- Management of the offer in the procedure of financial commitment on the project;
- Accountability and commitment to transferring technology; and
- Requirement to employing foreign workforces in case when qualifications and skills are not offered locally.

In the DRC, as well as in other diverse African countries, papers are well documented with guardrail sustained by laws and regulations that should guide investments and socio-economic development process, but the implementation of these laws and regulations are challenged by existing lack of political good will, institutional instability, corruption and conflicts that reduce the government capacity to promote entrepreneurship in the oil and gas sector as well as in other sectors of the economy.

The PPP Law indicates that resources-generating zones, specifically important infrastructures and natural resources such as hydrocarbons, mines, water and forest, the Private-Public Partnership shall be subject to collaboration, arrangements or agreements and support projects. In addition, the PPP Law provides that investment projects are subject to cooperation agreements, which have to be decided by the Council of Ministers, signed by the relevant Government members and recognised by Decree of the Prime Minister of the DRC for them to be effective. In trend of facilitating the business environment in the country and according to the PPP Law, the DRC government warrants the business groups, enterprises or corporations and their investors, who have come into partnership agreements, the free transfer of capital and revenues in relation with Exchange Rate Control in force, as well as the choice to open bank accounts in local and foreign currencies within the country as per circumstances specified in the governing laws.

The business framework in the DRC through the PPP Law provides benefits and guaranties formerly approved by business groups, enterprises, companies, agencies or firms assimilated under partnership commitments entered into the DRC's Government and expatriate business groups prior to PPP law that should intend to carry on to be acquired by their beneficiaries until the achievement of such projects. Moreover, any new regulation in cooperative law incorporating Para-fiscal and exchange rate, customs and tax provisions should be more promising than the provisions demarcated in this PPP law, which supposed to be directly applied, as of right, to companies or firms, business groups and enterprises, which formally accepted to sign a partnership agreement, including related commitment.

### **2.3.3 Classical model of doing business in the DRC**

According to the World Bank report (2015), the strategic perspectives of investing and doing business in the DRC is based on the factors including macro-economic drivers, key and future growth sectors, trade, infrastructure (transport and power), institutional reforms, human capital and demographics, the trade solution and the bank experience in the country. The most important procedures of doing business in the DRC involve almost ten steps to be followed: dealing with construction permits, opening a business, registering property, getting credit, being paid electricity, paying taxes, defending minority shareholders, applying contracts, resolving insolvency and trading across borders.

To enhance the business environment in the country, an economic governance program has been installed with the objectives of improving economic governance of the DRC, which include the restoration of confidence and transparency in the natural resources management; the improvement of business climate; the improvement of the effectiveness of the use of the resources resulting from the extractive sector; and the improvement of transparency, effectiveness and economy in the implementation procedures of the public expenditure.

According to the World Bank report on the country assistance strategy for period 2013 – 2016 (2013: 11), despite the healthy definition and dissemination of oil sector policy in the DRC, once again, the business climate in this strategic sector remains unfriendly to promote investments for the oil and gas industry development or for the processing industries improvement, such as SOCIR upgrading project and the private sector expansion. Thus, the PPP Law which provides a stimulating business framework for the country's construction and development is facing as usual the challenges, crisis and lack of non-implementation of policies and objectives defined. The government of DRC remains weak, unmotivated and powerless to drive and achieve a friendly business framework in the country, which retard the promotion of industrial development that could cause socio-economic change.

Many causes affecting the entire oil industry development or the socio-economic improvement have been identified, the most important include the PESTIE factors instabilities, regional armed conflicts, impunity of known perpetrators, regular social class injustice and corruption, which are enumerated among the strongest factors

that affect the business climate improvement and the socio-economic development in the DRC.

#### **2.3.4 Local Economic Development Framework in the DRC**

The DRC has a combined economic system in which the economy comprises private freedom joined with centralised economic planning and government guideline regulation (globalEDGE, 2015). A stimulating economic development framework that can promote socio-economic change and improvement exists in DRC, but usually encountering implementation obstacles which relate to an unreliable legal structure, corruption, and lack of transparency in government program, and which are the on-going challenges for the economy as a whole and specifically for the petroleum and mining sector. Significant economic activities are still taking place in the informal sector, and which are not replicated in GDP data.

This has dramatically affected and reduced national production and government income and amplified external debt, massive tax fraud or tax evasion, misappropriation of public funds, total dependence on export of raw material with import of all consumer requirements, non-passable roads and no reliable roads network between provinces, little industrialising business unable to create jobs; and irrelevant and unsuitable policies (CIA World Factbook, 2014). In addition, the country has experienced multiple challenges due to the consecutive looting and destruction of industrial infrastructures in 1991 and 1993 (U.S Department of State 2015).

However, the secondary industry sector is characterised by a deteriorated and ageing infrastructure, not even linked to primary industry and which is out of contemporary processing technology. The oil refinery crisis, SOCIR inefficiency and the entire petroleum industry disintegrated are an example of secondary industry that need innovation and upgrading project, for eventual socio-economic change in the country. According to the Perryman Group Report (2014: 9), investments in petroleum and gas exploitation, production and refinement produce substantial economic benefits and advantages, as well as other profits involving potential increasing energy autonomy in the country.

The lack of natural mineral resources processing industry in the DRC has accentuated the problem of economic diversity and promoted colonial economic model, which remains set up with consequences of permanent threat to national GDP growth that depends strongly on natural resources production exports. The government medium-term vision set out in the 2011-2015 Growth and Poverty Reduction Strategy Paper (GPRSP) and the 2012-2016 five-year action program focuses on the need to significantly improve the population's living conditions. According to the African Development Bank Report (2013: 7), 71% of the Congolese are living below the bottom line of poverty.

Therefore, effort and new project initiative from the government require diversifying the economy, strengthening the competitiveness of private investment and promoting priority growth areas that could generate competitive and quality employment. The petroleum industry development and oil refinery upgrading project are therefore relevant to promote massive jobs creation, and can contribute by promoting competitive economic growth, participating in the gross domestic products and in considerable interrelated indirect and induced jobs creation (Chevron Oil, 2013). However, one of the challenges to this attracting program achievement remains the lack of policies implementation.

The DRC's Economic Development Framework will need to focus on the priorities for sustainable infrastructure development likely to boost economic growth by paying attention to the effective contribution of such infrastructure to strengthening the community fabric and development of local enterprises (expectation include oil refinery upgrading). Also, the instable business environment climate in the DRC could be among the key barriers affecting the socio-economic development in the country.

### **2.3.5 Types of industries driving the DRC's economic development**

In whichever country worldwide, the industry environment can be divided into four main classifications and operate under two types of market structure: Monopolistic competition and oligopoly (Parkin, 2008: 285) and World Vision (2016). The industry categories include primary industries, secondary industries, tertiary industries and quaternary industries.

The primary industries relate to the extract of natural raw materials (natural products output) from land or sea and which provide products such as oil, iron ore, timber, fish; and mining, quarrying, fishing, forestry, and farming are all examples of primary industries. The secondary industries refer to manufacturing industries (involving the conversion, transformation, fabrication or the manufacture by manual labour or machines) of natural raw materials into another product. The tertiary industries take into account all services that provide support to the primary and secondary industries. This may include transportation, telecommunication, sanitation, security and health, banks and many others services.

Lastly, the quaternary industries comprise the use of high technology industries, which involve people who are often highly qualified within their field of work, to work for companies operating in the three previous industry's categories. This quaternary industry includes as well the research and development enterprises, which are the most corporate types of businesses in the technologies sector (Vision World, 2016). Concerning market category, the monopolistic competition is a market structure in which a large number of companies compete on product quality, price, marketing and branding; where each corporate produces a differentiated product and where companies are free to come in and exit the market (Parkin, 2008: 286/296).

The oligopoly is the market system or structure where natural or legal barriers prevent the entry of new businesses, and where a few number of companies compete. Therefore, in the previous section, it has been stated that the DRC has a mixed economic model where the economic system takes account of private freedom associated with government steering economic planning and guideline regulation regime. This allows understanding the existing type of industry categories that are driving the DRC's economic development.

Currently, the colonial economic model based essentially on the type of primary industries, associated to usual or real barriers that prevent the admission and development of new businesses in any sector of the economy govern and retard the socio-economic development process of the DRC. Consequently, all of the companies operating in the DRC's oil industry or economic system are not linked or interdependent vertically or horizontally.

Few small companies could be linked, but not integrated and most of them operate outside of monopolistic competition where product quality, price, marketing and branding are not following the legal ways of doing businesses. The informal practice of doing business in the DRC is very current in almost all sectors of the economy and in all industry categories.

In the oil and gas industry or mining sectors, for example, the raw materials (crude oil and natural gas, and other natural minerals) are extracted (by the primary extractive industries) and exported often illegally with uncertainty statistics and in the condition where CSR values and environmental regulations are violated. Crude oil and natural gas could then be processed, converted or refined into petroleum products in the country, if the secondary industry may possibly be developed.

However, this has not been the case in the DRC, given that crude oil and natural gas are exported totally to other foreign countries, due to the absence or breakdown of the existing refinery industry (SOCIR). The cost of oil products to be transported, storing, distributed and advertised or marketed should be reduced and operate in a very secure and safe condition involving public or private services. This way, all services included in the tertiary industries could as well be improved or developed in the country. Finally, the quaternary industry in the DRC could also involve the oil products being investigated and controlled to check that the quality meets the standards of environmental requirements. Unfortunately, the oil sector in the DRC remains politically a very strong and opaque field.

### **2.3.6 Social Development Framework in the DRC**

According to IPIECA (2004: 5), the indicators employed to measure the potential socio-economic impacts or roles through the development process include many aspects involving: changes in community lifestyle quality, changes in employment and income levels, changes in public services demand, changes in community demographics, changes in housing, health and educational system and changes in many other socio-economic aspects. Therefore, the social environment in most Sub-Saharan African countries including the DRC is characterised by various crises which comprise high rates of poverty, corruption, unemployment, crime, violence, rape, robberies, theft and disruption of business (The World Bank report, 2015).



Furthermore, several wars and tribal conflicts in these countries and particularly in the DRC have led to families being displaced and to social, economic and political instabilities (Handley, 2009: 2-9). Existing evidence estimated that there are approximately 2.3 million displaced people and deportees within the country and around 323,000 DRC nationals which lives in refugee camps outside the country; and also a humanitarian emergency continues in the more unstable parts of the DRC and sexual violence rates keep on increasing and remain high. According to the World Bank Report (2015), the DRC's social environment is dominated by socio economic inequalities in terms of wealth, education and information, sanitation facilities, employment, income, consumption, and deficiency of elementary human essentials needs consisting of safe drinking water, food, health and shelter. The inequalities are not only viewed on income, but also on access to basic services. Access to services is relative and depends on the rate of poverty in the country which has reached 71, 34% in 2005 to 63% in 2012.

The poverty rate remains actually very high and the country is still ranked second to last on the Human Development Index (186 out of 187 countries in 2014), and the per capita income, which erected at \$380 in 2014, is among the lowest in the world. However, this inadequacy or poverty is not in the same way distributed. The International Monetary Fund (IMF) Report (2007: 22) estimates that poverty is more predominant in rural zones (75.72%) than in urban zones (61.49%), while certain provinces such as Équateur, Bandundu and Sud-Kivu are experiencing a poverty frequency rate of over 85 percent compared to Kinshasa's 42 percent.

However, the projecting for petroleum industry and oil refining industry development in the country could be a great provider of social and economic change or improvement (PWC, 2013: 6-11) and (Perryman Group, 2014: 3-4). The benefits from oil industry or petroleum refinery development are tangible through direct, indirect and induced employment, labour income and value added. Upgrading the oil refinery or developing the oil industry in the country commonly provides more than direct, indirect and induced socio-economic impacts (Regeneris Consulting, 2013: 6-16). In the DRC, the promising development of the secondary industries, such as SOCIR development, could modify the strategy and running of social policy, which is the accountability of the Department of Social Affairs, Humanitarian Action and National Solidarity.

Social policy in the country is focused on the integration of vulnerable persons and a strategic plan for women. According to SADC Report (2009: 9-10), the objectives defined in achieving social policy are: to give advice to the government on issues appropriate to the disabled, to make available social aid and support, to provide income provision for the purchase of rice and flour, to pay non-contributing basic pensions, the elderly and vulnerable groups; to be able to achieve the national medical care for pensions above 90; and to empower NGOs through an NGO Trust Fund and to be responsible for financial assistance to victims of floods, fires and cyclones. It should, however, be noted that economic budgetary constraints, especially for social programs, are a major challenge for the country's social development perspective.

According to the World Bank (2014), the DRC's medium-term economic outlook still seems positive even though its political and security situation remain fragile. The country's economy is projected to grow gradually in the medium term at around 7 to 8%, resulting from improved investment and spreading out in the extractive industries (including petroleum extractive industry) and owing to distribution of the civil engineering and service sectors.

Furthermore, in 2013, the DRC registered an economic performance growth rate of 8.5% which should continue in 2014 and reached 8.6% in 2015, driven by extractive industries and favourable trends in commodity prices (African Development Bank Group, 2014). In contrast, the World Bank Report (2015) indicated that although the DRC has realised an exciting economic growth rate, the country's poverty rate has not changed and has remained high; however, it fell from 71% in the previous years to 63% in 2012. Although the report describes a progressive economic performance rate, the impact on the social environment is not yet perceptible.

The country will need to increase new investments on processing industries development to face the challenges of various socio-economic inequalities. The case of SOCIR upgrading, for example, could play a capital role of providing the country with valuable products that are fully strategic and fundamental for socio-economic development.

### **2.3.7 Political framework in the DRC**

The DRC, as the name can indicate is a democratic country with a semi-presidential system that involves the executive at the central level, which is divided between the president and the prime minister. However, from its long history, the country continues to face a real problem of state sovereignty. It lacks credible democratic institutions and is plagued by several political parties that are self-interest guardians. Although opposition political parties exist in the country, the political regime in the DRC is considered to have an authoritarian presidential system with massive violation of socio-economic rights and human rights; the country lacks the rule of law and has institutional instabilities, which are continually affecting socio-economic development. (Rohwerder, 2015: 2).

In addition, the current government of the DRC is brutally restricting democratic space, despite the strong indicators of democratic tendencies, such as the presence of competition and intensive activism by political parties. Congolese people are facing direct marginalisation and repression in a situation where the parliament remains ineffective in challenging the ruling coalition. Furthermore, the freedom or impartiality of media and judiciary institutions are very restricted and undermined in a democratic country, which is destabilised by persisting regional and national conflicts and instabilities.

According to EPRI (2011), the impression of the past twenty years of unrest cannot be overstated. Every single facet of DRC's civilisation is polluted by a history of insecurity, instability and violence: Basic infrastructures have suffered from a lack of maintenance or deficiency and physical deterioration with many institutions in calamities. Many Congolese people have lost their assets (livestock, tools, buildings), and several corporations have lost commercial networks, staff and properties, due to political conflicts. The economy which was progressively transformed is currently concentrated on primary industry, survival or subsistence agriculture and on illegal, criminal or informal activities, with a failure of export and value-added activities (EPRI, 2011). The socio-economic perspective or investment opportunities in any country are reliant on government or political interaction for implementation.

As the economic system of DRC involves the government and private investors (mixed economy), this has also allowed the duality of existing traditional (informal) economic model and formal (structural) economic system, due to various social, economic and political crises and instabilities that have prevailed in the country for many decades until today. The regional conflicts, internal rebellion and tribal or ethnic conflicts have caused much problem of insecurity, instability and infrastructures deterioration in the DRC.

Indeed, there is no prospect for new investment in large scale infrastructure or promotion of sustainable investment development in the context where peace is absent in the country. The DRC will continue to face these challenges if the government and the international community are not committed to invest much effort on peace keeping and peace building. Because these repeating challenges have remained unresolved, most socio-economic activities in the country will also continue to be affected and operate in the informal sector, missing out the opportunity for economic growth, industrial development and social improvement or well-being.

According to EPRI (2011), the government income that is mostly based on primary industry (mining and oil), which over all accounts for 75% of total export revenues and 25% of GDP, could probably increase, if the project for processing industries, such as SOCIR upgrading project can be successfully achieved. Furthermore, the private sector investment in the DRC is steered by multinational companies, which is relatively high, at about \$2.7 billion USD, but mostly focused on the primary industry (extractive industry).

This tendency can as well attract and modify possibly the trend of their business by aiming to increase more operations in refining industries, if the government can promote policies for the development of processing industries in the country. Therefore, the lack of transparency in government policy, corruption and an ambiguous, confusing and uncertain legal framework could create a long-term problem for the economy as a whole to emerge, including the primary industry: petroleum and mining sectors. Thus, the country will require an urgent PESTIE reform for potential socio-economic change.

Accordingly, the probable socio-economic development and SOCIR upgrading project in the DRC are strongly depending on ending conflicts and improving governance system.

### **2.3.8 Ecological Framework in the DRC**

In the contemporary world, strategic decisions about investments are usually made on the basis of political and financial considerations, but environmental or ecological criteria are dominating and driving most investment choices for small or large scale industrial projects. By means of having half of Africa's water resources and forests, and an estimated 24 trillion-dollar mineral reserve, the DRC has various potential environmental assets which could turn it into a driving force of African socio-economic growth and development (UNEP, 2011). Modern technology related to natural mineral resources (e.g. the petroleum refining industry) is subjected to comply with international legislative requirements and regulatory norms.

The DRC has a national legal framework for mining, petroleum and environmental conservation, but the implementation of that framework remains challenged by institutional crisis (Badash, 2011). Certainly, the project to upgrade and develop a modern oil refining industry such as SOCIR could be socio-economically profitable to the DRC, but as well it could cause an ecological threat if not conformed to national and international environmental requirements, that prevent pollution and other negative effects in the society. In most cases, feasibility studies on large-scale investment such as petroleum refineries establishment include environmental risk management during project implementation and achievement.

## **2.4 CHALLENGES AFFECTING THE BUSINESS ENVIRONMENT IN THE DRC**

### **2.4.1 Challenges of doing business in the African region**

In making an allowance for doing business on the African continent, specifically in the flourishing power and related infrastructure markets, the prospective can be perceived from various angles. However, the challenges to secure, finance, deliver and enterprise successful infrastructure assets and services are remaining constant issues to be attentively understood and considerate. According to Nelson (2010) and Investec (2014), undertaking business in Africa provides endless business opportunities and exceptional challenges, and the continent displays encouraging

developing markets principally in areas such as infrastructure and tourism, agribusiness, and oil and gas business. Numerous reports show that Africa is on a growth curve as new oil and gas discoveries continue across the continent. Furthermore, the economic basics are perceptibly in favour of Africa: healthy commodity prices, improved private capital flows, modest inflation and balanced exchange rates. But, according to Investec (2014), most important lacks in the core enabling infrastructure are obstructing sustainable business growth in the continent. Also, additional factors, including for example inefficient ports, badly maintained and congested highways, unreliable power supply and transmission networks, a lack of appropriate sanitation facilities and clean water, and limited regional connectivity are other concerns to the business development on the African continent.

These factors create a supplementary challenge for local and international investors considering undertaking business in Africa. In view of the African historical background, lack of political or institutional ability, legal and regulatory uncertainty; cloudy procurement processes, shortage of skilled workers, ageing of basic infrastructure, corruption, and excessive bureaucracy are remaining as the most barriers or challenges hindering business improvement and development.

Therefore, the political instability in Africa as well as in the DRC is absolutely the prevalent perceived obstacle of doing business, particularly in the infrastructure space and power where government and its parastatal entities are often the procurer of, and ultimate payee for, these indispensable public services (Investec, 2014). Despite political instability, armed conflicts and international headlines, Africa is on the shifting phase and in these days, taking a risk of doing business in certain countries has by now begun to decline and is projected to carry on its decline.

These have become less frequent occurrences in the last 10 years, with a continuing move towards more stable, transparent and accountable governments (Nelson, 2010). Governments are also acknowledging that international investors seek legal certainty as much as political and economic stability. However, the most concern for the African continent remains governments' commitment to implement the Win-Win partnership cooperation with multinational companies or foreign countries, which require experience and deep understanding of business to fruitfully and successfully negotiate in an exceptional environment.

#### **2.4.2 Obstacles over the business framework in the DRC**

The barriers to managing business on the African continent are equally similar to those affecting the business environment improvement in the DRC. As previously stated, the DRC is a country with vast natural resources, comprising 80 million hectares of arable land and over 1,100 natural mineral deposits and valuable metals. The DRC has the prospective to be among the prosperous countries on the African continent and a locomotive of African growth, mostly in terms of business development (World Bank, 2015). However, many challenges impede the running of formal business in the country.

According to Gilpin and Downie (2009), some of the challenges are restriction of access to finance, electricity and practices of the informal sector; only 10, 7% of firms have a line of credit or loan from a financial institution, compared to the regional average of 22, 7%.

#### **2.4.3 Barriers to Regional Trade or International cooperation in the DRC**

According to Iran News Agency (2010) and RIDDA (2014), the lack of trade agreements and potential tariffs are some of the major obstacles in expanding trade cooperation with Africa and the DRC. However, the economic growth of African countries in recent years has attracted investors from other continents, but still many concerns about the safety of their operations and their capital exist. Outside operators who want to invest in Africa including the DRC routinely seek assistance from other consulting firms, often from the north. International meetings of Business Law in Africa that have just taken place in Paris in 2014, referred to the risk factor.

These challenges consequently retard economic growth and impede human development efforts. For example, the economic model proposed and adopted in cooperation between DRC and China called the "Sino-Congolese partnership" was expected to turn into ideal of a fruitfully functional Win-Win cooperation or support framework in which, in interchange for access to 10.6 million tons of DRC's natural resources, China would be committed to invest US\$ 9 billion in dynamic infrastructure development for the country (Hellendorff, 2011: 11).

Meanwhile, transparency and equity in the implantation of regional or international socio-economic cooperation and development programs is the key for the DRC to pledge an industrial development plan. SOCIR, for example, could gain from such a relationship between the DRC and China, but often, projects in the DRC's context are facing political and economic challenges, which impede and retard new large-scale investments.

#### **2.4.4 Factors affecting the socio-economic development in the DRC**

Without doubt, the factors affecting the socioeconomic environment in the DRC are almost similar to those affecting the business climate in the country or vice-versa. According to Nkurayija (2011: 1-2), numerous socio-economic challenges affecting the African continent as well as the DRC involve low savings, slow growth deeper low income and falling trade shares. Additionally, environmental degradation, uneven access to resources, social exclusion, high inequality, insecurity, HIV/AIDS pandemic, and many others are among the challenges facing the African countries.

Therefore, within the factors causing socio-economic disruption in the DRC, including in the business environment are these factors named under the appellation of PESTIE variables, which means political, economic, social, technological, international and ecological. Thus, from the African continent to the DR Congo, the socio-economic environment remains confronted by several series of crises, instabilities and conflicts that delay the socio-economic development process. The socio-economic issues could be related to the lack of well managing or controlling the PESTIE factors, which for most of the time are instable and uncontrollable (Smit, 2011: 71).

In attempting to provide the inclusive factors affecting the socio-economic development in the DRC, Table 2.1 will denote some of the sources of socio-economic deficiencies and the possible strategies to be implemented in improving it. According to the World Bank Report (2013: 49), on the country's strategy assistance for period 2013 - 2016, the issues and obstacles from the business environment are these that are affecting the socio-economic development process in DRC. Table 2.1 in the appendix provides some issues, obstacles and factors affecting the socio-economic development in the DRC and the probable strategies to be implemented in improving socio-economic development process in the country. According to Litvinoff



(2012: 4), Nkurayija (2011: 2) and the World Bank report on the country strategy assistance for the period 2013 - 2016 (2013: 1-5), other key challenges subsequent to the promotion of socio-economic development in the country are linked to the domestic factors including the lack of security, lack of peace, lack of political stability, lack of economic diversity, lack of government's strong leadership, the strong dependence on international network, declining fiscal situation, obstruction to restructuring, transformation and transparency by genuinely entrenched vested interests, low ability for operational and powerful program putting into practice; and the lack of commitment by civil society and high unmet expectations for access to information and demand for good governance; and mainly external shocks in a perspective of ambiguous global environment.

However, good governance could be one of the constructive blocks to upkeep state effectiveness, better-quality of business environment for private sector expansion or development, service delivery, and promotion of processing industry innovation (SOCIR) for job creation.

## **2.5 CHALLENGES EXPERIENCED BY SOCIR IN THE MACRO-ENVIRONMENT**

The previous section discussed the factors affecting the socio-economic development in the DRC. This section will focus specifically on the challenges affecting SOCIR development in the DRC. Therefore, the macro-environment factors described in the structural design for this chapter are presently examined in line to determine how these factors are influencing the oil refinery operations. Before providing information regarding the challenges experienced by SOCIR in the macro-environment, it is essential and vital to explore the operational challenges besetting the sub-Saharan refinery industries.

### **2.5.1 Challenges affecting African Operational Oil Refineries**

According to the PWC report (2013: 3), most of the petroleum refining industries in Africa as well as the one in the DRC were built between 1954 and 2004. Prior to this period, the whole refined products were delivered to Africa from European and American processing plant (Mbendi, 2015). From 1954 up today, 61 years after, many refineries in Africa are no more operational, including SOCIR.

However, refineries today are facing similar global challenges with financial, operational and market challenges (KPMG, 2009: 1-7). The challenges experienced by SOCIR in the macro-environment are not different from those affecting the operational oil refining industry in Africa. Many challenges vary or depend on the country's political and socio-economic environments. According to Mbendi (2015), African refineries including SOCIR in the DRC, were forced to breakdown as consequence of low global refining margins and poor yields, high operating cost (due to small size) and small local markets.

The ageing of oil refinery infrastructure and financial shortage in Africa have been considered as the major constraints to their performance and efficiency. The Zimbabwean refinery, for example, was closed down due to the sanctions imposed during the UDI period in 1966. Other refineries have been closed permanently between 1980 and 2003 due to uneconomic performance (Mbendi, 2015). Furthermore, the oil refinery in Africa as well as SOCIR in the DRC has been affected seriously by technological problems which started to lower the capacity of production until to the closing phase. Even, many of the remaining operational refineries in Africa are still facing significant financial, operational and market challenges.

According to Kotze (2012), South African refining infrastructure, for example, which was built more than 50 years ago, when less sophisticated technology was used, is struggling today to compete with the modern and more sophisticated Asia-based refineries. Actually, these refineries cost more to maintain and operate, and could possibly become unsustainable in the future, than the Asia refineries which enjoy several advantages including new equipment, cheap labour, large capital reserves and rapidly growing local petrochemical products demand.

Therefore, the challenges facing SOCIR in the DRC are also relative to the local environment evolution and to these enumerate above which include factors that correspond to mismanagement, small markets, ageing logistics, inefficiency, less competitive or uneconomic performance and ecological aspects (crude oil specifications). Although refineries in Africa are all not mechanically and economically the same and function in very different environments, they do run into similar problems, difficulties or challenges (AVEC, 2015) and KPMG (2009: 1-7).

The current challenges experienced by the operational refineries are essentially designated in terms of cost and profitability (financial constraints). Indeed, oil processing industries in Africa need to grow economically while trading products at a price relative to the cost of imported oil products. Also, varying product specifications and environmental problems will keep on being a constant problem for African oil refinery industries in the present days and as well into the future. Among other challenges that affect the oil refineries in Africa and in the DRC, there is also the management aspect. SOCIR as well as most of the African oil processing industries are part owned by their respective governments and there is insignificant or no inducement to become competitive.

The price of refined products for these refineries is set such that the refining industry makes benefit and the operators receive a fee. This price differential has piloted some corporations to recommend that the smaller oil processing industries should breakdown since it given that they are inefficient and economically powerless to compete with international suppliers however they may be favourably located. The operator is usually receiving its fee regardless of how well the oil processing industry is carrying out its activities.

The oil refining industry productivity can only increase if the management structure is reformed, changed or transformed to reward effective operation and penalise reduced performance. Certain countries are studying the way for privatising their oil processing industries which could increase more effective operation. Therefore, SOCIR upgrading project could lead to the need of being privatised for more performance, productivity and competitiveness.

The markets aspect, the DRC's market of oil products has remained for long totally extraverted, while tangible efforts were engaged by certain countries in the continent, which have structured and regulated their markets and most of the oil refined products are traded locally and in the neighbouring countries. For these African countries, oil refined products which cannot be sold locally are shipped for export to other countries, sometimes at very high costs and low prices. For some of the inland oil processing industries only refined products for which there are a demand can be processed for the reason of challenges and cost related to transport.

Some African oil refining industries run at considerably less than their prospective capacity for the reason of difficulties associated with getting crude oil from a potential market, which is distant from the refinery's location. For most of the simple refineries in the continent, oil residue in particular is typically a problem for the simple reason that it is often shipped for export at a loss if it can be exported at all.

The technological or logistics aspect, most refineries in Africa including DRC's SOCIR are situated far away from the source of well-suited crude oil, far from international markets and providers or suppliers of engineering and equipment. The cost operative required for particular compatible crude oil is complex by the need for small shipments which must be transporting from a long distance. The high cost of importing and transporting crude oil from the international market affects the oil refining industry viability, productivity and profitability; and also, the time consumed for shipping and delivery affects operating flexibility.

Equipment for maintenance and for the need to upgrade the oil refinery is mostly imported because the engineering and construction skill in some of the African countries are very limited. Furthermore, almost all of the necessary material and equipment needed to maintain or upgrade African refineries have to be imported from the supplier countries at a fixed cost. The lack of financial capital and very limited capacity of workforce skill are supplementary factors to African refinery's technology innovation or maintenance, as well as for the SOCIR upgrading project.

The refinery's efficiency aspect is made up of the contemporary operating effectiveness or efficiency, while the processing unit is operational and the fraction of time that the operating unit is active. Most of the existing operational African oil processing industries are experiencing low energy efficiency and high losses for the reason that they have not been innovated, modernised, upgraded or optimised and have not kept up with new processing equipment or technology development, and trends. The lack of upgrading of the oil refinery with new processing technology is identified as one of the main reasons that led to low energy efficiency and to high losses. Contrary, an effective developed refinery with modern units could have high energy efficiency and increase its productivity timely.

According to Augood (2010: 24-26), beside the issues of low refining margins and product oversupply or the time for the refining process that are more difficult to manage than ever; the continual problems of low complexity, low utilisation rates and the remaining logistical constraints; the fiscal obscurity and political uncertainty in some countries, including DRC are obstructing refineries to perform and reach the standard of modern refineries capacity. Countries such as the DRC that specialise in extractive industries and commodities will have a disadvantage in their terms of trade (Demissie, 2014: 3).

In facing these challenges, the oil refining industry (SOCIR upgraded in the DRC) will begin to demonstrate the ability to react from internal and external changes. Finally, the global standards issues affecting refineries on the continent are mainly relevant to small size of refinery's capacity and technology inefficiency or incompatibility. The low complexity has led to the effect of negating the profits usually related with availability of locally produced crude oil.

According to African Refiners Association (ARA Week Report, 2014), it is advantageous to consider that challenges must lead to solutions and solutions are investments in the upgrading or modernising of natural resources refining industry (replace/upgrade ageing infrastructures or refineries equipment). The actual condition in which operate Sub-Saharan African oil refineries affect industry decision making in terms of competition (quality, quantity, cost and prices of petroleum and oil products to be supplied in the local or regional marketplace).

Challenges facing the African refineries include insufficient capital investment to produce cleaner fuels, and gradual substitution of scarce light low sulphur refinery feeds by heavy high sulphur, and the decreasing demand for heavy fuel oil (Bridjaniam and Khadem-Samimi, 2011: 1). Additionally, other challenges consist of the need to invest, the effect of subsidies on product pricing, increasing refinery energy intensity, regulatory requirement cost of product refining, increasing fuel quality specifications or increasing greenhouse gas emissions and the associated costs, and quality of petroleum products as well as rising energy costs (Bergh, 2012: 20-21) and Olowonirejuaro, (2010: 5-9).

The World Bank Report (2009), on Sub-Saharan African oil refinery argued that most refineries on the continent are not equipped and not competitive to produce ultra-low sulphur fuels, which means these refineries are not upgraded or modernised with contemporary technology that allows various methods of processing crudes oil to obtain clean and quality products environmentally required. According to Augood (2013), the challenges that are restraining the petroleum refining industry development in Africa consist of the logistical constraints, the low complexity, low utilisation rates, and fiscal and political uncertainty.

Additional issues comprise competition from export refineries in other regions, products specifications, the lack of financial capital, and pressure from international financial institutions for market liberalisation and deregulation. Furthermore, most African refineries are very simple, small and relatively inefficient; the lack of secondary refining capacity limits a refiner's ability to maximise production of clean products and reduces the values of its overall yield. Therefore, the consequence of low complexity has affected the effect of negating the benefits generally related with accessibility of locally produced crude oil.

Certain of African simple refineries were commissioned prior to the discovery of local crude oil, which have contrasted the oil processing configuration and the structure of the local market demand. As consequence, several African oil processing industries as well as SOCIR have remained reliant on international market, and chosen not to refine locally produced crude oil, but have continued to import specific light sweet crude oil with higher quality products yield.

The necessity of upgrading the oil refinery is premised on the fact that the simple refinery, without sufficient desulphurisation capacity, processing heavy and/or sour crude oil will produce sub-specification clean products and a large volume of low-value fuel oil (Augood, 2013). As it will be described below, one of the reasons that led certain African simple refinery, including SOCIR to breakdown their operations could be related to the lack of investment funds needed for additional desulphurisation and the lack of upgrading its capacity in terms of modern technological infrastructure.

### **2.5.2 Macro-environment factors affecting SOCIR development (PESTIE)**

From the above review, it is really understandable that the challenges facing the operational African refineries are mostly the same that have led to SOCIR breakdown in the DRC. Before attempting to spell out factors that have affected SOCIR operations through the macro-environment factors, it appears justifiable to first describe the internal challenges experienced by SOCIR in the DRC's petroleum industry, within the upstream, midstream and downstream petroleum industry sub-sectors.

As it will be indicated further below in the following sections, the origin of SOCIR crisis could refer not only to the technological issue such as notified previously, but also to the endemic corruption and mismanagement, lack of public sector ability to manage, integrate and develop the petroleum industry sector in the country (Litvinoff, 2012: 4).

#### **2.5.2.1 Local oil industry's barriers to SOCIR processing operations and development**

Litvinoff (2102: 3-4), indicated that exploration and production of oil and gas activities are getting developed in the DRC with many interesting international and local companies involved in the business of oil and gas exploitation. For many decades, the oil exploration and production operations in the DRC has not promoted any integration or linkage to local refining process, given that the total oil output produced in the country is exported to be refined somewhere else, limiting and missing out the direct, indirect and induced socio-economic benefits that should be profitable to the Congolese community.

According to Litvinoff (2012: 5), around 20 companies are involved in the exploration and production of crude oil in the country, but there remain critical concerns about contracts signed between the government of DRC and most of the corporate operating in the national petroleum industry. The specific critical concern includes the lack of linkage or total disintegration through the oil industry's life cycle, which include the upstream, midstream and downstream oil and gas industry, given that crude oil produced in the DRC is not directly refined and distributed in the country due to the lack of appropriate upgraded oil refinery or SOCIR technology inefficiency

and incompatibility. Therefore, SOCIR modernisation process or upgrading project has been studied by several specialised organisations and oil companies, which have provided available statistics concerning the acquisition costs of the appropriate high-tech new technology to process local crude oil (Bafala, 2006: 139-146). But among the main challenges experienced by SOCIR and the oil and gas industry development remain the continuing problem of lack of financial capital and the colonial economic issue, which consist of total export of the entire oil output, forcing SOCIR to remain weak and the DRC reliant on imports of finished oil products from other countries.

New technologies to upgrade SOCIR exist and they are available, but the cost of new technology to invest on SOCIR modernisation depends on the type of processing units to be added that will be compatible and efficient to refine local crude oil and other various potential crude oil specifications. In the year 2006, the cost of technology selected to upgrade SOCIR was approximately estimated at US \$ 150 million – US \$ 180 million for full cracking technology (Bafala, 2006: 139-146). Today it can cost more than this previous estimation, due to technological progressive innovation in the refining of oil and gas qualifications that rely on the environmental requirement. Logically, the government of DRC should manage effort to invest on SOCIR development, from using, for example, part of income from crude oil exploitation and exportation.

Unfortunately, income from Production Sharing Agreement and other form of contracts signed for oil and gas exploitation, which are generating billions of US dollars to some of the other countries, are politically and secretly managed in the DRC. The lack of transparency or corruption in the petroleum industry is among the top challenges that are costing the country in limiting the possibility of investing on the way of improving the whole oil industry. According to Pauw (2014), the political factor remains the key aspect that affects negatively the business of oil and gas industry in the DRC. It is clearly indicated that most Production Sharing Agreement (PSA) or contract signed for oil exploration and production in the DRC are politically negotiated without any socio-economic targeting ambition and without any prior conditions associated with Corporate Social Responsibility (CSR) strategies implementation.



All contracts in the petroleum industry are signed in exclusion of community requirements or being involved, informed and trained, and as well not any possible linkage to local processing industry development is preventively conditioned as policy or strategy to promote SOCIR development and socio-economic improvement. All is State top secret and nothing allows disclosing accurately details of business negotiated between the DRC's State and foreign partners.

### **2.5.2.2 The political restrictions to SOCIR development**

According to Smit (2011: 64-65), the political environment includes the ruling government, its political institutions or regulation involvement in the oil and gas business environment. As the primary constituent of the macro-environment, the government influences the oil and gas industry environment as a ruling force that promulgates and enforces laws with measures that are usually politically directed.

The government plays the role of implementing policies which are profitable to the communities' socio-economic well-being and which steering or piloting development in the country. According to Shikhar (2010: 2), government regulation includes employment law, antitrust law, discrimination law, consumer law, and safety and health law. These factors can have impact to how the oil industry operates, its costs, and the supply and demand for oil products. Bargorett (2014: 11-12), Taleski (2009: 18-19) and Madeley (2015: 3) acknowledged that political factors affect the oil industry in various ways; through faire decision on prices and oil supply directly, political stability or instability and fiscal policy.

As owner of hydrocarbon resources, governments also regulate and sell concessions to different companies, and controlling the exclusive rights for exploration, production and hydrocarbon reserves. Furthermore, government policies govern the energy industry and have the degree of intervention in the economy. Political decisions have many effects when it comes to oil and gas business activities in the country. These decisions involve aspects like workforce, quality of oil products and infrastructure such as rail, roads and health of the nation (Shikhar, 2010: 3). However, the political challenges facing SOCIR today are similar to those which are still facing the global oil industry.

In this section, it is important to underline firstly, the secretive facet of oil activities (oil operations are not accurately revealed), its strong politicisation in the DRC, uncertainty and delays in instituting and implementing new laws. Secondly, the lack of enforcing and well- implementing energy policies and regulations remain as the major constraints that continue to affect the oil industry and the SOCIR development. According to Twendele (2012), the Congolese oil and gas industry is a mystery that keeps its secret well and oil is a well-protected fortress, almost the State secret that nobody knows except those who squat the corridors of power.

Several contracts signed in the oil exploitation and productions in DRC are based on political affiliation or State's political friendship. For example, the South African City Press revelation cited previously is one of the cases that show how the political environment in the DRC interrupts the oil industry development. Indeed, in the DRC, the political factor represents the key sensitive variable that is causing the oil industry and SOCIR to remain disintegrated, underdeveloped and inefficient. Mostly, the socio-economic crisis is therefore due to the negative political interference in the business environment. According to the African Development Bank ranking (2013: 2) and the World Bank ranking (2011), the DRC's government is respectively ranked in the 5<sup>th</sup> and 10<sup>th</sup> percentile of categories control of corruption, voice and accountability.

Also, the lack of clear mechanism for the delegation of authority is preventing the effective implementation of the government's financial decentralisation policy and various weaknesses undermine the Government's effectiveness and confidence in the institutions. It should, however, be noted that the deregulation and privatisation of certain sector of oil industry (markets and refineries) is suggested for new investors to meet the tighter specifications and obtain the investment funds needed for additional desulphurisation and for upgrading the SOCIR capacity, which will promote the SOCIR development, to maintain its activities and not to be forced to remain close. On the other hand, due to various socio-economic crises facing the country, the present and future consecutive governments will have to play the role of implementing adequately policies and regulations which could be profitable to oil industry development and to socio-economic well-being, which could also steer SOCIR improvement or socio-economic infrastructure development in the country.

Therefore, efforts to reduce corruption in the oil industry could be the key for the government. These include the government's intervention as a regulator force that promotes environmental law, trade restriction, tax policy, labour law, tariffs and political stability strategy to ensure progressive investments in the country.

### **2.5.2.3 The economic obstacles to SOCIR Development**

The economic system of the DRC involves private freedom combined with centralised economic planning and government intervention or regulation (GlobalEDGE, 2015). Shikhar (2010: 1) and Smit (2011: 64-65), stated that the economic environment comprises factors such as economic growth, the fiscal and monetary policies of the government, exchange rates, inflation rates, the recession and general state of the economy which influence the petroleum industry's activities in diverse ways.

These economic variables have specific implications in the oil and gas industry, which ultimately result in prosperity or adversity. Most often, these factors have important influences in what manner businesses make decisions and operate. As illustration, the interest rates have an impact on the oil industry's cost of capital and therefore to what extent a business expands and grows. The exchange rates have impact on the costs of importing and exporting crude oils or petroleum products, and the price and supply of imported oil products in the local market or economy. In the DRC, many economic adversities have affected the oil industry and particularly the oil refining industry.

According to CIA World Factbook (2014), uncertain legal framework, lack of transparency in government policy and corruption are continuing to affect the oil sector and for the economy as a whole. Significant economic activities in the oil and gas industry and in other sectors of the economy are still occurring in the informal sector and are not replicated in GDP data. According to African Development Bank (2013: 2-3), the high degree of informality of the economy, the obsolete production machinery, the lack of financial capital, the labour force's lack of technical skills, the lack of competitiveness of local production and significant shortfall in energy supply have handicapped SOCIR and other industries development in the country.

Furthermore, the fiscal policy environment in the DRC has contributed to SOCIR, as well as to the entire petroleum industry crisis, which has suffered and experienced over several decades, the chronic lack of public finance, which for long has remained as a major factor that is obstructing project implementation and economic infrastructures modernisation in the country. The African Bank report (2013: 3) specified that the DRC's fiscal deficit has affected all the economy, including SOCIR for many years until 2012. Thus, it is evident that SOCIR has encountered multiple economic constraints that led to its breakdown.

#### **2.5.2.4 The social barriers to SOCIR improvement**

Shikhar (2010: 2) specified that social components or factors include population growth rate, education, the cultural aspects, age distribution, health consciousness, career attitudes and emphasis on safety. According to Smit (2011: 64-65), the social environment in which the oil industry is at the centre of social change, is also influenced by social trends comprising people's lifestyle, habits, urbanisation, and values that are shaped by cultural values and, in turn, create certain demands on the petroleum industry. Therefore, trends in social factors have impact on demand for oil products and influence in what manner the oil industry operates. SOCIR, as well as many other public or private organisations in the country are experiencing the issues of security instability and socio-economic fragility. According to the World Bank report (2014), the DRC's medium-term economic outlook still seems positive even though it's political and security situation remain fragile.

The country's economy is projected to grow gradually in the medium term at around 8% to near 9% following improved investment and growth in the extractive industries (including petroleum extractive industry) and owing to distribution of the civil engineering and service sectors. Indeed, in 2013, the DRC registered an economic performance growth rate of 8.5% which should continue in 2014 and reach 8.6% in 2015, driven by extractive industries and favourable trends in commodity prices (African Development Bank Group, 2014). In contrast, the World Bank report (2015) on the DRC social environment indicated that although an exciting economic growth rate, the country's high poverty rate continues remain very alarming, even though it fell from 71% in the previous years to 63% in 2012.

According to the African Development bank (2013: 8), although the country's economic stabilisation process in the few past years, the strengthening of security throughout the national territory and enhancement of political dialogue remain major socio-economic challenges. These circumstances have weakened institutions, impacted negatively on social and economic recovery, sapped the confidence of the population, investors, and development partners and remain a stumbling block to increased private sector participation in the economic development.

Further, the African Development Bank (2012) divulged that, DRC's socio-economic environment has ranked among the most fragile African states and that fragility is characterised by the lack of legitimacy of State institutions as a result to major crisis facing political, economic and social activities today, especially on the basis of potential investment that could promote investments (the oil industry and SOCIR development) in the country. The lack of Corporate Social responsibility (CSR) strategy implementation has increased social crises in the country.

These crises include the lack or weak relationship between various stakeholder groups, safety and health concerns, perpetual and incessant violation of human rights and socio-economic rights, transparency, corruption, community relations, stakeholders' rights, and ecological protection issues. As a result, the informality of most lucrative economic activities in the country has led to progressive social infrastructure deterioration, causing unemployment and poverty of major population that lack access to the most infrastructures services such as education, health, transport, water and sanitation.

Additionally, the African Development Bank (2013: 8) has mentioned that the lack of or weakness of industrial development and infrastructure services, including the lack of energy supply (oil products and electricity supply) constitute a major obstacle to sustainability of most socio-economic activities. The social challenges include as well the lack of appropriate human capital training centres facilities, which should provide quality skill development for people that are entering the oil and gas industry. The lack of skilled workforce should also be considered as a key factor to SOCIR crisis (e.g. shortage of skilled engineers to maintain permanent control of the distillation process) that obstructed its socio-economic role in the DRC.

Thus, the lack of socio-economic infrastructure maintenance and innovation, the lack of CSR values implementation, the lack of financial capital for new investments and the lack of policies implementation have contributed to SOCIR inefficiency and breakdown.

#### **2.5.2.5 The technological constraints to SOCIR modernisation**

According to Varian (2010: 332-333), the constraints that may affect any industrial organisation are relative to its customers, competitors and its nature. SOCIR has faced different limitations, which are relevant to its nature, on the fact of processing local oil outputs from inputs; which means technological and other factors of production issues. Broadly the factors of production include land, labour, and financial capital, physical or technological capital and raw materials. Technological capital or physical capital refers to the processing investments or machines that serves to produce goods (produced factors of production); computers and whatever that is relative to technical imperative.

Shikhar (2010: 2), described that the technological factor consists of the rate of technological change and technology incentives. It can influence outsourcing decisions, determine barriers to entry; and technological shift can lead to innovation, affect the quality, costs, and minimum efficient production level. According to Smit (2011: 64-65), the technological environment has a valuable direct effect on the oil industry trade environment markets and has the ability to compete within those markets. Contemporary, technological environment is liable for the speed of innovation and socio-economic progressive changes, which produce more quality and quantity of better products or services and is continually an important source of competitive advantage.

In the DRC, SOCIR, the only one national oil refinery has the history of a simple oil refinery industry since it was commissioned in 1963 until the breakdown in 1998. According to James (2007: 16-17), SOCIR as the simplest refinery has had the limited facility or ability to change the configuration of the crude oil input and it has had the lowest margin and is often operated by small, niche players. The technology used by the simple refinery today is the very oldest which often refers to topping or hydro skimming refinery.

The upgraded refineries use modern technology consisting of atmospheric distillation and typically one or more pre-treatment facilities, catalytic reforming, and hydro-desulphurisation. Further, the complex oil processing industry is characterised by important upgrading ability and a high level of integration and is efficient to change the composition of the crude oil input, taking the heavy oils, low-value and shifting them to light products, high-value, furnishing the marginal barrel and realising the profit from the base margins.

According to James (2007: 17), complex refineries with cracking technology typically comprise vacuum distillation and vacuum gas oil hydrodesulphurisation; catalytic reforming, fluid catalytic cracking, naphtha, distillate, alkylation, light naphtha isomerisation units and kerosene. Upgraded or complex refineries with deep conversion technology use the coking process to convert virtually the entire barrel of crude oil to valuable light products and eliminating the vacuum residue. Therefore, the ageing or oldest simple technology designed from the 50s and used by SOCIR, for example, appears as one of the major constraints that caused its inefficiency and incompatibility to distillate the local crude oil output as well as the light crude oil from other different fields, for which it was commissioned for (Bafala, 2006: 129-136).

Furthermore, the challenges experienced by SOCIR in the DRC are firstly associated with technological infrastructure and secondly with the weakness of economic activity across the country. These technological and economic challenges affecting SOCIR were explained earlier in the previous sections. Therefore, according to Smit (2011: 67), technological development such as the equipment, hardware, software, procedures and technical knowledge are required to transform the organisation's management.

Mostly, technology refers to the understanding of by what method to process a raw material from natural condition to the finished products. Unfortunately, the lack of qualified workforce (trained and skilled engineers) to maintain the well-running operations of SOCIR could also be among the most crucial challenges that have affected the one and only national oil refinery in the DRC.

#### **2.5.2.6 The international factors affecting SOCIR upgrading project**

According to Smit (2011: 77), the business environment improves or grows with new opportunities and threats, if the global aspect is considerate. A country like DRC has its own technology, economy, culture, laws, politics, unique environmental factors, competition and markets, which vary on or after those of other nations. Therefore, the macro-environment factors such as described previously, have influenced to a greater or lesser extent the oil and gas industry in the DRC.

But it is imperative today to recognise that times have passed, many things have happened to the DRC's oil and gas industry for which multinational companies and local governments could be held responsible in terms of opportunities missed out and threats, for oil and gas industry development. Since four decades until today, local crude oil output has been processed externally, limiting the socio-economic benefits of this natural resource to the country. The province producing crude oil of Bas Congo has remained without development, even since Perenco took over in 2000s; no perceptible socio-economic changes can be observed within local community.

The lifestyle condition of local population has not changed; no socio-economic infrastructures have been improved or developed while the province of Bas-Congo is intensively exploited by multinational oil companies. According to Engilbertsdottir (2011: 17-19), the colonial economic model instituted by Belgian colony which was followed by a genuine policy of exploitation based on forced labour used to extract mineral resources from 1880-1920 has led to the fact that between 5 and 10 million Congolese natives, or roughly half of the population died as a consequence of colonial brutality. The colonial predatory companies robbed the natives of their riches and their agents cut off hands and burned villages to force the inhabitants to deliver their resources to Belgium, and this treatment of Congolese natives provoked the anger of other colonials, who protested against the colonisation strategy of King Leopold II.

Until today, this system has not changed, but it has been modified and amplified as a strong barrier to processing industry development (SOCIR) and socio-economic development in the country. Currently, the same system remains operational in view of millions of Congolese which are still dying or killed every day by several armed



conflicts supported by multinational companies because of natural mineral resources exploitation that is occurring frequently in the DRC. Therefore, the exploitation model of colonial rule (domination over political, economic and social institutions) comprised mineral resources extraction and export only, without community involvement or socio-economic interest, and without ambitions for sustainable investments project in the processing industry of local raw material output, and which still have a very negative impact on the economic and social environment.

Thus, Congolese are still victimised and enduring a long history of abusive international interaction on socio-economic dependence, international influence on political instability, corporate monopolisation, military or armed conflicts driving to political groups of leaders that are destroying and exploiting the country by committing to human rights and socio-economic rights violations without punishment (Lapierre, 2015).

#### **2.5.2.7 The ecological barriers to SOCIR development**

According to Shikhar (2010: 2), the ecological factor includes elements such as weather conditions, average temperature and climate change, pollution, water and air quality which might influence the oil refinery industry and the entire oil industry. The growing awareness to environment and climate variation is affecting how the oil industry operates and the oil products are offered. The ecological environment includes natural resources such as mineral resources, climate change, flora and fauna, and access to clean water and quality of air (Smit, 2011: 64-65).

Actually, host countries and oil and gas industry companies are likely aware of climate change and the interdependence between the oil and gas industry and the natural environment. The environmental concern is currently influencing and affecting most decisions between countries and investors partners in the business environment, given that most economic activities around the globe and particularly in Africa are happening through natural resources exploitation.

Organisations are operating in the interdependence with the ecological environment through which, the raw material is obtained. However, while organisations' operations are based on natural resources from the ecological environment, industries or organisations in turn dispose of their waste into the natural

environment. And when the natural environment is not well-regulated for waste control, it creates various forms of pollution, which becomes harmful and dangerous to human well-being. The most other important issue to the ecological environment is the limited natural resources needed for socio-economic development (Smit, 2011: 76). Indeed, the environmental challenges affect the petroleum industry or petroleum refining industry from source to end of crude oil drilling, processing and transportation; crude oil refining and transportation, use as fuel in industry and motor vehicles; and downstream processing for petrochemicals. However, according to Michalis (2012: 8), even though the economic and social benefits of oil industry, there is still constant concerns for safety in the petroleum industry's activities, the prospect of oil spills and the outcome of pollutants such as CO<sub>2</sub> (carbon dioxide, a product of hydrocarbon combustion) on global environment, including climate change and air quality; and the influence that new projects will usually have on surface environments.

Thus, the global business related to petroleum operations has diverse outcomes that affect every day all aspects of people's lives in different ways, positively or negatively. According to Narimisa (2011: 331), the major environmental impacts and consequences that could compete against SOCIR development include the effects relative to solid wastes, noise, odour, effluents, visual, aesthetic and gas emissions impacts. But modern technologies for oil and gas industry operations exist and they are conceived to reduce the negative impacts on the environment (Fernandez, 2013: 27). SOCIR as well as any other oil refinery around the globe will have to face the issues of air pollution, water pollution, solid wastes and ecosystem demolition during the processing activities.

Probably new technologies and regulations improvement or changes in the oil industry could help to reduce and control the effects of pollution from the petroleum industry operations. Chapter four will indicate much further about the challenges experienced by SOCIR in the ecological environment, and the effects the upgrading of SOCIR would have on the ecological environment.

## **2.6 SOCIAL AND ECONOMIC THEORIES IN THE OIL AND GAS INDUSTRY DEVELOPMENT**

Theories of socio-economic development explain how world developing countries are characterised by diversity within commonality. This means, these countries have diverse development challenges or problems which call for particular specific policy responses, specific guiding principles on the course of actions and wide-ranging development policies.

According to Todaro and Smith (2015: 55), the socio-economic characteristics of developing countries including the DRC involve the very important problems that are related to adverse geography, higher levels of inequality and absolute poverty, lower levels of human capital development, lower levels of living and productivity, greater social fractionalisation, higher population growth rates, larger rural populations and rapid rural-to-urban migration, underdeveloped markets and lingering colonial impacts and unequal international relations lower levels of industrialisation and manufactured exports.

The causes of these problems have been explained under the PESTIE framework analysis. Other causes will be described further below in examining different theories related to oil industry development. In this section, the study will look at the social and economic theories linked to the petroleum industry challenges and development.

### **2.6.1 Theory of Corporate Social Responsibility (CSR)**

According to Adeyeye (2012: 7-13) and Hoskins (2012: 63), CSR can be understood as the fundamental relationship that exists between business (SOCIR for example) and society, through posing actions that affect societal expectations.

According to Sage publications, Inc (2012: 10), companies operating in the oil industry as well as in different others industries would be expecting to prove their engagement to society's value on community, economic goals, and environmental over their activities; fully insulate community from adverse impacts of corporation's operations; share the profits of company operations with key interested community, as well as investors, and make evident that the corporate can be more lucrative by doing business through the right things: doing good by doing well (CSR policies and values consideration and implementation).

CSR and the PESTIE approaches involve community-linked activity and community investment, climate change and global warming, recycling, use of hazardous materials, water consumption and biodiversity, labour: potential and existing employees: permanent and temporary nature and subcontractors and marketplace: suppliers and customers, as well as human rights and socio-economic rights abuses, development and anti-corruption aspects which are external to SOCIR or oil industry (Hoskins, 2012: 63) and (Adeyeye, 2012: 7).

In the DRC, the lack of considering and implementing CSR policies and values by companies operating in the petroleum industry is considered as a key additional factor affecting the socio-economic development process, particularly in the oil and gas industry operations. The CSR is another key approach that has to guide this study to evaluate the socio-economic roles of the petroleum refining industry in the DRC.

#### **2.6.1.1 Theory of CSR in the oil and gas industry development**

Along the way, the PESTIE approach and the CSR approach will certainly be meeting at the point that both approaches could finally culminate in the implication of issues relative to qualitative aspect of socio-economic perspectives that involve community's lifestyle improvement, from the promotion of employment, environmental safety, marketplace development, business environment expansion (improving relationship between shareholders and stakeholders), and to human rights and socio-economic rights considerations.

The choice for PESTIE approach has prevailed over CSR approach for the reasons described earlier at the Section 2.1 above, but in this study, CSR approach has added an important factor which could be either positive or harmful to business environment and socio-economic development process in the DRC. The lack credible democratic institutions, the lack of socio-economic rights and human rights implementation, abuses or violation are therefore noted as key additional factors affecting the business environment and socio-economic development in the DRC. In present-day or society, CSR theories fight against the traditional thought of economic development that consists of maximising profits to the shareholders' interest only and neglecting the other aspects relative to community involvement, environmental consideration and economic growth goals of the host country.

The host countries which have to generate a safe business environment through the PESTIE stability and sustainability are also likely to create opportunity for CSR values to be well-considered and implemented by companies involved in socio-economic activities. According to Hoskins (2012: 131), the rationale for CSR is based on the potential influence of corporate activities related to the range of stakeholders and the likely business risk or opportunity related with each.

Unfortunately, in the DRC, businesses in diverse economic sectors and particularly in the oil and gas industry are arising until today far out of considering CSR values, which means that the country keeps on practicing the traditional thought (related to Milton Friedman) of the free-market economic system that simply wants business to focus on making revenues benefits and to be liable to the shareholders only, not accountable to the societal interest (neglecting social and economic development actions relative to human development and environmental safety). Therefore, the lack of credible democratic institutions is causing companies to practice the traditional thought of free-market economic system.

This traditional system of thought of the free-market has contributed to the existing of the neo-colonial approach involving domination and exploitation of national natural mineral resources by multinational companies' owners and shareholders over the stakeholders (government, employees and community ), which is resulting in the lack or low-growing and closing down of many companies such as SOCIR, and to many socio-economic crises comprising unemployment, inequality, poverty and corruption, which have raised and remained as a systematic threat to the country's socio-economic development process.

Indeed, the project to upgrade SOCIR with regards to putting CSR values into practice, could contribute on reinforcing the pillars of sustainable development as economic development, environmental protection and social development or to promote the sustainable political and economic stability of the country that will take into account CSR values. Unfortunately, CSR values which are supposed to play a key role in the DRC's socio-economic development process are limited by many of these crises enumerated above.

Thus, one of the causes that led SOCIR to break down from its operations could as well be associated with the lack of CSR policies implementation, typically in terms of investing on human capital resources development (e.g. Quality education and training for workforce skill). Accordingly, the strong company may not grow without successful CSR values and sustainable policies put into practice or without continual investments on human capital skill. Based on this statement, SOCIR and the whole oil industry in the country should fundamentally focus on employees' development (by a range of personnel quality training from variety of academics' institutions worldwide), for great expectation of service delivery and making profits. Once again, this remains a thoughtful issue that needs to be taken into account by the ruling government and companies involved in the petroleum industry.

#### **2.6.1.2 Government attitude to CSR values**

The workforce skill deficiency related to the lack of cultivating a good relationship between shareholders and stakeholders is among the amplified factors that have led to SOCIR and socio-economic crisis. Therefore, public intervention (regulation, taxation, public spending) to various kinds of business activities has been weakened by the fact that corporate social responsibility is out of business operation plans or project establishments in the country. Informal business operations, corruption, lack of law enforcement, public institutional instabilities, weakness and various crises of mismanagement and political power abuse have created real barriers of non-implementing CSR policies in the oil industry's business environment.

As a result, if CSR values are not taken into account and if no resolution of the crisis of relationship between businesses and CSR policy implementation is considered, no promotion of socio-economic improvement can be expected in the DRC. Adeyeye (2012: 10) and Sage publication, Inc (2012: 2), considered that the emerging thought of corporate social responsibility for socio-economic improvement and development goes beyond the target of business profits maximisation only in involving broader responsibilities that extend further than owners and shareholders, that might include societal stakeholders such as government, natural environment, employees, consumers, suppliers and host communities (multi-stakeholders), given that the shareholders are the most effectively the actors in society, playing the role of investors, service providers, tax payers, producers, distributors, polluters, and many

more. Furthermore, corporates are the most active private forces to be responsible for widespread harm and widespread good. Thus, due to many existing requirements for socio-economic condition improvement in the country, consecutive governments and companies involved in the DRC's oil and gas industry should increase the awareness of the need for CSR consideration to be taking into account the legal possibilities of CSR that include both mandatory and voluntary rules. According to Sage publication, Inc (2012: 7-8), the CSR role in the business environment comprise a responsibility that involves legal, ethical, economic, and flexible or discretionary expectations that community had from organisations at a certain point in time.

Therefore, the economic responsibility refers to the business of producing services and goods that people needs and sell them at a profit. While corporates expect business to make a profit for its productivity and effectiveness, people also are expecting that business have to obey the law. The legal responsibility in its most fundamental form refers to rudimentary rules of the game by which corporate is intended to operate. In addition, community expects business to achieve its economic mission within the context of legal requirements set forth by society's legal structure, following the ethical responsibility requirement.

The ethical accountability refers to the kind of behaviours and ethical standards that community expects corporate to follow with decisions, actions and practices that are beyond what is required by the law. This is called voluntary or discretionary responsibility or rule. Also, the discretionary responsibility denotes the voluntary roles and practices that the corporate assumes but for which community does not provide a perfect cut expectancy as in the ethical liability. Thus, the discretionary or voluntary responsibility remains relevant to the individual managers' and corporations' judgment and choice.

#### **2.6.1.3 CSR Emerging thought compared to traditional thought in the oil and gas industry development process**

The traditional economic thought fundamentally consisted of maximising excessive profits at the expense of involving community's social and economic requirements. This kind of business conduct has been critically measured as a traditional thought of free-market economic system associated with Milton Friedman, who sustained that

the only responsibility that corporations have is of maximising profits to shareholders, whereas the emerging economic thought has proved that there is a direct relationship between CSR and profit maximisation (Adeyeye, 2012:7-8) and (Hoskins, 2012: 65-67). For this study, the rational thought relative to oil and gas industry development in the DRC could conciliate both CSR values consideration (policies implementation or the respect of law: socio-economic rights and human rights), and profit maximisation commitment that promote the principle of doing good by doing well, which involve shareholders and stakeholders' relationship implication.

Therefore, the lack of implementing regulations and the weak capacity of public services to monitor socio-economic activities in the country continue to fuel the traditional economic thought from which the high rate of unemployment, inequalities and poverty are seen as a result of anarchic socio-economic operations. According to Sage publication (2012: 10), CSR in the new millennium and particularly in the developed countries, enforce companies to make evident their obligation to community's values on economics, social and environmental goals through their actions; entirely insulate community from harmful effects of corporate's activities; share the profits of business activities with key stakeholders, as well as shareholders, and prove that the business can be more productive and socio-economically profitable by doing the right thing.

Thus, if the government of DRC can profitably comply with the doing well by doing good approach, reassuring shareholders and stakeholders that new behaviours will outlast good intentions, then CSR could become a national key strategic response from companies to the community. However, CSR values involve the achievement of three main goals: Impacts on community involvement (risks and opportunities), economic growth and environmental actions.

#### **2.6.1.4 CSR role in the oil and gas industry development**

The value of implementing CSR strategy development and then undertaking its practice offer an active communications program supporting it, which describes the nature of the operation and how it is profitable to the oil industry, (Hoskins, 2012: 130-133). Furthermore, the CSR allows deciding and communicating about the direction in the actions of investment and understanding the range of activities before



proceeding to develop the strategy, and helps the oil industry to use the cultural norms that are already in place to make the oil industry an effective organisation.

Furthermore, through the case of SOCIR, for example, when CSR should be part of the its vision, mission and values; probably, there should be development of values that allow staff to talk to each other, build the importance of teams, and the importance of achieving profits. Additionally, CSR value focuses upon the corporate's relationship with stakeholders: how they are treated, how they are valued and the way of communication to the stakeholders. Therefore, CSR helps identify the oil refinery industry's impacts: facilitates the assessment of the risk and opportunities to the business relating to each of the key stakeholders.

Finally, CSR helps the company's decision making strategy with issues that are relative to the lack of information or facilitates information availability, reconciles different attitudes towards CSR between owners, shareholders (head office) and the business units. Unfortunately, due to the lack of CSR values taking part in the oil and gas industry, corporate in several economic sectors and mostly in the oil and gas field have kept on remaining less dynamic, not innovative, not inventive or revolutionary; and they are almost static, stagnant, motionless and immobile, without growth.

According to Hoskins (2012: 71-82), among several reasons that have led to social and economic crisis in the DRC could be added as well the lack of entrepreneurship development associated with the lack of CSR strategies implementation for socio-economic activities growth in the country. The following Figure 2.3 summarises the CSR's role in the oil and gas industry development.

**Figure 2.3** CSR framework and effects in the oil and gas industry development



Source: Modified from Hoskins (2012: 130). *CSR, Handbook, Making CSR and Narrative Reporting work for your Business.*

Several reasons should lead the government of DRC and companies operating in the oil industry to consider the need for CSR strategy and practice implementation. According to Hoskins (2012: 130-133), the implementation of CSR values should allow a well practice of strategic development through stakeholders' participation and engagement, workplace, environment, marketplace and human rights and socio-economic rights improvement and performance. Stakeholders' engagement, CSR strategy and practice in the DRC could also allow the oil industry to reduce divers' potential risks or crises and create valuable opportunities for the business units and community wealth.

### 2.6.2 Theories of economic development in the oil and gas industry

There are many theories of economic development that are mostly relevant to the developing countries, which provide a modelling ways out from poverty, inequality, unemployment, and for the development approach to be adopted that could generate multiple effects on the community's well-being.

At first sight, employment generation, technology and skills transfer are considered as the main outcomes of economic growth theories of the oil and gas industry development. Therefore, Todaro and Smith (2015: 118, 164) have specified much clearly about the contemporary models of development and underdevelopment, the classic theories of economic growth and development which may be linked to the role played by the petroleum industry in the economic growth process.

### **2.6.2.1 The classic theories of economic growth development**

The classic theories of economic growth development include approaches that are associated to the development as growth and Linear-Stages theories, Structural-Change models, the international-dependence revolution, market fundamentalism, the neoclassical counterrevolution: market fundamentalism, and the classic theories of development: reconciling the differences. Indeed, all of these theories are vital to be examined deeply for socio-economic growth and transformation. But the emphasis concerning the classic theories of economic growth development for this section and for the study has adopted the structural-change models and the international-dependence revolution approaches, because of their relevance to the research aim and objectives of this study.

According to Mehta (2012: 1), the reason for selecting these two approaches can be as well-explained in relation to socio-economic adversities or crises in the developing countries, particularly in the DRC, which require an urgent action to prevent repetition of bad experience from colonial and traditional thought of free-market economic systems, already clarified in the previous sections. Also, because the colonial and traditional thought of free-market economic systems have led to the economics of killing in the DRC, which involve negative effects of military conflicts on global and human security, refugees, forced migrations and urbanisation; conflicts and its cruel effects on health, environment and development (Mehta, 2012: 73-83).

#### **❖ The Structural-Change theories**

According to Todaro and Smith (2015: 124-129), the structural-change models of economic development comprise theories that relate to the structural change and patterns of development and to the Lewis theory of economic development.

Therefore, the Lewis theory of economic development is based on the structural transformation of a primary subsistence economy, the Lewis two-sector model and the surplus labour theories. The structural-change theory itself explains the causes of socio-economic crises or of underdevelopment by the fact that underdevelopment is due to underutilisation of resources arising from structural or institutional factors that have their origins in both domestic and global dualisms.

Development therefore involves more than just accelerated capital formation. Further, concerning the oil industry development (SOCIR upgrading project in the DRC), the structural-change theory explains the process of changing an economy in such a way that the contribution to national revenue by the industrial sector eventually exceeds the contribution of the primary industry (extractive industry) sector. In general, it includes a most important change in the industrial configuration of any economy.

The emphasis for this study is based on the structural change and patterns of development model, which focuses on the sequential process through which the industrial, economic, and institutional structure of an underdeveloped economy is improved over time to permit new businesses or industries to replace traditional one as the locomotive of economic growth. According to Todaro and Smith (2015: 130), the most important hypothesis of the structural-change model is that development is a perceptible process of growth and change, whose key features are similar in all countries. This model recognises that changes or transformations can arise among countries in the pace and pattern of improvement, depending on their specific set of environments.

But, factors inducing the change process include government's policies and objectives, country's resource endowment and size, technology, the availability of external capital and the international trade environment. Thus, the structural-change model advises that a correct mix of economic policies (public-private policies) that promote economic diversity based on manufacturing industries could produce valuable patterns of self-sustaining development. It is in this context that the study raises the awareness of decision-makers for SOCIR to be upgraded, then local crude oil output, which is totally exported could be transformed in the country and create opportunities for socio-economic growth.

### ❖ The International-Dependence Revolution theory

The petroleum industry sector in Africa and specifically in the DR Congo is commonly operating under the influence of this international-dependence model. According to Todaro and Smith (2015: 131), the international-dependence theories involve essentially developing countries as affected by political, institutional, and economic rigidities, both international and domestic, and caught up in a dependence and dominance partnership with industrialised countries. Surrounded by this international-dependence approach, there are the dualistic-development thesis, false-paradigm model and neo-colonial dependence model.

Therefore, in view of social and economic challenges in the DRC such as presented in the previous sections, including strong dependence on primary industry and divers' social crises or military conflicts affecting the major population living in total poverty, inequality and unemployment prove sufficiently that the DRC's oil industry sector as well as other economic sectors are still confronted with issues associated with underdevelopment, strong external dependency, dominance and neo-colonial economic dependence model.

This strong dependence of the DRC on primary industry (oil and gas and other mineral extractions for example), shows the reliance of the country on developed-countries' economic policies for local economic growth and a situation in which industrialised countries have considerable greater power or dominance over the developing countries in decisions-making, affecting major economic issues, such as agricultural commodities and raw materials, and the prices of natural mineral resources in the world markets.

This also means that the socio-economic underdevelopment exists in the DRC for the reason of continuing exploitative economic system, political and cultural policies of former colonial rulers toward less developed countries (neo-colonial dependence model). Therefore, the consequences of colonial and neo-colonial economic model in the DRC can be explained through economic situation characterised by persistent low levels of living in conjuncture with low income per capita, low rates of economic growth, absolute poverty, dependence on foreign economies, poor health and

educational services, low consumption levels, high death rates, high birth rates and limited freedom to choose among activities that satisfy human requirements.

Thus, the oil industry development or investing on industrial expansion for natural mineral transformation, including SOCIR modernisation could contribute to reducing the effects of colonial and neo-colonial economic model.

#### **2.6.2.2 The contemporary Models of Development and Underdevelopment**

The petroleum industry development with SOCIR modernisation might be a responsible for a modern DRC's State and for a growing socio-economic environment. The contemporary models of development and underdevelopment involve theories that are relevant to underdevelopment as a coordination failure and multiple equilibrium including a diagrammatic approach, the big push model, problems of multiple equilibrium, starting economic development, Michael Kremer's O-Ring theory of economic development, economic development as self-discovery and the Hausmann-Rodrick-Velasco growth diagnostics framework (Todaro and Smith, 2015: 166-174).

The starting economic development theory which involve the big push and the Hausmann-Rodrick-Velasco Growth Diagnostics framework approaches are examined in this chapter in the account of the contemporary models of development and underdevelopment theories, which seem to be convenient to the DRC's socio-economic situations and requirements for development. Specific reasons have led the researcher to focus on these particular two models. Firstly, the big push model such as explained further below includes private and public efforts of boosting the economic development in the country, and secondly, the Hausmann-Rodrick-Velasco growth Diagnostics framework focuses on economic development based on growth diagnostics and social returns. The industrial infrastructure restructuring, upgrading, modernisation or development is also related to the two approaches.

##### **❖ The big push model**

According to Todaro and Smith (2015: 166, 174), the big push economic development model is a concerted, economy-wide, and typically public policy-led effort to initiate or accelerate economic growth across a wide-ranging spectrum of new industries and expertise. The SOCIR upgrading or the project to build a new oil

refinery in the DRC relate to this big push model of economic development, for the reason that the big push economic development approach is a model that describes how the presence of market failures can produce a need for a concerted economy-wide and likely public-policy-led effort to get the long process of economic growth under way or to accelerate it. Also, because the need for big push economic model usage in the DRC can result in the following effects:

- Intertemporal effects: industrialisation makes the society better off (improvement);
- Urbanisation effects: The increasing return-to-scale manufacturing such as the oil refinery is urban and urban dwellers' demand may be more concentrated in manufacturing goods. The big push model is needed to promote industrialisation to achieve urbanisation or urbanisation to achieve industrialisation and socio-economic improvement;
- Infrastructure effects: The oil refining development can lead to necessary infrastructure development such as railroad, port and storage tank development, road construction and many more. The existing infrastructure improvement could help investing firms to lowering their own costs and contribute indirectly to lowering the costs of other firms; and
- The Training effects: Industrial development requires needs for skilled or trained people because, actually, infrastructure and trained workers are subsets of a general case of jointly used intermediate goods. In the DRC, the development of SOCIR could contribute to resolving the issue of underinvestment in training facilities, because in the context of industrial underdevelopment there is no much need on skilled workers, contrary, more skilled and trained workforce are required in the very industrialising society. Indeed, in the DRC, the industrial development including SOCIR upgrading could increase the demand for trained workers and consequently the increase of training facilities.

#### ❖ **The Hausmann-Rodrick-Velasco growth Diagnostics framework**

This model focuses on economic development based on growth diagnostics and social returns. According to Todaro and Smith (2015: 193), the key mission of economic growth diagnostics refers to a decision tree framework for identifying a

country's most binding constraints on economic development. Therefore, the economic growth diagnostics through the tree framework divide the country between two main problems, those for which the leading challenge is a low underlying rate of return and those for which the problematic is an abnormally high cost of finance. Thus, according to Todaro and Smith (2015: 193), the low return to investors may be due to the fact that there are basically low underlying social returns to economic operations. The social returns refer to the viability and productivity of an investment in which both costs and profits are accounted for from the perspective of community as a whole. Indeed, social crisis in Africa and in the DRC could result as well from the low return to the economic activities, causing the underdevelopment of economic activities, including the oil and gas industry and SOCIR breakdown, for example.

Further, the low returns may be also caused by the low private appropriateness or limited capacity of investors to gain an adequate share of the rewards of their otherwise lucrative investments. Furthermore, low social returns may be caused by low levels of private investment and entrepreneurship, the lack of restructuring and upgrading existing infrastructures, and by factors related to poor geography (distance to world markets, physical barriers, and landlocked status), low human capital skills and education as well as health of workers and the lack of vital infrastructure needed to achieve and sustain a modern economy such as roads, railroads, bridges, telecommunications, port, and other utilities are complementary with other factors in production, influencing the returns to economic activity process.

In The DRC specifically, the low levels of private investment and entrepreneurship can be better understood following the Hausmann-Rodrick-Velasco Growth Diagnostics Decision Tree below.



**Figure 2.4 The Hausmann-Rodrick-Velasco Growth Diagnostics Decision Tree**

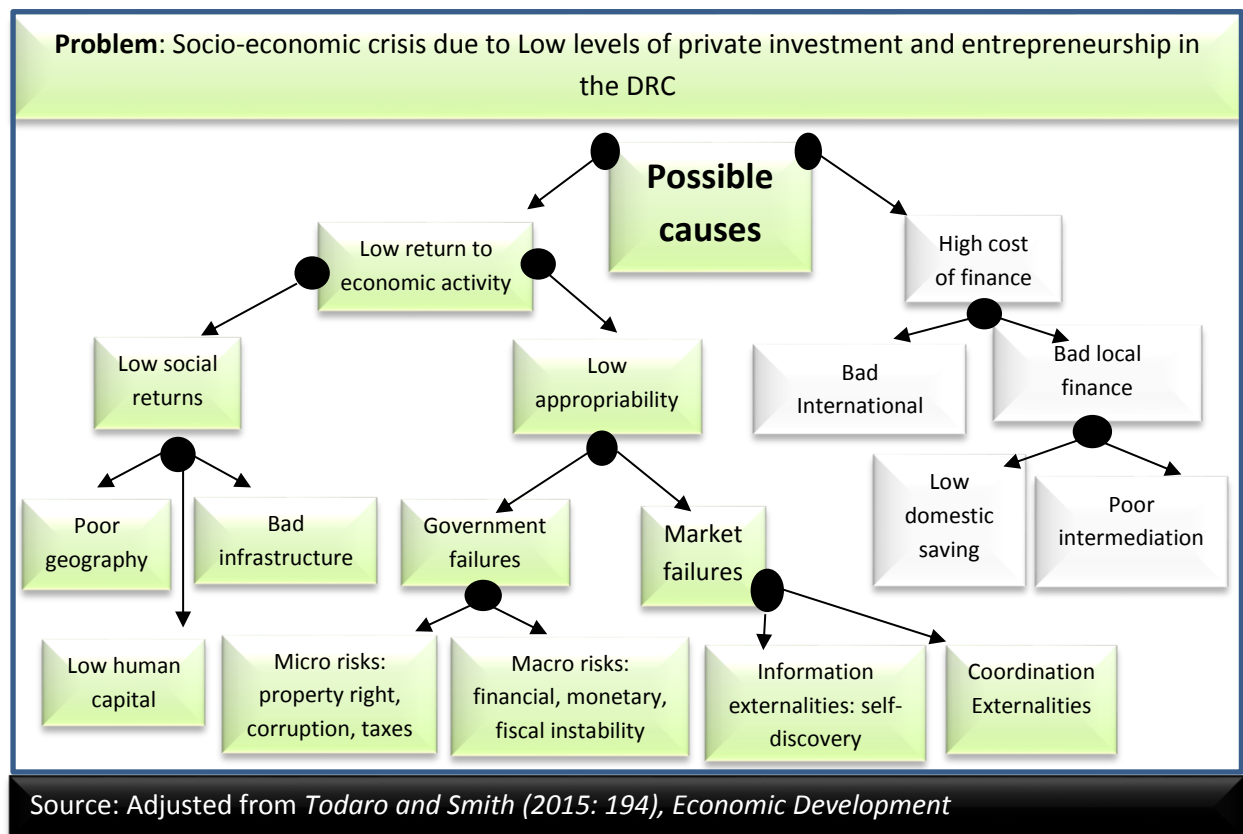


Figure 2.4 above describes the potential origin of socio-economic crisis situation in the DRC, which could be caused by the low levels of private investment and entrepreneurship, as well as the lack of innovation, restructuring, upgrading and modernising the existing basic economic infrastructure, such as SOCIR. On the contrary, the probable socio-economic effects due to potential increased levels of private investment and entrepreneurship linked to oil industry and SOCIR development in the DRC could be observed through Figure 2.5 below.

**Figure 2.5 Potential socio-economic effects due to increased levels of private investment and entrepreneurship interlinked to SOCIR and oil industry development in the DRC**

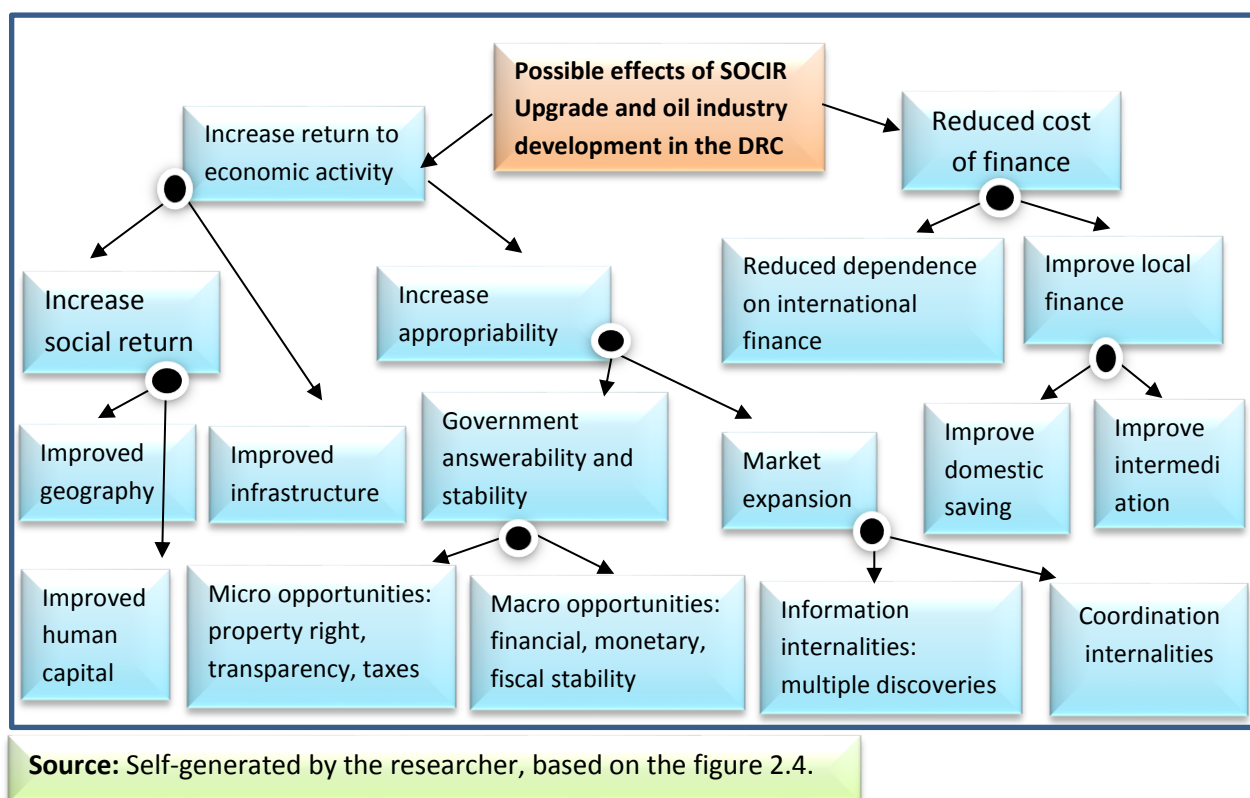


Figure 2.5 above explains the fact that SOCIR upgrading and oil industry development in the DRC could contribute to increasing the levels of related private-public investment and entrepreneurship (small business development), and promote socio-economic activities in the country. Therefore, all theories and models of economic development considered and not considered in this chapter will remain useful for the DRC's economic development process, and particularly for the oil and gas industry development or for SOCIR upgrading.

Putting into practice of the profitable one is the key concern, because of the strong political restriction, institutional instabilities and strong reliance on the colonial economic model. These theories and models explain the source of economic growth development that can be traced to a diversity of factors including investments that develop the quality of existing physical and human resources, strengthening and increasing the quantity of these similar productive resources, and promote the

productivity of all or specific resources through innovation, modernisation, and technological invention and progress that have been and will continue to be primary dynamic factors in motivating economic development in the country. Thus, the purpose of economic development theory is not only to understand underdevelopment situation of a certain country, but also to formulate effective policies to redress it (Todaro and Smith, 2015: 154, 197).

## **2.7 FACTORS THAT PROMOTE SOCIR AND OIL INDUSTRY DEVELOPMENT IN THE DRC**

### **2.7.1 Socio-economic factors that promote the effects of SOCIR upgrade**

Figure 2.6 further below describes the socio-economic effects the upgrading of SOCIR could have on the socio-economic situation in the DRC. Generally, studies for promoting the global oil industry, including oil refineries have been conducted and aimed to support international organisations involved in the oil field and stimulate the oil industry efficiency and performance that finally could culminate in social and economic development. Thus, technology development, extended reach, innovative ways of doing business, creating and developing new opportunities continue to remain the outcomes of the effects of upgrading the oil refining industry or developing the oil industry in any country (OPEC, 2007).

Further, in a more international and interconnected world, the challenges continue, and socio-economic issues remain one of the most important concerns of countries and companies involved in the business of petroleum resource. The focus of evaluating the effects of oil industry on the society consists of ensuring healthy economic development, rapid social improvement and environmental safety in a mutually-supportive manner. The national cohesion could be solidified through the increased effect of industrial innovation and development that might promote the government capacity to provide quality policies for socio-economic transformation and better service delivery to the community. Thus, such as described above and further below, there are multiple effects on continuously investing over the oil and gas industry development (SOCIR upgrading) and of frequently assessing the factors that influencing the socio-economic improvement.

This way of acting may be seen as a profitable tool for both business environment and local communities' perspectives. According to IPIECA Report (2004: 5), the factors that could benefit the effects of oil and gas industry development shall include aspects relative to socio-economic, demographics, health and social infrastructure, resources, cultural property, social equity, psychological and community aspects.

According to Consiglio (2006), potential social and economic impacts of petroleum project can be both positive and negative, but these are often balanced by positive effects such as the promotion of employment, government revenue improvement, socio-economic infrastructure improvement and expansion. The socio-economic impacts analysis can lead as well to avoiding or mitigating adverse effects on the communities.

Table 2.1 below provides information on the factors and effects that the petroleum industry or the petroleum refining industry development could produce in any country, including in the DRC.

**Table 2.1: The socio-economic factors that could promote the effects of SOCIR upgrade in the DR Congo**

<b>Factors</b>	<b>Potential effects of SOCIR upgrading and oil industry development in the DR Congo.</b>
<b>Demographics impacts</b>	<ul style="list-style-type: none"> <li>Population growth or changes in size and make-up of population due to migration of people in search of work, emigration from an area as the result of safety or security issues or any other reasons.</li> </ul>
<b>Socio-economic impacts</b>	<ul style="list-style-type: none"> <li>Taxes and royalties; expected payments to different levels of government - national, regional, local; time profile of payments.</li> <li>Supply chain impacts; local sourcing opportunities; reduced potential inflationary impacts on local markets for goods and services; impacts on non-oil and gas sector.</li> <li>Employment; labour practices; changes in existing industries as workers shift from traditional industries to oil and gas activities; movement of other necessary workers (e.g. teachers and police) into the oil and gas industry as translators or security personnel; return of construction workers to lower end jobs.</li> <li>Time profile of projects; construction boom; operation phase; decommissioning; potential oil and gas industry independency.</li> </ul>

<b>Health impacts</b>	<ul style="list-style-type: none"> <li>▪ Spread of new diseases to indigenous communities, impacts on health of operations personnel, impact of local diseases on workers and the spread of pandemics such as HIV and STDs.</li> </ul>
<b>Social infrastructure impacts</b>	<ul style="list-style-type: none"> <li>▪ Adequacy of health care and education facilities, transport and roads, power supply, fresh water supply to support project activities and personnel as well as the community.</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>▪ Land-take for facilities and resettlement, new or increased access to rural or remote areas, use of natural resources.</li> </ul>
<b>Psychological and community aspects or effects</b>	<ul style="list-style-type: none"> <li>▪ Changes from traditional lifestyles, community cohesion, attitudes and behaviour, perception of risk.</li> </ul>
<b>Cultural property effects</b>	<ul style="list-style-type: none"> <li>▪ Sites and structures with archaeological, historical, religious, cultural or aesthetic values that may be change or have their access limited.</li> </ul>
<b>Social equity</b>	<ul style="list-style-type: none"> <li>▪ Identifying who gains and who loses as a result of the project or operation.</li> </ul>
<p><b>Source:</b> <i>IPIECA Report (2004: 5). A Guide to Social Impact Assessment in the Oil and Gas Industry</i></p>	

According to Mohamed (2007), the oil industry development offers not only profit and opportunities, but also environmental challenges in the actual advancing world. Table 2.1 above shows the investment on oil industry development and the assessment of socio-economic effects the upgrading of SOCIR would have on the socio-economic situation in the DRC, can represent a significant opportunity to a project and also an effective risk management tool informing and encouraging timely decisions on the projects.

According to IPIECA (2004: 5-7), the socio-economic valuation can influence project design and improve the quality of decision making. Particularly, the valuation of social impacts such as designed in this above table can assist the business unit from:

- Managing the short and long-term business impacts.
- Providing important input into the design of effective stakeholder engagement, building consensus and collaboration between parties and managing expectations.

This can also assist the business management in securing trust with:

- The workforce, helping to prevent disputes.
- The local communities, to avoid protests, blockades and land access disputes.
- The regulatory authorities, reducing problems such as licensing delays.
- Better estimating and optimisation of socio-economic costs (like resettlement), resources required for mitigation measures, management plans, etc.
- Defining socio-economic considerations for inclusion into tender documents.
- Meeting the requirements of financial and aid institutions which may be important to the company or one of its partners. Many financial institutions have requirements for the management of social issues to safeguard investments.
- Increasing the capacity of production with new technology that provides quality and quantity of petroleum products demanded on the marketplace.

## **2.7.2 The imperative of investing on SOCIR modernisation in the DRC**

The advantage and benefits for upgrading SOCIR in the DRC could be many. The first advantage is the flow of environmental oil products in the economy and the direct, indirect and induced employment opportunity, such as described in the figures further below. Secondly, the oil and gas industry integration and development could be among the key outcome of SOCIR development. DRC is itself a vast country in central Africa which has a rapid growing population that will inevitably continue to make pressure on natural resources and progressive demand of energy (dependence on oil products) for socio-economic activities and sustainable development.

Therefore, oil products demand is expected to increase gradually at a very large scale in the country. SOCIR upgraded in the DRC is expected to boost the whole country and probably the region with quality oil products and ensure national security of supply of oil products and reduce therefore, the challenges of instability of supply of petroleum products. Besides being a strategic investment project for the DRC, upgrading SOCIR in the country could improve national balance of payments by reducing the petroleum products import bill.

According to PWC report (2013: 6), in the U.S. national economy for example, the oil and gas industry's operations directly and indirectly supported 8.4 million full-time and part-time jobs in the national economy in 2011; the industry's capital investment supported an extra 1.4 million jobs in the national economy; the oil and natural gas industry's total employment impact on the national economy was projected to 9.8 million full-time and part-time jobs in 2011, accounting for 5.6 percent of total U.S. employment. In the DRC, the oil and gas industries and particularly the oil refinery development are expected to create in the same way massive direct, indirect and induced jobs estimated to more than thousands of temporary jobs and more permanent jobs.

The development of attendant industries such as petrochemical and related manufacturing industries is as well expected and could eventually create additional jobs for many unemployed Congolese, and ensure the transfer of technology in the refining and associated industries. More benefits will include contribution to the growing energy requirements by providing oil products which can be used for power generation and liquefied petroleum gas that could replace firewood used for domestic cooking, and fight against deforestation or environmental degradation.

Finally, SOCIR upgrading project could influence greater opportunities for the DRC to experience the effects of industrialising industries and socio-economic transformation. According to Canada Fuels Association (2013: 9), the advantage of more upgraded oil refinery in the DRC could provide:

- Additional value from the product slate: Better yields of high-value products, such as gasoline, and middle distillates, such as diesel fuel and home heating oil reduce the reliance on low-value products, such as heavy fuel oil, asphalt and residues. For example, a topping refinery typically yields 20 % gasoline, 30 % middle distillates and 50 % heavy residuals from Arabian light crude oil. The most complex refineries produce as much as 60 % gasoline, 35 % middle distillates and 5 % heavy residuals.
- Ability to process a wider range of crude oil types: Greater flexibility in the choice of crude means SOCIR could use cheaper heavy crude oils to produce lighter products that are more in demand, and increase profit margins through higher sales volume and greater crack spreads.

- Flexibility to modify to changing markets and local fuel specifications: This flexibility allows SOCIR to adapt production to changes in market demand and in fuel specifications (for example, the growing demand for lighter products, diesel rather than gasoline, and reformulated gasoline suitable for ethanol blending).

## **2.8 PREDICTION OF SOCIAL AND ECONOMIC OPPORTUNITIES FROM SOCIR UPGRADING PROJECT IN THE DRC**

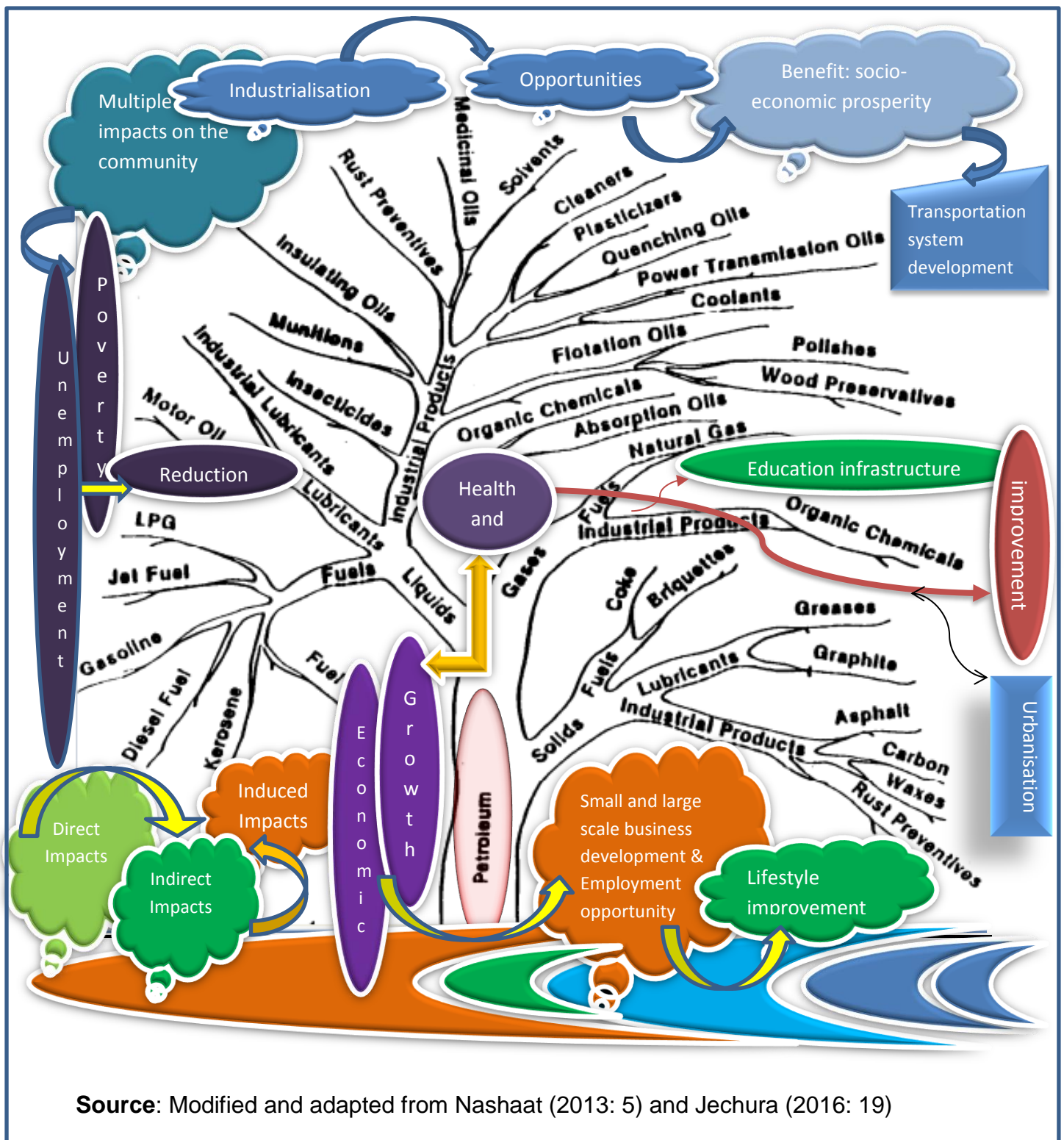
Components including social and economic expectations are most often interdependent and inclusive when it is about assessing the socio-economic effects of any projects in the development process. The socio-economic opportunities that could be achieved through SOCIR upgrading project can be perceived from various aspects that include oil products specifications to be injected or offered into the economy and increased socio-economic benefits such as presented in Figure 2.6 below.

The further down petroleum tree framework condenses the obtainable variety of oil products converted from crudes oil, through an upgraded refinery process and the expected socio-economic impacts that it could have in the society. So, if SOCIR can be upgraded with modern equipment or machinery, it can produce diverse blend stocks similarly to the following tree framework or provide variety of petroleum products specifications and create socio-economic change in the country (Jechura, 2015: 19).

As a result, the country will have the ability to produce environmental sound oil products, increase government capacity to change and affect positive socio-economic change, societal lifestyle improvement and support possible sufficient quantity of oil products reserve that could anticipate unpredictable crises and promote small and large scale business development.



Figure 2.6: Oil products specifications and potential socio-economic effects



Source: Modified and adapted from Nashaat (2013: 5) and Jechura (2016: 19)

### **2.8.1 Probable Social effects**

The perspectives for social expectation in the local and national community are identifiable. According to IPIECA Report (2004: 5-7), the social perspectives from SOCIR upgrading project, will comprise the effects that could also contribute to the local or national community lifestyle improvement. This will consist of resolving and reducing issues relating to unemployment, poverty and inequality among Congolese, through the mechanism of:

- Access to the company to express their views/ concerns and suggestions and involvement in the decision-making processes as a result of effective consultation.
- Identification of opportunities for economic development through the supply of oil products and services by local stakeholders.
- Contribution to local capacity building in infrastructure, services and environmental protection.
- Increase in human capacity building through the transfer of best practices.
- Social investment to meet both local and project needs.
- Support for traditional industries alongside the development of the project.
- Protection of cultural resources for the communities.
- Inclusion for local communities through better understanding of both the positive and negative effects of the project or operations.

According to Smit (2011: 71), social perspectives from SOCIR development will involve aspects related to Table 2.3 above and an analytic view over the composition of the business environment variables significantly well presented in Figure 2.6 above, and as well as the consideration of social potential effects represented in Figure 2.7, Figure 2.7.1 and Figure 2.7.2 below.

### **2.8.2 Potential Economic effects**

The economic perspectives from SOCIR development have been identified in the previous sections under the label of benefits due to SOCIR upgrading effects. According to Pirog (2007: 1), the economic perspectives from SOCIR development include the processing of products that are precarious to the functioning of the economy. Fundamentally all transportation, land, sea, and air, is fuelled by products

that are refined from crude oil. Industrial, residential, and commercial activities, as well as electricity generation, use petroleum-based products. Along with volatile changes in crude oil prices, the economy will face evolving health, safety, and environmental requirements which will continue to change and multiple products specifications and which will require capital investment in refinery modernisation. Potential new investments linked to the oil and gas industry development are expected to promote and create massive permanent and temporal employment in the country.

According to the Regeneris Consulting Report (2013: 2-54), there are multiple impacts on projecting for SOCIR upgrade and the oil and gas industry development in the country. These include overall effects such as infrastructure improvement and construction needs, labour markets effects, business sector effects, health, housing and public sector services effects. According to ERM Eurasia Report (2008-2009: 190-195), the upgrading of SOCIR in terms of modern technologies in the DRC will have a number of positive effects on the socio-economic conditions of Congolese people at a large scale.

Firstly, the upgrading of SOCIR technology will foster a further strengthening of the economic potential of the DRC. The project implementation will enable further innovation and the introduction of new technologies that would ensure the production of more environmentally friendly products and enable a significant reduction in negative environmental impacts both in the plant area and in the town of Muanda at large, and would increase the enterprise market competitiveness.

Secondly, during the innovation phase, the existing local, national and international engineering, technical and transport infrastructure will be used and incorporated in the project. SOCIR development could offer positive socio-economic opportunities to the country, by including:

- Promotion of employment, provision of comfortable housing for the company's employees;
- Attracting other industrial operations development in the country;
- Employment in the environmental, health and safety specialist during and after the upgrading project completion;

- Attraction of operating specialist with specialised secondary or higher education;
- Production of quality fuel which will meet the most stringent quality standards, including international norms;
- Reduction in the air pollution level on a provincial scale due the use of environmentally sound fuel, and as a consequence, lower level of sickness and death rates among the population;
- Development of a number environmental protection measures with the objectives to improve the overall environmental situation in Muanda district and in the province of Bas-Congo;
- Development and maintenance of transport networks (motors roads, railroad lines, petroleum products pipelines);
- Competitive working conditions and improvement of skills and qualifications of the operating personnel; and
- Improvement of the employment situation and development of the occupational education and training.

The eventual petroleum refining industry development in the DRC could promote several macro-economic effects. The initial direct economic effects include employment, wages, profits and GDP growth associated with the activities of the oil refining industry itself and its main suppliers. The initial indirect effects include relative or dependent industries development, and the initial induced multiplier effects is associated with the extra economic activity involving the local spend from wages and local profit generated and the overall impact through other economic sector effects such as the increase on public services needs which will lead on socio-economic activities development (education, health and security services infrastructures improvement).

According to Regeneris Consulting (2013: 14), the socio-economic effects the upgrading of SOCIR could have in the DRC may be better understood following Figure 2.7, Figure 2.7.1 and Figure 2.7.2 presented further below. Each of them attempt to demonstrate in different ways the values of socio-economic benefits the SOCIR upgrade could provide in the DRC.

**Figure 2.7 The socio-economic effects the upgrading of SOCIR could have in the DRC**



Figure 2.7 above explains diverse effects the upgrading of SOCIR and the oil and gas industry development could have in the DRC through public and private investments, increase population migration, need for public services requirement (Health, Education, Transport and Roads, Power supply, Fresh water supply and Community Project activities support infrastructures) and business projects developments, which finally could increase jobs opportunities. SOCIR and the oil and

gas industry development could eventually lead to what is called super-multiplier effects (extra socio-economic activities such as health infrastructure: nurses and doctors employment), education infrastructure (teachers' employment) and different more public services (police or security services, and sanitation) and their extra spend in the country.

In addition, the capital investment in infrastructure and housing associated with the Oil and Gas sector will directly increase economic activity and population lifestyle growth, which could produce further economic effects as a result of the project implementation (accelerator effects), and as well, which in all cases will affect increase on local spend and also increase on investments. Without doubt, two significant structural changes will characterise the necessity of developing and integrating the oil and gas industry in DRC through SOCIR upgrading project. Firstly SOCIR upgraded will almost all cases add value to the country over an import alternative and secondly, SOCIR will promote greater employment with consequent multiplier effects of direct, indirect and induced labour.

Further, SOCIR upgraded is expected to support jobs creation through three channels; firstly, SOCIR will proceed to recruit and employs qualified people directly to run the refinery (direct effect), secondly SOCIR will refine local crude oil as input from the upstream oil and gas industry, refine it and supply it to the downstream (transportation, distribution and marketing); which also creates massive employment (indirect effect) and thirdly, the whole oil industry: upstream, midstream and downstream employment or jobs created (direct and indirect employees) will spend their wages in supporting other businesses (induced effect or employment).

This multiplier effects could finally produce the socio-economic improvement and oil and gas industry integration and development in the country. Figure 2.7.1 and Figure 2.7.2 describe particularly how the mechanism of an integrated and developed oil industry can promote industrial expansion and create reliable socio-economic activities that may change community's lifestyle.

**Figure 2.7.1 Potential outcome the upgrading of SOCIR could have in the DRC**

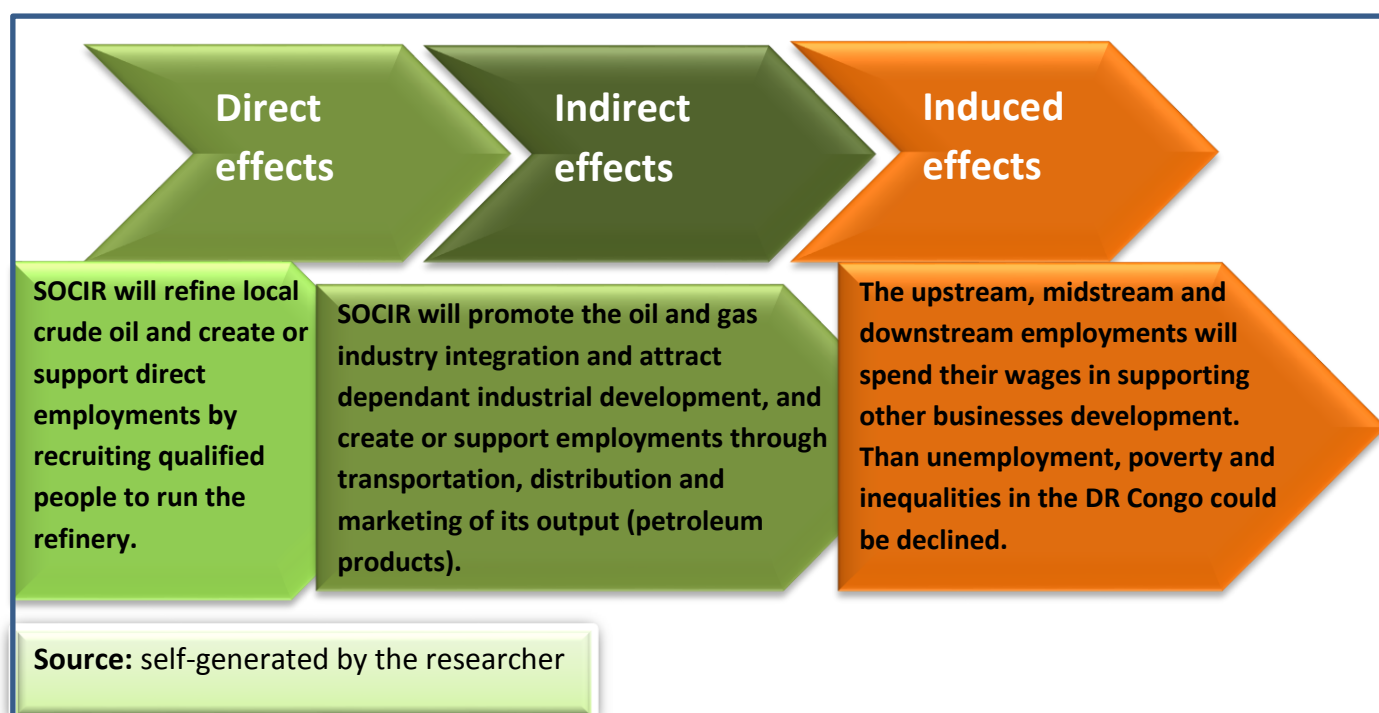
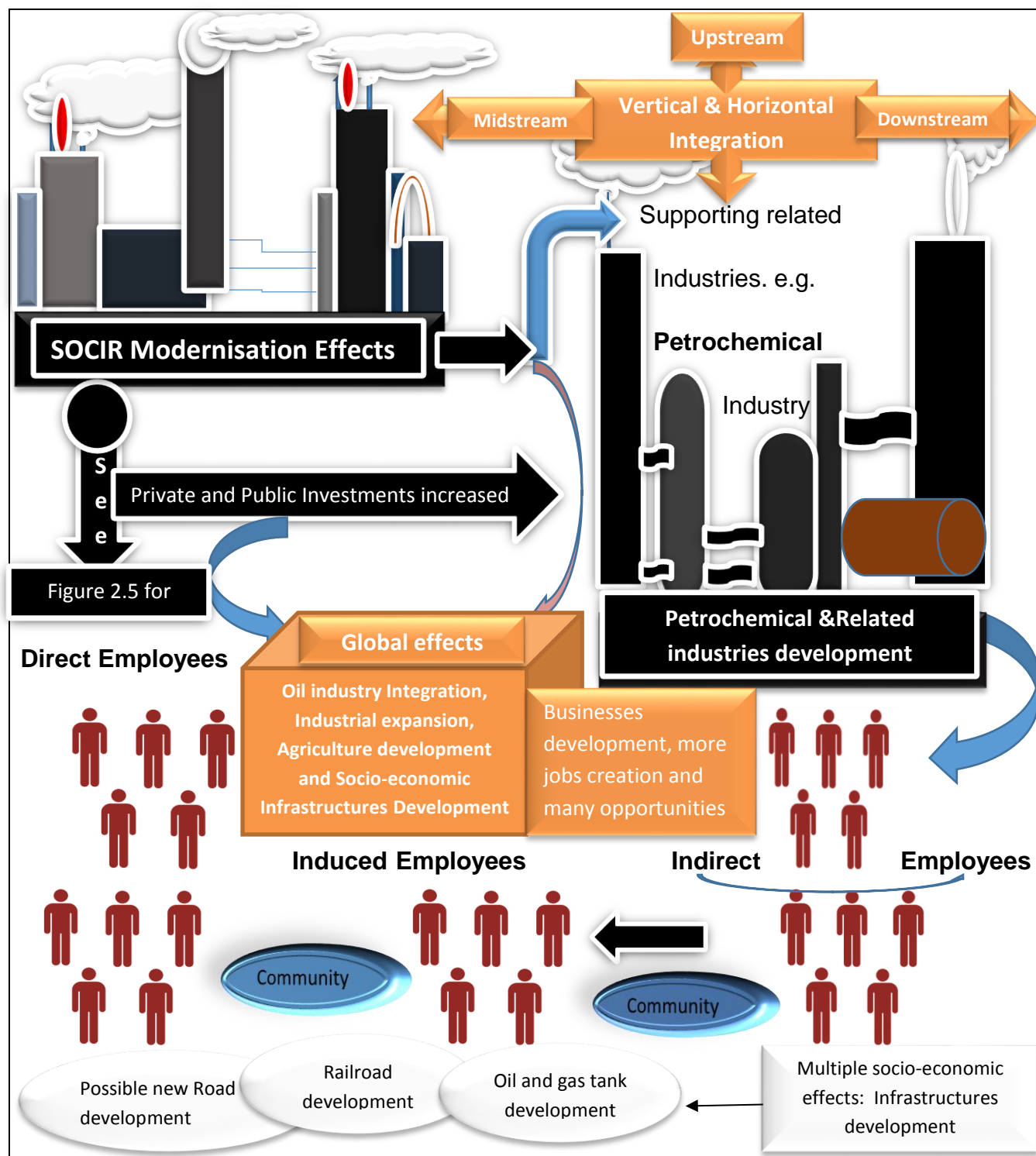


Figure 2.7, Figure 2.7.1 and Figure 2.7.2 below; explains and summarises the possible socio-economic effects the SOCIR upgraded or the probable effects the new petroleum refinery establishment would have in the DRC. This great expectation associated with macro-environment stability and CSR values consideration could inevitably promote the country's industrialising industries sector, which mean SOCIR innovation could lead on economic diversity and growth, and consequently to societal lifestyle improvement.

The mechanism of these direct, indirect and induced effects of oil refinery upgrading in the DRC is also well-captured in Figure 2.7.2, which describes the potential role that the SOCIR development could play within the oil industry and through the socio-economic development process in the country. The global effects from SOCIR development could include oil industry integration, industrial expansion, agriculture and petrochemical industries development and socio-economic infrastructures development.

**Figure 2.7.2:** Promising Community's benefits the upgrading of SOCIR could have in the oil and gas industry development in the DRC



**Source:** Self-generated by the researcher, based on ARA (African Refiners Association) report 2014, Cape Town.



The exceptional nature of socio-economic context of the DRC is critical. Figure 2.7.2 above shows how the probable vertical and horizontal integration of the oil industry with SOCIR upgraded could contribute to change and improve the business environment as well as the community lifestyle well-being through three channels of jobs opportunities, higher potential for personal income; better health care systems improvement and advancing education system projected. Great expectations are socio-economic changes in the land of endless opportunities.

## **2.9 INTEGRATED PETROLEUM AND GAS INDUSTRY PERSPECTIVES AND TRADE IMPACTS IN THE DRC**

The imperative for upgrading SOCIR in the DRC Congo is also for integrating the oil and gas industry, which represent a great opportunity for vertical and horizontal correlated industrial development, socio-economic infrastructure improvement and development, business operations expansion and for economic diversity. These motives have been largely explained in the previous sections. The interesting aspect on the imperative of boosting SOCIR with new equipment is about the support of large scale trade with various specifications of crudes oil to be processed and petroleum products inflow in the national and regional markets.

According to OPEC (2013: 22), crude oil is a dominant component of contemporary life and the world's most marketable and essential energy resource. Petroleum has become the world's most important source of energy since the mid-1950 and is used mostly, by volume, for producing fuel oil and gasoline (petrol), both significant primary energy sources and about 84% by volume of the hydrocarbons present in petroleum is converted into commercial energy-rich fuels (petroleum-based fuels), including gasoline, diesel, jet, heating, and other fuel oils, and liquefied petroleum gas.

This is due to its high energy density, easy transportability, and relative abundance (Nassar, 2013: 7). In the most advanced and developed countries the oil industry is the largest and main generator of GDP growth. The petroleum industry in the DRC, if well-integrated, regulated and managed could promote diversity of business development, enhance the management of petroleum resources and optimise domestic oil and gas supplies for industrial development and consumer needs (Omojuwa, 2014).

According to PwC (2013: 9), the business of oil and gas involve exporters who want to maximise their revenues and improve their trade balances, maintain control and sovereignty over their natural resources. It involves importing nations which want to minimise trade deficits and ensure a steady, reliable oil supply. In the DRC, the business of oil and gas still facing issues that are relative to poor infrastructure and an uncertain regulatory framework, political interference and a lack of transparency about procedures particularly with regard to the awarding licenses and production agreements.

The development of SOCIR and the oil industry integration could contribute to reducing total dependence of oil products imports, by refining locally the oil output. The deficit of balance of payment is real when the country depends on imports of all needs about petroleum products. But this trend can be reversible with local oil output processing and supply, which could also be reduced by the effect of SOCIR upgrade and oil industry infrastructure modernisation. This means that the trade perspective about the business of oil or oil products must operate in projecting industrial expansion and supporting economic growth in the country.

When a country spends money to import merchandises that are used to produce more goods, this country will sustain and create opportunities for employment and promote socio-economic prosperity. However, countries that spend the money not with investment perspective for producing socio-economic prosperity are destined to become poor. The DRC unfortunately is experiencing the situation in which the income from crude oil export is spent for import oil finished products consumption. No real investment for oil industry development has been promoted.

Therefore, the need for SOCIR upgrading project or a new refinery established in the country could become more vital for local existing crude oil refinement, and for further estimated potential 3 billion reserves of oil discovered in the Lake Albert at the Eastern province of North Kivu, neighbouring to Uganda, for which the estimated production of 50, 000 bpd is projected (Jeff, 2014). The implementation of this kind of project could preserve the country from spending a lot of money on imports of petroleum products, money that can be used for other investments to diversify the national economy.

The oil industry and SOCIR operations improvement can support several investments development in social infrastructure (health, education and the emergence of training Centre for human capital development), and make an important economic growth and sustainability, not least by facilitating access to opportunities in other industries and jurisdictions: public and private (Regeneris Consulting Report, 2013: 16-26).

According to James (2007: 325-337), the oil industry development and SOCIR upgrading project could lead to petrochemical industry establishment in the country, given that oil and gas products are used as raw materials for manufacturing diverse marketable products including fertilisers, fabrics, synthetic rubber and the plastics that go into almost everything people use today from toys to personal and household items, to heavy-duty industrial goods, which can be destined to local or external market demand. According to KPMG (2013: 4-8), the operations of exploring, producing, refining, exporting and importing crude oil or petroleum products consumption creates trade opportunities, political, economic, social and even national security concerns in different ways.

## **2.10 GOVERNMENT BENEFITS FROM SOCIR RESTRUCTURING AND DEVELOPMENT PROJECT**

A weak State with unstable institutions cannot create a strong economy and promote socio-economic development. Also, a weak economy depending on colonial economic model and dominated by social crises cannot create a strong State. In contrast, a state with stable institutions that has the ability to promote industrial development could also have the ability to create a strong sustainable economy that can contribute to social change.

The oil and gas industry development and SOCIR upgrading project in the DRC could lead the government to improve policies and regulations that promote the oil and gas industry development, related industries development and contribute to socio-economic change in the country. SOCIR development project can profit the government through socio-economic activities that support economic growth, including jobs creation or reducing unemployment, inequality and poverty rates; diversification of productive activities in the country, enhanced national competitiveness and increased finished products exports, and oil and gas industry

integration. These benefits could motivate the government to create a safe business climate and ensure institutional stability. The following sections point out the strengths and the weaknesses to SOCIR development project in the DRC.

### **2.10.1 Strengths for SOCIR upgrading in the DRC**

According to the Taneco Report (2009: 190-192) and Santec Report (2012: 7-9), there are constantly government benefits linked to socio-economic impacts or benefits from continually improving and upgrading the petroleum industry or the petroleum refining industry. The effects can be positive and negative, direct, indirect, intended and unintended to the well-being of the community. The positive and direct effects consist firstly of more competitive working conditions and upgrading the skills of operating personnel.

According to Bargorett (2014: 19), the oil refining industry upgrading process provides many opportunities and strength for the country's socio-economic growth, as well as a threat for natural environment. Generally, positive promising changes could be expected through concrete economic growth, reduction of unemployment, inequalities and poverty rates. Also, through technology upgrading and possible skills transfer, SOCIR could play an enormous role in the DRC with multiple effects on the economic diversity.

The effects on the economy could lead to diverse small and medium enterprises linked to the existing of SOCIR development, which possibly will increase more socio-economic operations (urbanisation, education and health infrastructure system where the oil refining industry is established and/or of the entire national community and environmental safety of people in the area concerned) in the country with expected increase on job creation.

SOCIR upgraded could contribute as well to the increase of national capacity of oil and gas products supply, promote local and international investments with new technologies that could provide more increase in machinery and equipment, which will build-up the local or national industrial capabilities and ipso-facto contribute to human skills formation where the capital-intensive technology will require a pool of trained labour.

Additionally, the oil refinery with modern technology facilities could provide a new approach to minimise environmental impacts, which can be used as an example for other industrial operations in the country to limit environmental pollution. In prevision to environmental issues, SOCIR development could facilitate the improvement of regulation on environmental and health situation in the country with quality products specification. According to Ndiaye (2013: 21-22) and Stantec (2012: 7-9), despite certain threats and weaknesses due to the oil industry development, there are profitable socio-economic impacts on the process of upgrading and developing the oil refining industry in any country.

These include economic growth and diversity, and value added impacts from crude oil refining process upgrading. Technology development, oil products specifications and improvement, socio-economic improvement, training, provision of machinery and equipment together with development of local market opportunities could constitute the most relevant support or role of SOCIR in the promotion of industrial development and economic diversity in the country.

Furthermore, inevitably, the government policy and regulation in the oil and gas industry could be forced to improve or to change sensibly by the effect of SOCIR development, and the management of oil operation in the country could also be improved through progressive change from new technology and equipment that will allow and promote the mechanism of transparency in the whole oil and gas industry sector. New policies in the oil and gas industry and for SOCIR upgrading could embark the DRC in socio-economic reforms that could reverse socio-economic decline and generate sustainable growth and development.

The specific key areas where the DRC will need to stimulate reforms and attract external investments include liberalisation of investment regulatory framework, sustainable economic development (reduction in fiscal deficits), privatisation, rationalisation and restructuring of state-owned enterprises and the development and upgrading of physical infrastructure. The PWC report (2013: 1-2), Narimisa (2011: 456), IPIECA (2004: 6), TANECO report (2012: 7-9), Regeneris Consulting report (2013: 13-47), BBC Research and Consulting Report (2013: 5-9) and many other sources and reports reviewed have demonstrated as well that there are three main channels of opportunities among the several effects the oil refinery or oil industry

development could have in the country. These effects are Direct: the jobs, labour income, and value added within the oil and natural gas industry, Indirect: the jobs, labour income, and value added occurring throughout the supply chain of the oil and natural gas industry, and Induced: the jobs, labour income, and value added resulting from household spending of labour and proprietor's income earned either directly or indirectly from the oil and natural gas industry's spending.

Thus the strength for SOCIR development includes available existing of abundant quantity of crude oil discovered and easily accessible in the country; expected strong financial position with high revenue growth, ability to attract commercial support for growth projects, expected extensive infrastructure network development in the country, diversified portfolio, experience and capability in successful undertaking of large scale projects, capacity to direct financial resources towards research and products development, strategic management capability; and the ability to attract, develop, and retain skilled personnel.

Further strength involves the improvement of the economy and increasing investments, increasing government revenue, possibility for large scale oil and gas products security reserves in the country, increasing global energy demand, significant need for tank and pipeline capacity development in the country, socio-economic infrastructure development opportunities, increasing development of unconventional oil and gas resources, technological advancements to improve productivity and reliability, growth in DRC's oil and gas technology and services sector and balancing expanding import-export market, opportunities in emerging renewable energy and environmental solutions technologies (Bargorett, 2014: 19).

### **2.10.2 Government liability to SOCIR's development weaknesses and threats**

The process of driving petroleum operations remains practically the same around the world, but challenges and opportunities relative to oil industry and oil refineries activities depend on the region's or country's configuration. In the sub-Saharan African countries, for example, governments are concerned about existing technologies that cost more to maintain and operate, and which could possibly become unsustainable or non-operational in future: case of SOCIR in DRC (Kotze, 2012).

Such as explained previously, the weaknesses and threats to SOCIR development, include the lack of government decision-making for it innovation, the small limited market for oil and gas products distribution, ageing of physical infrastructures, lack of skilled labour-force for maintenance, lack of financial capital for operational costs; currency fluctuations, commodity price fluctuation and unpredictability, cost of regulatory compliance and uncertainties in regulatory environment, inter-provincial unreliable roads which remain a strong barrier for national trade or for oil products distribution, lack of pipeline development in the country, increased domination of shareholders operating in the entire oil industry (exploration and production, import and distribution of petroleum products in the country), continual strong dependence on the external oil products and financial capital assistance, different political and socio-economic instabilities and unforeseen events relative to insecurity, natural disasters and tribal conflict or rebellion are therefore some of the factors that could retard investment on SOCIR development.

The most important threats to SOCIR development are as well relevant to the environmental pollution and degradation, if not well managed. Further constraints that SOCIR and the oil industry will need to face continually comprise improving and sustaining up to date current operations that should include the need to invest, the effect of subsidies on product pricing, cost of products refining and quality of petroleum products, as well as rising energy costs, increasing refinery energy intensity and increasing fuel quality specifications or increasing greenhouse gas emissions, the associated costs and regulatory requirement (Olowoneirejuaro, 2010: 5-9) and (Bergh, 2012: 20-21).

But, the most positive impacts are manifest through the expected flow of petroleum products and chemical products in the economy, the increase of market competitiveness, promotion of employment, provision of comfortable housing for company's employees, production of more environmentally or friendly products (by removing the high sulphur content oils), which will enable a significant reduction in negative environmental impacts both in the plant area and in the country.

## **2.11: CHAPTER SUMMARY**

In this chapter, the researcher has addressed the socio-economic role of the oil refining industry in the DRC as well as the factors affecting the socio-economic development in the DRC, the challenges experienced by SOCIR in the business environment and the socio-economic benefits and opportunities the upgrading of SOCIR would have in the socio-economic situation of Congolese people now and into the future. The findings from literature review revealed that socio-economic crises and the lack of oil refining industry (SOCIR crisis) in the DRC are related to the PESTIE instabilities climate.

Unemployment, poverty, massive inequalities, corruption, education and health deterioration, the raising of informal business, lack of economic diversity and disproportional economic growth, the lack or absence of well implementation of socio-economic rights and human rights are the most crucial factors among many others, which are affecting the day-to-day living condition of millions of Congolese.

The reasons why SOCIR have to be restructuring and upgrading include boosting its processing capacity for local crude oil refinement and security of supply, reducing total dependency on oil products import and related cost, reducing total crude oil output export and related risk, promoting transparency in the management of oil and gas activities in the country, oil and gas industry integration, related industries development, oil and gas business climate improvement, economic diversity and growth, and for socio-economic infrastructures improvement.

Also, the refinery industry development could facilitate related industrial development by generating chemicals and specialised products for use in other industries such as textiles, construction, electronics and machinery, and as well facilitates tax collection through a well-controlled tax point for petroleum products, that will allow the government to regulate tax collection more efficiently. Further, SOCIR development could add value to the country over an import terminal alternative. The major factor of SOCIR upgrade could be the value added of greater employment and consequent multiplier effect of direct, indirect and induced labour.



Unemployment, poverty and inequalities decline, as well as the increasing opportunities for direct, indirect and induced employment are therefore the key expected outcomes from the oil and gas industry development in the DRC. Eventually, a clear and strong legitimate climate in the management of oil and gas business can possibly generate new opportunities for socio-economic development and stimulate macro-environment stability and improvement.

Finally, most literatures examined have suggested that SOCIR and the entire oil and gas industry, once upgraded with new efficient and compatible contemporary technologies, could expectedly create an industrialising industries environment, which could drive the country with a tracked several effects on economic diversity and transformation, social viability and environmental welfare. Chapter four will elucidate and corroborate theories reviewed in this chapter. The next chapter explains the research design and methodology for this study.

## **CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY**

### **3.1 INTRODUCTION**

The preceding chapter has focused on the review of pertinent literature that assisted as a foundation for the development of the research methodology. It also reviewed the factors affecting the socio-economic development in the DRC; the challenges experienced by SOCIR in the business environment and identified the socio-economic benefits or effects the SOCIR upgrade could have in the DRC.

This chapter focuses on the research design and methodology, which includes the methods, techniques and instruments used during the study process. It also intends to discuss the types of methodology undertaken by the researcher to obtain data as accurately as possible to authenticate the study. This chapter provides as well an indication of steps taken to gain an understanding of the current situation regarding socio-economic crisis and SOCIR crisis in the DRC, and the need to improve or upgrade the whole oil and gas industry in the country.

### **3.2. RESEARCH DESIGN**

The research design is the investigation plan, which helps to obtain useful answers to the research questions and assists the researcher with the breadth and depth of understanding and corroboration (Turner, 2010). According to Creswell (2015: 14), the rational of mixed methods used for this study is to obtain a superior appreciation of the research problem through combining two different perspectives, one drawn from closed-ended response data (quantitative) and one drawn from open-ended personal data (qualitative).

The survey approach has used simple questionnaires or structured interviews for data collection, with the intent of generalising from a sample to a population. The case study of SOCIR has been the strategy of inquiry in which the researcher explored in-depth activity or processes and collected detailed information using a variety of data collection procedures (Creswell, 2009: 13). The research design implemented for this study is the mixed methods. Data was collected by means of questionnaires and interviews.

### **3.2.1 Mixed methods approach**

Creswell (2009: 204) and Turner (2010) define mixed methods as the combining of both quantitative and qualitative research methods in a research study. Further, Creswell (2011:4) defined mixed methods approach as a procedure of collecting, analysing and mixing both quantitative and qualitative data at a certain level. Thus, Creswell (2011: 217) indicated that researchers across diverse field are expected to be skilful in both quantitative and qualitative techniques.

#### **3.2.1.1 Quantitative research design**

Creswell, Klassen, Clark and Smith (2011: 4) describe quantitative research as the mode of enquire intended at testing theories and hypotheses, collecting descriptive information and examining relationships between variables. In quantitative research, the researcher makes every effort to be as objective as possible in seeking accurate measurement and analyse target concepts in answering the inquiry.

According to van Wyk (2010: 16), in most cases quantitative research methods are related with deductive approaches (based on logic), while qualitative research methods are usually associated with inductive approaches (based on empirical evidence). Therefore, deductive-quantitative designs are usually more structured than inductive-qualitative designs.

#### **3.2.1.2 Qualitative research design**

According to Creswell (2009: 175), qualitative techniques are particularly useful when a subject is too complex to be answered by a simple yes or no hypothesis and when budgetary decisions have to be taken into account. The broader scope covered by the qualitative design ensures that some useful data is always generated, whereas an unproved hypothesis in a quantitative experiment can mean that a lot of time has been wasted.

The researcher has focused on the benefits or strengths of the mixed methods approach in this study in order to obtain a deeper understanding of the socio-economic role of the petroleum refining industry in the DRC.

### **3.2.1.3 Rational for using mixed methods**

According to Creswell (2015:4), the rational for using mixed methods for this study can be well identified in Table 3.1 below. According to Creswell (2011: 5-6), the advantage of using mixed methods in this study is to allow complementary data and more complete analysis of the research situation. The rationale was maximising the strengths and minimising the weaknesses of each type of data, and to view the problem from multiple perspectives in order to enhance and enrich the meaning of one perspective through merging quantitative and qualitative data to develop an in-depth understanding of the research problem.

Creswell (2011: 233), pointed out that mixed methods assist the researcher from integrating multiple forms of data (merging, connecting and embedding data) and explaining or elaborating quantitative results with subsequent qualitative data. It enhances the development of a new measurement or theory that is to be tested with a comparison of quantitative and qualitative data sets in order to obtain well-validated conclusions.

According to Creswell (2011: 6), the advantage of using mixed methods for this study is based on the following aspects:

- Confirming quantitative results with qualitative findings;
- Understanding community perception about factor affecting the socio-economic development in the DRC;
- Understanding the challenges experience by SOCIR in the macro-environment from multiple views;
- Understanding community's various views with regards to the effects of SOCIR upgrading in the socio-economic situation; and
- Explaining survey results from both quantitative and qualitative techniques.

Furthermore, Table 3.1 below enhances the rational for mixed methods used in this study.

**Table 3.1: Benefits of mixed methods approach for this study**

Mixed Methods Approach	
Qualitative Research	Quantitative Research
<ul style="list-style-type: none"><li>- Provides detailed perspectives of a few people</li><li>- Captures the voices of participants</li><li>- Allows participants' experiences to be understood in context</li><li>- Is based on the views of participants, not of the researcher</li><li>- Appeals to people's enjoyment of stories.</li></ul>	<ul style="list-style-type: none"><li>- Draws conclusions for large numbers of people</li><li>- Analyses data efficiently</li><li>- Investigates relationships within data</li><li>- Examines probable causes and effects</li><li>- Controls bias</li><li>- Appeals to people's preference for numbers.</li></ul>

Source: Creswell (2015: 5): *A concise introduction to mixed methods research*.

The core assumption of mixed methods is that when the researcher combines statistical trends (quantitative data), with stories and personal experiences (qualitative data), this collective strength provides a better understanding of the research problem than either form of data alone (Creswell, 2015: 2).

The choice was also relevant to the level of interaction between the quantitative and qualitative strands, the relative priority of the strands, the timing of the strands, and the procedures for mixing the strands (the strand is a component of a study that encompasses the basic process of conducting quantitative or qualitative research: posing question, collecting data, analysing data, and interpreting results based on that data). Thus, the level of interaction is the extent to which the two strands (quantitative and qualitative) are kept independent or interact with each other (Creswell, 2011: 64).

### **3.3 TARGET POPULATION**

Graziano and Raulin (2013: 405) described the target population as an intended population through which the researcher expects to get an understanding of the study's outcomes. Sekaran and Bougie (2010: 262) argued that population represents the entire group of people, events, activities or things of interest which the

researcher expects to investigate and to make inferences. A letter of intent was submitted to these organisations, prior to the start of the study. The target population comprised:

- SOCIR (Congolese Company of Oil Refinery's Industry) managerial team;
- COHYDRO (Congolaise des Hydrocarbures);
- Ministry of hydrocarbons (DRC)
- Petroleum and Gas Institute (IPG)
- Public and private professionals people in the oil industry.

The reason for targeting this population is that they are a major source of information and key respondent groups that are involved in the oil industry. Their experience in the field represents a significant asset for the achievement of this study's aim and objectives.

- SOCIR management has been selected because of the challenges experienced by the oil refinery before, during and after the operational period and breakdown; to get their various roles played in the refinery and their perspective for future upgrading and operational oil refinery in the country.
- COHYDRO is the government principal agent which is leading the global petroleum industry's operations in the DRC and dealing with all hydrocarbon affaires in the country.
- Ministry of Hydrocarbons has been selected in terms of understanding the regulations and legislations that are currently influencing the petroleum industry operations in the country and their perception regarding the oil and gas industry development concern in the country.
- Petroleum and Gas Institute is the first training academic institution in the field of oil business in Central Africa that is now training future leaders who will have to evolve their career in the Congolese oil and gas industry, as well as in other African countries. The students and administrative staff of this higher Petroleum and Gas Institute have been selected in order to solicit very academic perceptions and criticism within the objectives defined for this study.

- Public and private professional people within the oil industry were also chosen for their involvement in the oil field and for the necessity of getting much perception concerning the oil industry environment and operations in the DRC.

### **3.4 SAMPLING STRATEGY**

The sampling design selected for this study is purposive or judgment sampling, because it based on the assumption that the researcher is able to select elements which represent a typical sample from the appropriate target population. According to the Lund Research (2012), non-probability sampling represents a group of sampling techniques that help researchers to select units from a population that they are interested in studying.

Therefore, the sampling strategy which is manageable for this study is non-random or non-probability sampling, which is a technique where the samples are gathered in a process that does not give all the individuals in the population equal chances of being selected; or otherwise, the elements in the population do not have any probabilities attached to their being chosen as sample subjects, which means that the findings from the study of the sample cannot be confidently generalised (Sekaran, 2013: 252). This technique has allowed the researcher to select appropriate respondents which are representatives and experts who provide advice to the government for making responsible decisions in terms of investments.

### **3.5 SAMPLE SIZE**

Sekaran and Bougie (2010: 294-296) have stated that sample sizes larger than 30 and less than 500 are appropriate for most research. Following this assumption, a simple random sample was chosen since each organisation, in which population theoretically had an equal chance of being selected for the sample. The sample for the study is hundred and five respondents represented in Table 3.2 below.

**Table 3.2: Sample size**

<b>Sample Size</b>	<b>Organisations</b>	<b>Data collection method</b>
1	SOCIR: Congolese Company of Oil Refining Industries: One of the executive directors has been involved to facilitate the research process and has himself provided information through the interview that was appointed in his office.	1 Direct Interview
31	COHYDRO: Congolese des Hydrocarbons: Division manager in charge of Exploration and Production and its head director were most committed for the interview and have assisted the researcher for questionnaire distribution to the administrative personnel	1 Direct Interview and 30 questionnaires distributed.
32	Ministry of hydrocarbons: The head of division in charge of geological and geochemical exploration and his assistant have contributed to facilitate and grant an interview with expected information.	2 Direct Interviews and 30 questionnaires distributed.
1	Petroleum and Gas Institute (IPG): An academic and professor in charge of the refinery and petrochemical department and his assistant were both committed to facilitate the interview and questionnaire distribution to the students of the IPG.	1 Direct interview
30	Students of Petroleum and gas Institute (IPG): Questionnaires were distributed to the students of third year Bachelor, first and second year Honours selected from the Department of Economy and Petroleum Management and Refining and Petrochemicals	Questionnaires distributed in a hall organised by the professor in charge of Economic and Petroleum Management Department.



10	Private participants operating in the DRC's oil and gas industry, operating in the import and distribution of petroleum products in the country.	Questionnaire distributed
105	Total participants	

### 3.6 PILOT TEST

A pilot test assists the researcher in determining if there are flaws, limitations, or other weaknesses within the interview and questionnaire design and allows him or her to make necessary revisions prior to the implementation of the main study. The pilot test also assists the researcher with the refinement of research questions, which will take account of the flow, question skips, timing and respondent interest and attention (de Vaus, 2014: 116). Questionnaires have been presented to five respondents randomly selected from the list participants that are not part of the sample population within the oil and gas industry, to test the questionnaire, so that the necessary revision could be made before the administration of the questionnaire to the research sample.

The results are analysed using appropriate wording and relevance in the next chapter. In order to increase the respondents' ability to answer the questionnaire, the researcher was available and even has provided a phone number, to explain to any preoccupation or any part of the questionnaire not well understood by the respondents. The Likert scale measuring instrument is used in this study to analyse how strongly subjects agree or disagree with statements on a five-point scale: strongly agree = 1, agree = 2, strongly disagree = 3, disagree = 4, and neither agree nor disagree = 5 (Sekaran and Bougie, 2009: 141).

The pilot test is used to attest validity of questions asked and to check if they have been understandable. Questionnaires are tested according to a variety of information regarding the aims and objectives defined, available from selected literature on the petroleum refining industry improvement process and the oil industry development.

### **3.7 MEASUREMENT INSTRUMENTS**

The measuring instrument used for this study comprised questionnaire that consisted of closed-ended questions, structured on five point Likert scale and the open-ended interview that were conducted with selected managers of the oil and gas industry, which constituted part of the sample. According to Sekaran and Bougie (2013: 211), a scale is a tool or mechanism by which individuals are distinguished as to how they differ from one another on the variables of interest to a study. The review of relevant literature in the business environment theories, socio-economic theories and oil and gas industry theories assisted the researcher to develop both open- and closed-ended questions.

The questionnaire used for this study followed the stages such as defined in the introduction of this chapter. The questions were outlined as statements requiring the ranking of respondent's opinion, based on a five point Likert scale. Therefore, respondents were required to indicate the degree of perception following the statements, ranging from strongly agree to strongly disagree. According to Pearce (2011: 160), the Likert scale numbers 1 to 5 was used to demonstrate respondent's perception about the aim and objectives outlined for this study. This consisted of several defining characteristics, such as a declarative statement, which was designed to request respondent's responses.

The factor analysis used for this study (SPSS version 24.0, for quantitative analysis and thematic analysis for interview) was to ensure that the responses received was an adequate measure of respondent's opinion with regards to the variable outlined in the following chapter.

### **3.8 DATA COLLECTION**

Data collection refers to the obtaining of useful information on fundamental quality characteristics produced through a process. In qualitative research, data is usually collected from a smaller sample, which provides rich and deep insight into the phenomenon under study. For this study, data were collected on the basis of both questionnaires and interview reformulated, written and stated to which respondents have recorded their answers or perception to the problem stated (Sekaran, 2013: 147).

The questionnaire has included quantitative, closed-ended, Likert scale questions, as well as qualitative, open-ended questions that permitted respondents to provide detailed views, experiences and opinions. The methods of collecting qualitative data involved direct interaction with individuals on a one-to-one basis and direct interaction with individuals in a group setting in order to gather people's perceptions, meanings, and definitions of situations and constructions of reality (Punch and Oancea, 2014).

According to Sekaran (2013: 147), personally administered questionnaires assisted the researcher to collect all the completed responses within a short period of time, any doubts that the respondents could have on any question were clarified on the spot. This offered the researcher the opportunity to introduce the research topic and motivated the respondents to offer their frank answers. Thus, for this study the research process has used personally administered questionnaires with both closed and open-ended questions (Sekaran and Bougie, 2009: 212).

An interview (face-to-face interviews interactions) has been the additional method of collecting data in this study, which assisted the researcher to identify the factors affecting the socio-economic development in the DRC, the challenges experienced by SOCIR in the business environment and the benefits or effects the upgrading of SOCIR would have in the socio-economic situation of the DRC. The researcher travelled in June 2016 for face-to-face interviews and distributed questionnaires to participants represented in Table 3.2 above. Thus, a total of 105 respondents were involved in the study, 5 face-to-face interviews were conducted and 100 questionnaires were distributed and administered to the participants.

### **3.9 DATA ANALYSIS**

Data analysis in mixed methods research relates to the type of research strategy chosen for the procedures. The analysis occurs both within the quantitative (descriptive and inferential numeric analysis) and the qualitative (description and thematic text analysis) approaches and often between the two approaches (Creswell, 2009: 218). According to Fink (2010: 180), data analysis can be considered as the process involving the selection and focus of data, in addition to the discarding of irrelevant data. The process of data analysis also involves statistics of organising and interpreting numerical information.

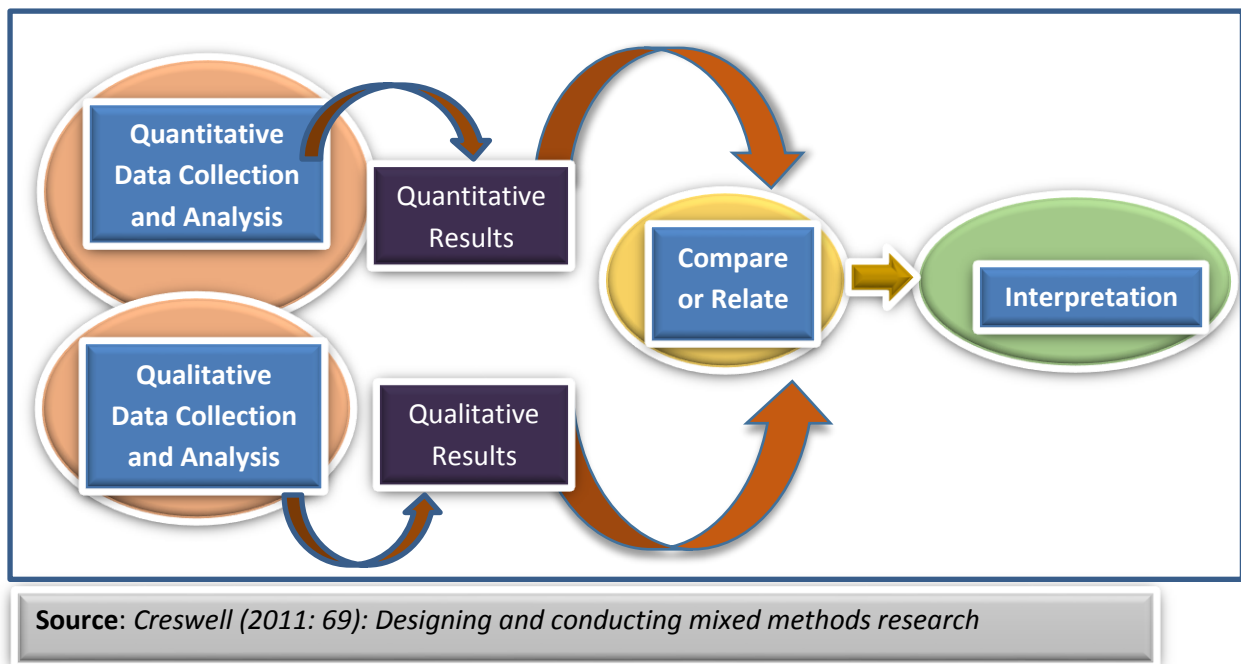
According to Creswell (2011: 68-69), the researcher has to select the typology-based design that provides a kind of framework and logic to guide the implementation of the research methods to ensure that the resulting design is rigorous, persuasive, and of high quality. Furthermore, this study has employed the software program of Statistical Package for Social sciences (SPSS version 24.0) for quantitative method, Nvivo software package, descriptive and thematic text analysis for qualitative method respectively. There are two primary ways of thematic analysis which is the theoretical/deductive and inductive approach.

The theoretical/deductive thematic analysis is largely driven by the researcher's theoretical interest in that area, while the inductive thematic analysis approach means the themes identified are strongly linked to data. An inductive thematic analysis is a process of coding the data analysis without trying to fit it into a pre-existing coding frame. In this study, the inductive thematic analysis was used to analyse the data. The coding and generation of themes was done using the Nvivo software package for the interview responses and these interview responses were grouped accordingly.

The interview questions were categorised into five sections including political, economic, social, technological and ecological environments. Therefore, according to Creswell (2011: 69-70), data gathered by means of questionnaires administrated and interviewed are processed through four basic mixed methods designs which comprise the convergent parallel design, the explanatory sequential design, the exploratory sequential design, and the embedded design.

The converged parallel design framework was selected for this study, by purpose of reflecting the process of interaction, priority, timing and mixing data. Quantitative data collection and analysis, and qualitative data collection and analysis are therefore designed following the framework below, which involves descriptions, relationships, comparisons, as well as predictions.

**Figure 3.1: Mixed Methods Designs for Data Analysis**



According to Creswell (2015: 4), Figure 3.1 explains that the mixed approaches or methods follow the general process of research that consist of identifying a problem, determining research questions, collecting data, analysing data, and interpreting results. Elements of both quantitative and qualitative research are included in a mixed methods study. A rigorous effort was made to collect both types of data in a timely way and to make sure that the data were integrated in a correct and accurate process manner, such as presented in the above framework design (Figure 3.1).

This process of data analysis has been helpful from the respondents and from the interpretation of certain numerical data within the tables and graphs, which represented an easier way to understand data analysis, particularly in explaining the necessity of socio-economic effects the upgrading of the oil refining industry could have in the country. Data analysis was accessible and explained by using tables and graphs and through description, inferential statistics, charts and frequencies. In addition, the researcher attempted to analyse the interview notes and drew conclusions from both approaches. Thus, in using the above framework, research questions similar in both questionnaires and the responses were compared following the framework process from the respondents, which were combined and categorised to show the patterns and to draw general conclusions from the data.

### **3.10 VALIDITY AND RELIABILITY**

According to de Vaus (2014: 95), a valid question is one that measures what we think it does. To ensure reliability, the question should be answered in the same way on different occasions if given to the same person (assuming that the person's position has not changed in the meantime). The question that fails to achieve consistent responses is unreliable or ambiguous and vague question wording may produce unreliable responses as respondents read the question differently on different occasions (de Vaus, 2014: 95). Reliability is the extent to which a data collection procedure and analysis yield the same answer for multiple participants in the research process.

The research instruments selected for this study (questionnaires and interview) have ensured validity of information and data collection. A pilot test was conducted with the identified interviewees and some of the participant was supervised while completing the questionnaires. To ensure the validity of information and data collection, research instruments selected for this study (questionnaires and interview) were managed by means of a specific sampling group of principal managers, administrative personnel and academic institution, which were considered to have deeper knowledge of the field. To enhance the accuracy of information, the researcher has been ensured that respondents have had sufficient time and were not forced or intimidated at time or during administration of questionnaires or interviews

### **3.11 CONFIDENTIALITY AND ANONYMITY**

The names of participants that were involved to assist and participate on the research study are kept confidential and anonymous. Information and data collected are saved and reserved and will be destroyed 5 years after research completion.

### **3.12 ETHICAL CONSIDERATIONS**

The study was compliant with the ethical requirements of the Durban University of Technology. Ethical consideration was essential for this study, to ensure that the research could not be risky or involve any kind of deception. The researcher remained aware to ensure that data collected from the respondents will remain strictly confidential and participants' identities will be anonymously kept.

Also, the requirements have included the respect of participants, do not harm, be in good attire during data collection and be friendly and polite to participants. Thus, effort has been made to protect the privacy of respondents by not releasing their names.

### **3.13 CHAPTER SUMMARY**

This chapter has focused on the research design and methodology used to explore the socio-economic role of the petroleum refining industry in the DRC, through the case study of SOCIR. The chapter has presented the research design and types of methodology undertaken by the researcher to obtain data accurately as possible to authenticate the study. It presented the research design, target population, research instrument, and data collection method, pilot test or measurement instrument, ethical considerations and how the data analysis was done.

The mixed methods approach has also provided the researcher with a better understanding of the research problem by combining detailed perspectives of a few people in capturing the voices of participants, allowing participants' experiences to be understood in context (qualitative approach) and by attempting to draw conclusions from large numbers of people's perceptions, by analysing data efficiently, by investigating relationships within data, by examining probable causes and effects, by controlling bias and by appealing to people's preference for numbers (quantitative approach). Lastly, for the research to remain operational there was a certain form of ethical clearance, which is as well described in this chapter. The following chapter will focus on the data analysis and outcomes interpretations.

## **CHAPTER 4: DATA ANALYSIS AND FINDINGS**

### **4.1 INTRODUCTION**

The aim of the study was to explore the socio-economic role of the petroleum refining industry in the DRC through the case study of the SOCIR. This chapter presents the results and discusses the findings obtained from the questionnaires in this study. This chapter includes data analysis, findings and interpretations of quantitative and qualitative data collected respectively from four institutions and public and private people involved in the business of oil and gas activities in the country, including 100 participants using closed-ended, Likert scale questions administration and 5 respondents by means of face-to-face interviews interactions.

The findings highlight the perceptions, understanding and the implications of participants for the role played by SOCIR in the oil and gas industry and in the socio-economic environment of the DRC. The challenges experienced by SOCIR in the macro-environment and the potential socio-economic impacts or benefits the upgrading of SOCIR would have in the socio-economic situation of Congolese presently and into the future was also analysed.

### **4.2. RESPONSE RATE**

In total, hundred and five questionnaires were dispatched and six operational managers were interviewed. Data was obtained from questionnaires completed by 100 participants, comprising employees and students, and interviews of five operational managers were conducted from four organisations in the oil and gas industry, which gave a 90% and 83% response rate respectively. Therefore, the response rate was considerate to be at least 70%, acceptable for the study as fair representation of the respondents in the DRC's oil and gas industry.

### **4.3 THE RESEARCH INSTRUMENT**

The research instrument consisted of 93 items, with a level of measurement at a nominal or an ordinal level. The questionnaire was divided into 3 sections (ABC), which measured various themes and subthemes as illustrated in Table 4.1 below. The sub-sections C1B, C2B, C3B, C4B, C5B and C6B that are not included in the



tables below were the questionnaires which linked to interview and which are discussed in the second part of this chapter.

**Table 4.1: Research Instrument**

<b>A</b>	Biographical Data
<b>B</b>	Evaluating the factors affecting socio-economic development in the DRC
<b>C1A</b>	Constraints experienced by SOCIR in political environment
<b>C1C</b>	Effects of SOCIR upgrade on the political environment
<b>C2A</b>	Main challenges experienced by SOCIR in the economic environment
<b>C2C</b>	Encouraging effects of SOCIR upgrade on the economic environment
<b>C3A</b>	Challenges experienced by SOCIR in the social environment
<b>C3C</b>	Prospective effects of SOCIR upgrade on social environment
<b>C4A</b>	Constraints or challenges experienced by SOCIR in the technological environment
<b>C4C</b>	Effects of SOCIR technological improvement in the country's development process
<b>C5A</b>	Most constraints or challenges experienced by SOCIR in the international environment
<b>C5C</b>	Probable effects of SOCIR development in the international environment
<b>C6A</b>	Challenges experienced by SOCIR in the ecological environment
<b>C6C</b>	Effects of SOCIR upgrade in the ecological environment

#### 4.4 RELIABILITY STATISTICS

The two most important aspects of precision are **reliability** and **validity**. Reliability is computed by taking several measurements on the same subjects. A reliability coefficient of 0.70 or higher is considered as “acceptable” for a newly developed construct.

Table 4.2 below reflects the Cronbach's alpha score for all the items that constituted the study questionnaire.

**Table 4.2: The Cronbach's alpha score of items constituted the questionnaire**

		<b>Number of Items</b>	<b>Cronbach's Alpha</b>
Constraints experienced by SOCIR in political environment	C1A	3 of 3	0.487
Effects of SOCIR upgrade on the political environment	C1C	2 of 3	0.525
Main challenges experienced by SOCIR in the economic environment	C2A	7 of 8	0.650
Encouraging effects of SOCIR upgrade on the economic environment	C2C	13 of 13	0.779
Challenges experienced by SOCIR in the social environment	C3A	4 of 4	0.743
Prospective effects of SOCIR upgrade on social environment	C3C	13 of 13	0.851
Constraints or challenges experienced by SOCIR in the technological environment	C4A	5 of 5	0.526
Effects of SOCIR technological improvement in the country's development process	C4C	9 of 10	0.765
Most constraints or challenges experienced by SOCIR in the international environment	C5A	2 of 3	0.588
Probable effects of SOCIR development in the international environment	C5C	2 of 3	0.633
Challenges experienced by SOCIR in the ecological environment	C6A	4 of 5	0.402
Effects of SOCIR upgrade in the ecological environment	C6C	9 of 10	0.767

The reliability scores for all 5 out of 12 sections exceed the recommended Cronbach's alpha value of 0.70 for a newly developed construct. This indicates a degree of acceptable, consistent scoring for these sections of the research. The remaining sections have values that are less than the recommended value. This is mainly due to the interpretation of the statements that constituted the sections.

#### **4.5 FACTOR ANALYSIS**

The broad purpose of factor analysis is to summarise data so that relationships and patterns can be easily interpreted and understood. It is normally used to regroup variables into a limited set of clusters based on shared variance. It also helps to isolate constructs and concepts. Factor analysis is a statistical technique whose main goal is data reduction (Pearce, 2013: 79-81).

A typical use of factor analysis is in survey research, where a researcher wishes to represent a number of questions with a small number of hypothetical factors. For example, as part of national survey on socio-economic opinions, participants may answer three separate questions regarding environmental policy, reflecting issues at the local, state and national level. Each question, by itself, would be an inadequate measure of attitude towards environmental policy, but together they may provide a better measure of the attitude. Further, factor analysis can be used to establish whether the three measures do, in fact, measure the same thing.

If so, they can then be combined to create a new variable, a factor score variable that contains a score for each respondent on the factor. The requirement is that Kaiser-Meyer-Olkin Measure of Sampling Adequacy should be greater than 0.50 and Bartlett's Test of Sphericity less than 0.05. Therefore, the conditions are satisfied which allows for the factor analysis procedure. Factor analysis is done only for the Likert scale items. Certain components divided into finer components. This is indicated below in the rotated component matrix.

**Table 4.3: KMO and Bartlett's Test for Factor Analysis**

		Kaiser-Meyer-Olkin Measure of Sampling Adequacy	Bartlett's Test of Sphericity		
			Approx. Chi-Square	df	Sig.
Constraints experienced by SOCIR in political environment	C1A	0.580	16.623	3	0.001
Effects of SOCIR upgrade on the political environment	C1C	0.393	25.068	3	0.000
Main challenges experienced by SOCIR in the economic environment	C2A	0.506	122.438	21	0.000
Encouraging effects of SOCIR upgrade on the economic environment	C2C	0.852	371.983	55	0.000
Challenges experienced by SOCIR in the social environment	C3A	0.702	121.948	6	0.000
Prospective effects of SOCIR upgrade on social environment	C3C	0.791	503.371	78	0.000
Constraints or challenges experienced by SOCIR in the technological environment	C4A	0.585	45.354	10	0.000
Effects of SOCIR technological improvement in the country's development process	C4C	0.666	323.599	45	0.000
Most constraints or challenges experienced by SOCIR in the international environment	C5A	0.572	24.792	3	0.000
Probable effects of SOCIR development in the international environment	C5C	0.617	36.142	3	0.000

Challenges experienced by SOCIR in the ecological environment	C6A	0.496	40.325	6	0.000
Effects of SOCIR upgrade in the ecological environment	C6C	0.718	300.561	45	0.000

All of the conditions are satisfied for factor analysis. That is, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy value should be greater than 0.500 and the Bartlett's Test of Sphericity sig. value should be less than 0.05. The tables that indicate the Principal Component Analysis (PCA), which was used as the extraction method, and Rotation Method: Varimax with Kaiser Normalisation for all variables and each rotated component matrix are fully presented in the appendix. This is an orthogonal rotation method that minimises the number of variables which have high loadings in each factor, and simplifies the interpretation of the factors.

#### **4.6 TESTS OF SIGNIFICANCE AND RELATIONSHIPS**

A chi-square test was used to indicate whether the difference in scoring patterns were significant, the purpose of which is to nullify the hypothesis that suggests the scoring for each statement is the same. The scoring pattern for the statement which is attached to the appendix points out significant differences as their p-values were mostly less than the level of significance (0.05). Further, another chi-square test was used to determine significant relationships between the variables.

These are also attached as appendix. A bivariate correlation was performed as well on the ordinal data, where positive values displays a directly proportional relationship between the variables, and negative values indicate an inverse relationship; significant relationships are indicated by an asterisk (sample is also attached in the appendix). The descriptive and inferential statistics related to the results are jointly discussed where necessary.

#### **4.7 DEMOGRAPHIC INFORMATION OF THE RESPONDENTS**

The first part of questionnaire comprised questions that required respondents to indicate demographic information. The demographic information is accessible further down using descriptive statistics.

### 4.7.1 Section A: Biographical Data

This section summarises the biographical characteristics of the respondents.

The table below describes the overall gender distribution by age.

**Table 4.4: Biographical Data**

			Gender		Total
			Male	Female	
Age Category (years)	< 20	Count	1	1	2
		% within Age Category	50.0%	50.0%	100.0%
		% within Gender	1.3%	4.5%	2.0%
		% of Total	1.0%	1.0%	2.0%
	21 – 30	Count	19	12	31
		% within Age Category	61.3%	38.7%	100.0%
		% within Gender	24.4%	54.5%	31.0%
		% of Total	19.0%	12.0%	31.0%
	31 – 40	Count	18	4	22
		% within Age Category	81.8%	18.2%	100.0%
		% within Gender	23.1%	18.2%	22.0%
		% of Total	18.0%	4.0%	22.0%
	41 – 50	Count	21	5	26
		% within Age Category	80.8%	19.2%	100.0%
		% within Gender	26.9%	22.7%	26.0%
		% of Total	21.0%	5.0%	26.0%
	51 – 60	Count	11	0	11
		% within Age Category	100.0%	0.0%	100.0%
		% within Gender	14.1%	0.0%	11.0%
		% of Total	11.0%	0.0%	11.0%
	60+	Count	8	0	8
		% within Age Category	100.0%	0.0%	100.0%
		% within Gender	10.3%	0.0%	8.0%
		% of Total	8.0%	0.0%	8.0%
Total	Count		78	22	100
	% within Age Category		78.0%	22.0%	100.0%
	% within Gender		100.0%	100.0%	100.0%
	% of Total		78.0%	22.0%	100.0%

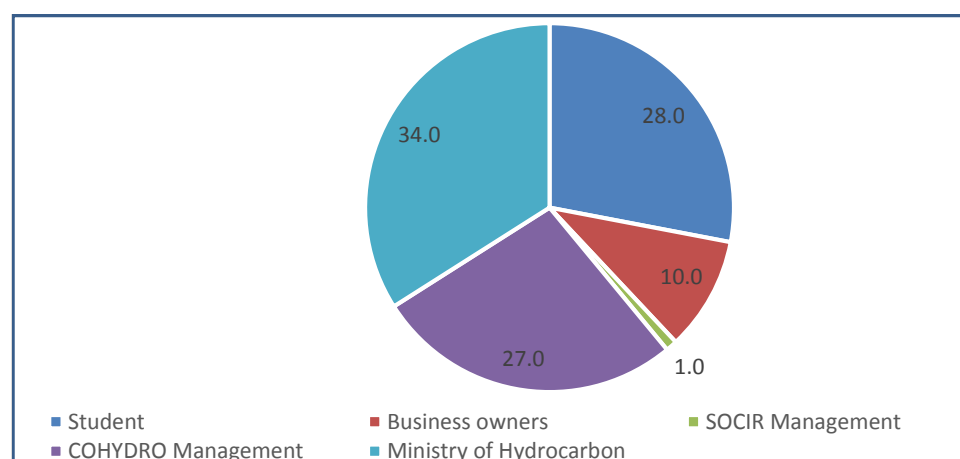
The findings indicate that the overall ratio of males to females which have participated in this study was approximately and respectively of 78.0% to 22.0%.

The results indicate a very dominant participation of males and less participation of females. This could justify and demonstrates significantly the level of inequality between males and females in the DRC in terms of participating in socio-economic activities and in terms of decision-making.

The leading opinion of skilled males over females in this study describes a general critical position of females in the work field and in other various sectors of the business environment in the country.

#### Figure 4.1: Respondents' Positions

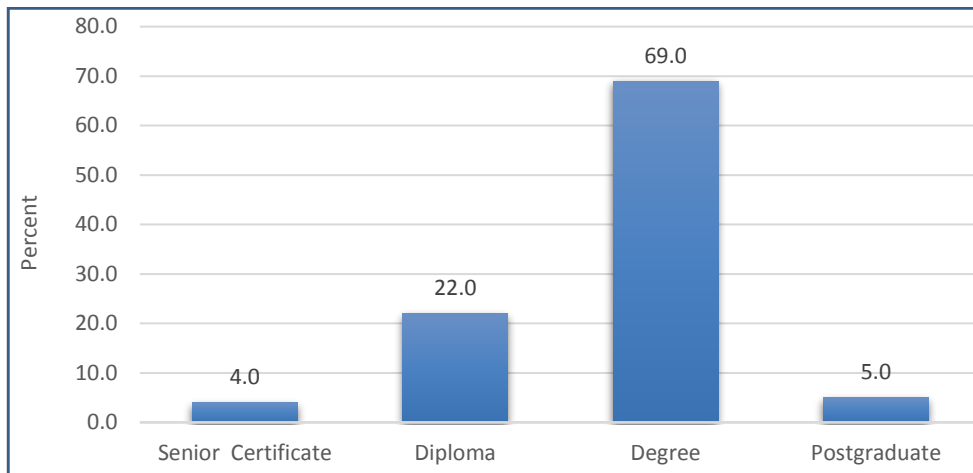
The figure below indicates the positions that respondents hold.



A third of the respondents (34.0%) are employed in the Ministry of Hydrocarbon. There were similar levels of COHYDRO management and employees (27.0%), Students (28.0%) were from IPG (Petroleum and Gas Institute), and SOCIR respondents represented only 1.0%.

#### Figure 4.2: Education Levels of the Respondents

The figure below indicates the education levels of the respondents.

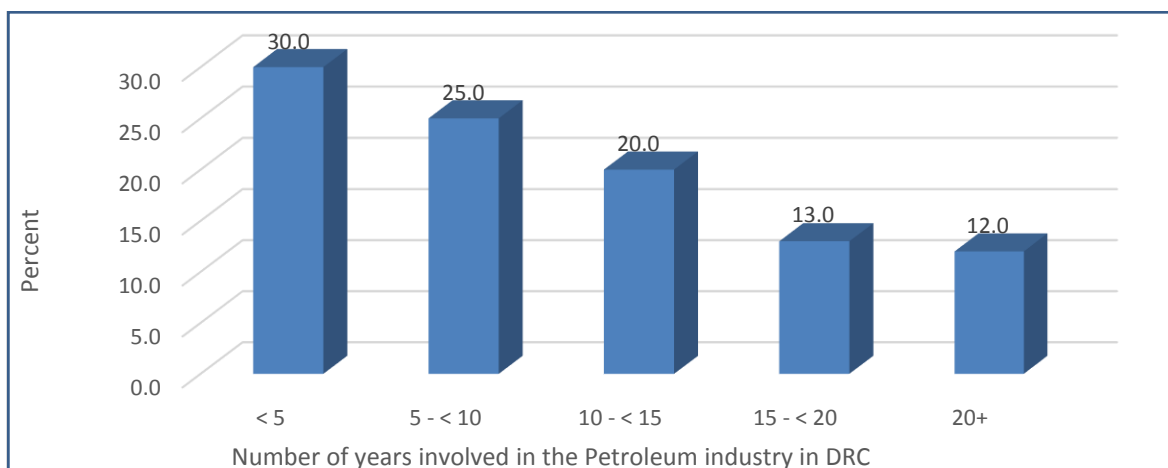


The majority of respondents (69.0%) had a post school qualification. Nearly three-quarters of the respondents had at least a degree. The rank of educational levels: postgraduate (5%), diploma (22%) and senior certificate (4%) indicate the trends of respondents mostly involved in the oil and gas industry.

This is a useful statistic as it indicates that a fair proportion of the respondents have a higher qualification. This also shows that the responses gathered would have been from an informed (learned) source.

#### **Figure 4.3: Length of Service of the Respondents**

The figure below indicates the length of service of the respondents.



Seventy percent of the respondents had been in employment for more than 5 years. This implies that respondents had been in employment for a while and this is also a useful fact as it indicates responses from experienced workers.

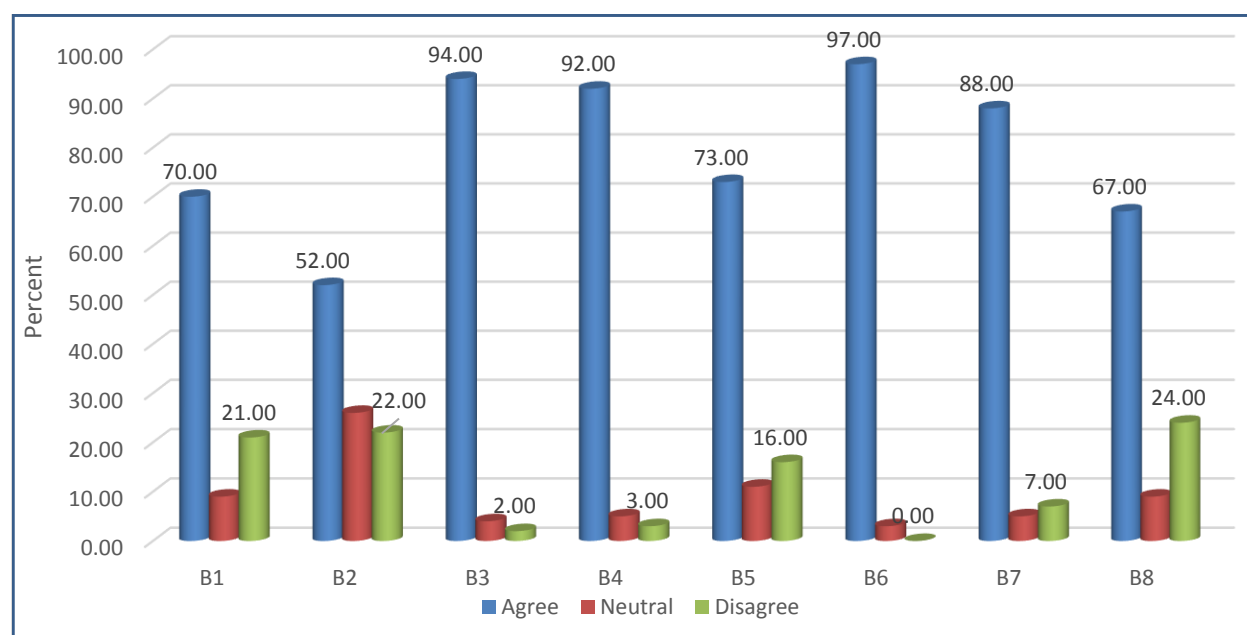
The section that follows analyses the scoring patterns of the respondents per variable per section. Where applicable, levels of disagreement (negative statements) were collapsed to show a single category of “Disagree”.

#### 4.8 SECTION B: OBJECTIVE 1: EVALUATING THE FACTORS AFFECTING SOCIO-ECONOMIC DEVELOPMENT IN THE DRC

The socio-economic instabilities or change are regularly influenced by factors that compose the management or business environment (Smit, 2011: 63). This section deals with the question that required respondents to indicate the factors affecting the socio-economic development in the DRC. The statements designated by way of B1 to B8 in the figure below, which were suggested to respondents to indicate the levels of agreement, neutral or disagreement are provided in the appendix, including the Chi Square p-value.

Figure 4.4 below summarises respondents’ understanding and perception and comprise the scoring patterns. It explains the statistical rate of participants’ responses and indicates their different view related to the factors affecting the socio-economic development in the DRC.

**Figure 4.4: Factors Affecting the Socio-economic Development in the DRC**





The following patterns are observed:

- Some statements show (significantly) higher levels of agreement whilst other levels of agreement are lower (but still greater than levels of disagreement).
- The significance of the differences is tested and shown in Figure 4.4 above.

The levels of agreement for statements related to B3, B4, B6 and B7 are describing most important factors affecting the socio-economic development of the DRC and provide a significant perception of the degree of challenges that are fronting the day-to-day living condition of Congolese.

The higher concern (for example: 97%) such as shown in the above figure, is the respondents' sensitivities about the statement that relate respectively to the lack of credible democratic institutions, the lack of enforcing legislation in the country, multiple macro-environment instabilities, and the lack of economic diversity. However, the levels of disagreement and neutral which represent 24% and 22% respectively are for the statements that relate to B8 and B2 shown in the above figure. But the lower level of agreement (52%) remains higher than the higher level of disagreement and neutral, which means that the factors enumerated in this study are exceptionally affecting the socio-economic environment of the DRC.

To determine whether the scoring patterns per statement were significantly different per option, a chi square test was done. The results are shown further above. The highlighted sig. values (p-values) are less than 0.05 (the level of significance), it implies that the distributions were not similar. That is to show that the differences between the way respondents scored (agree, neutral, disagree) were significant. The socio-economic issues could be related to the lack of well managing or controlling of the PESTIE factors, which for most of the time are instable and uncontrollable (Smit, 2011: 71).

#### **4.9 SECTION C: OBJECTIVE 2 AND 3: CHALLENGES EXPERIENCED BY SOCIR IN THE MACRO-ENVIRONMENT AND THE POTENTIAL EFFECTS OF SOCIR UPGRADE IN THE MACRO-ENVIRONMENT**

This section deals with the questions relative to the challenges experienced by SOCIR in the macro-environment and the promising effects the upgrading of SOCIR would have in the DRC through the PESTIE environments.

### 4.9.1 Political Environment

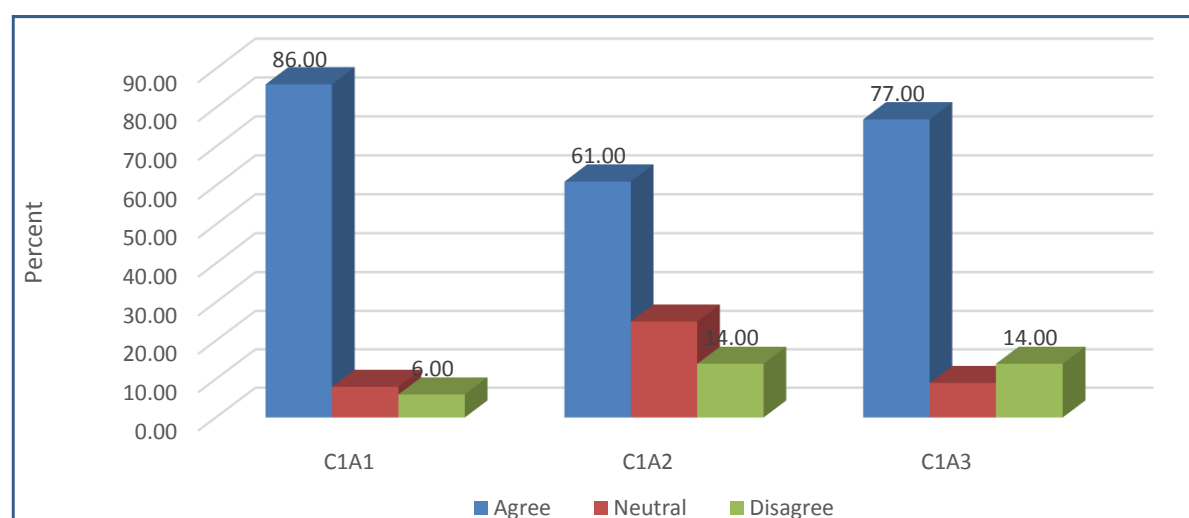
The political environment includes government and its political involvement and legislation through the petroleum charter which directs decision making in the oil and gas industry (Smit, 2011: 65). In this section, respondents were required to respond to the following questions:

#### **Q1.A: Indicate the major constraints experienced by SOCIR in political environment?**

This part discusses findings for the above question. Figure 4.5 below represents the degree of respondents' perception and understanding for the major constraints experienced by SOCIR in the political environment and comprises the scoring patterns. The statements designated by way of C1A1 to C1A3, which were suggested to respondents to indicate the levels of agreement, neutral or disagreement are provided in the appendix further below, including the Chi Square p-value. Figure 4.5 below summarises respondents' understanding and perception and comprise the scoring patterns. It explains the statistical rate of participants' responses and indicates their different view related to the major constraints experienced by SOCIR in the political environment.

**Figure 4.5: Major Constraints Experienced by SOCIR in Political Environment**

The Major constraints experienced by SOCIR in political environment are indicated in Figure 4.5 below.



The statistical significance of the response received indicates that all of the p-values (highlighted) are less than the level of significance of 0.05. This implies that the scoring patterns were significantly different. The average level of agreement for the major constraints experienced by SOCIR in the political environment (74.67%) indicates that respondents were typically assertive about the political influence in the oil and gas industry, which is continually affecting SOCIR and the oil and gas industry operations in the DRC.

As it can be seen from Figure 4.5, the results indicate that respondents were very concerned with statements relative to C1A1 (86%), C1A3 (77%) and C1A2 (61%) listed above, which describe respectively the degree of respondents' understanding and perception that point out the lack of contemporary petroleum charter which should guide the petroleum industry, the lack of public capacity to enforce regulations that should lead to SOCIR restructuring and upgrading project or the oil industry development, and the political pressure exerted by the consecutive ruling governments and its institutions in the oil business environment. This also means that the government of DRC has not played the role of implementing appropriate policies which could be profitable to the communities' socio-economic well-being and which could be steering or piloting development in the country Smit (2011: 64-65).

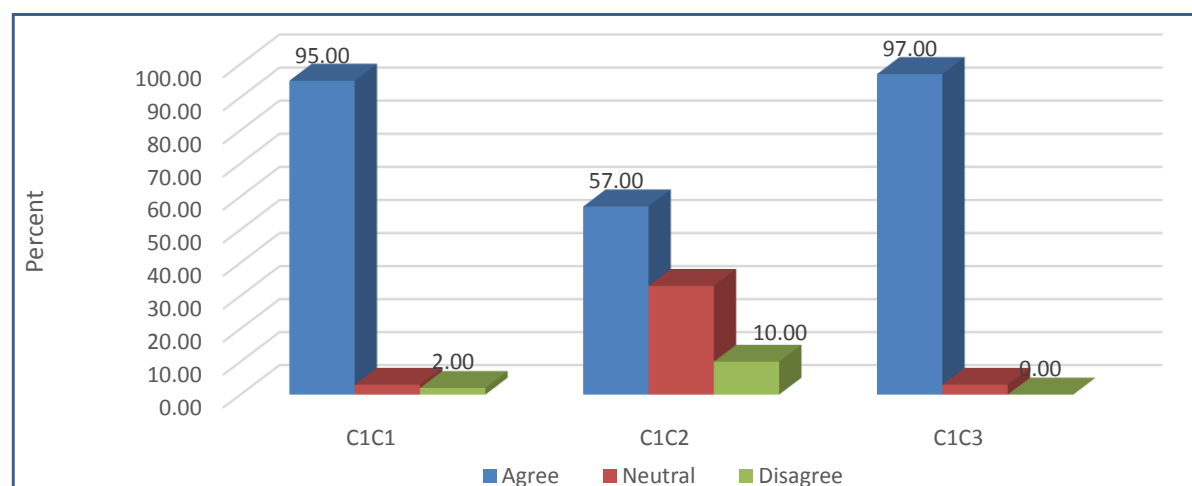
**Q1.B: Indicate the promising effects of SOCIR upgrade on the political environment?**

Findings for the above question are shown in Figure 4.6 below, which are signifying the degree of respondents' perception and understanding of the promising effects of SOCIR upgrade on the political environment, and comprise the scoring patterns. The statements designated by way of C1C1 to C1C3, which were suggested to respondents to indicate the levels of agreement, neutral or disagreement are provided in the appendix further below, including the Chi Square p-value.

Figure 4.6 below summarises respondents' understanding and perception and comprise the scoring patterns. It explains the statistical rate of participants' responses and indicates their different view related to the promising effects of SOCIR upgrade on the political environment.

**Figure 4.6: The Promising Effects of SOCIR Upgrade on the Political Environment**

The figure below shows the promising effects of SOCIR upgrade on the political environment.



From Figure 4.6 above, it is observed that all p-values (highlighted) are less than the level of significance of 0.05. This implies that the scoring patterns were significantly different. Therefore, respondents were required to indicate the promising effects of SOCIR upgrade in the political environment.

The majority of respondents (C1C3: 97%) and (C1C1: 95%) displayed respectively their expectation to the fact that the government of DRC could reduce the cost of oil refined products imports by promoting local oil refined products production and distribution in the country, and SOCIR upgrade could play a fundamental role in allowing the government to develop a security plan of fuel supply, as well to manage the stock of exchanges rate of the country.

The respondents' lower degree of expectation for C1C2 (57%) means that the lack of democratic institutions and strong political influence in the oil and gas industry may not promote progressive innovation and implementation of government legislation in the oil industry. This appears much lower as well because 33% of respondents were neutral or unconfident, due to actual political environment in the country, which is not guarantee that SOCIR development could stimulate liberal improvement of government legislation in the oil industry.

The promising effects of SOCIR upgrade on the political environment is expected to include the improvement of government regulation that involves discrimination law, consumer law, antitrust law, employment law, and health and safety law. These factors can affect how the oil industry operates, its costs, and the supply and demand for oil products (Shikhar 2010: 2).

#### **4.9.2 Economic Environment**

The economic environment comprises factors such as inflation, recession, exchange rate, the monetary and fiscal policy of the government that influence management decisions in undertaking the business of oil and gas (Smit, 2011: 65). This section relates to the degree of respondents' perception and understanding of the main challenges experienced by SOCIR in the economic environment and describes the encouraging effects of SOCIR upgrade on the economic environment. Respondents were required to respond to the questions below:

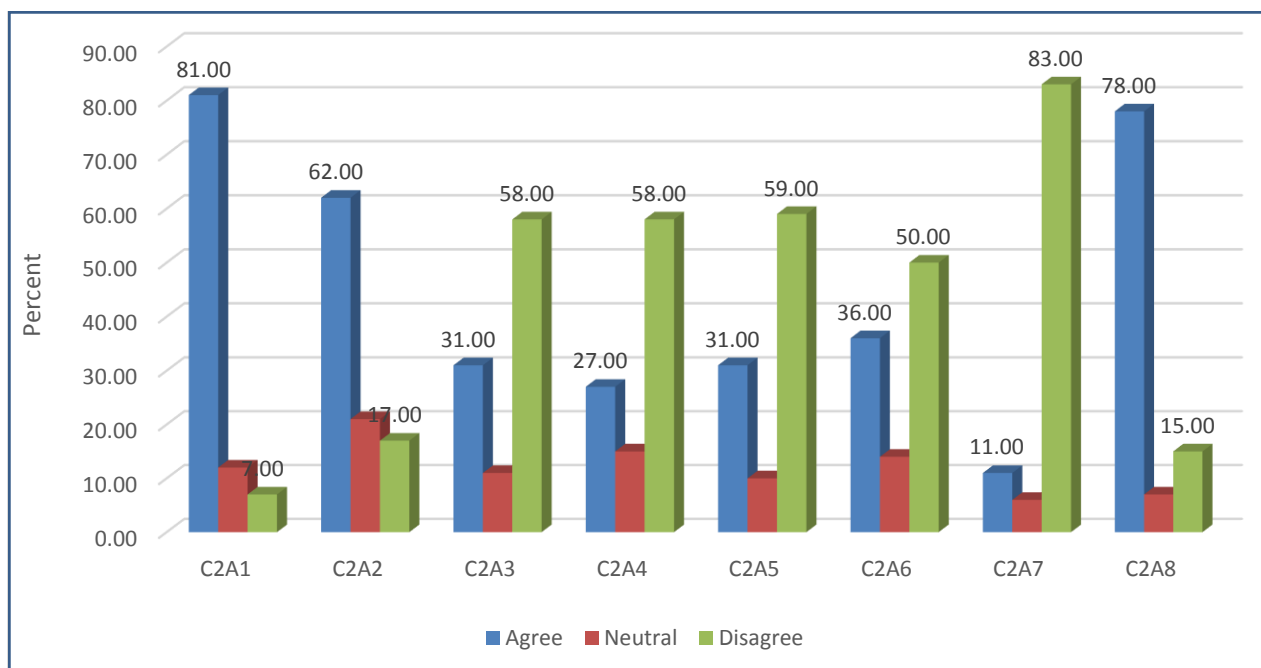
##### **Q1.A Indicate the main challenges experienced by SOCIR in the economic environment**

Outcomes for the above statement are presented in Figure 4.7 further down, which are signifying the degree of respondents' perception and understanding for the main challenges experienced by SOCIR in the economic environment, and comprise the scoring patterns. The statements designated by way of C2A1 to C2A8, which were suggested to respondents to indicate the levels of agreement, neutral or disagreement, are provided in the appendix below, including the Chi Square p-value.

Such as indicated in the appendix further below, it is noted that all the p-values (highlighted), which can be viewed in the appendix, are less than the level of significance of 0.05. This implies that the scoring patterns were significantly different.

##### **Figure 4.7: The main Challenges Experienced by SOCIR in the Economic Environment**

Figure 4.7 below indicates the significance of the main challenges experienced by SOCIR in the economic environment.



The results such as displayed from Figure 4.7 above describe interesting respondents' views concerning the challenges experienced by SOCIR in the economic environment as some statements have higher levels of agreement and disagreement. Relating to the respondents' understanding and opinion, the higher levels of disagreement 83% (C2A7) significantly mean that respondents have no confidence in that the low consumption or decreased demand for petroleum products in the country could lead to SOCIR breakdown, and that this statement may not be linked to the main the challenges experience by SOCIR in the economic environment. But, in their decision, the low consumption or decreased demand for petroleum products in the country is a statement that can be related to other factors such as socio-economic crises in the country (African Development bank, 2013: 8).

This is similar for the disagreement of statements that relate to C2A3 (58%), C2A4 (58%), C2A5 (59%) and C2A6 (50%), which can be observed in figure 4.7 above. Significantly, it is showing that these factors could not directly affect SOCIR operation, and therefore, they are not the main challenges that caused SOCIR break down. Contrary, the levels of agreement are very high for C2A1 (81%) and C2A8 (78%) associating the main challenges experienced by SOCIR in the economic environment to the lack of financial capital that has impeded SOCIR infrastructure innovation or upgrading project, and to the colonial economic model of exporting the

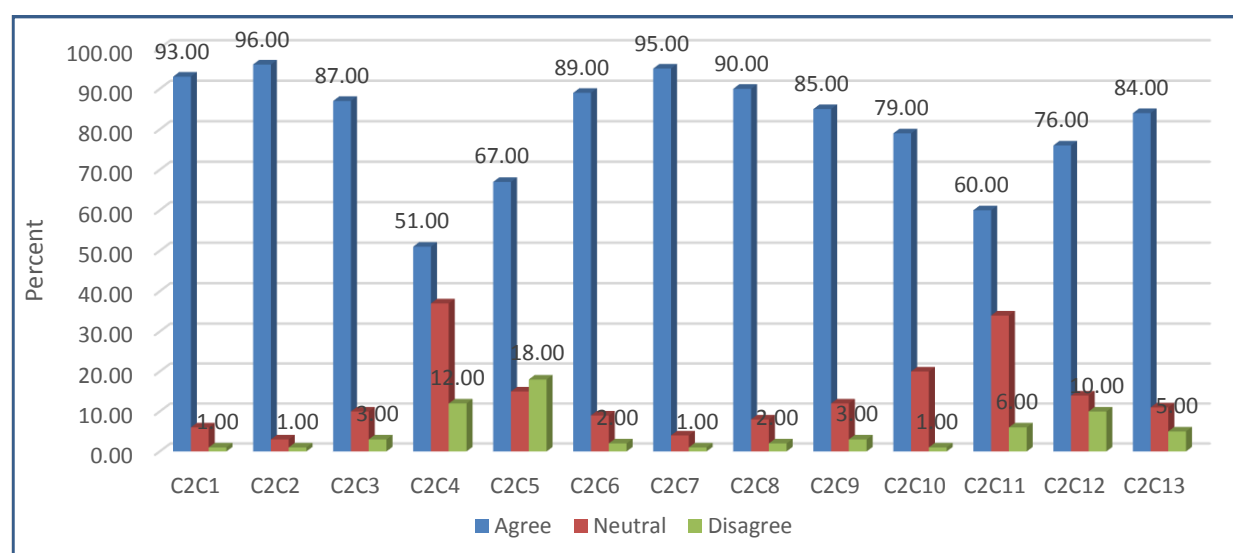
total oil output for imports of oil refined products. This has affected the project of SOCIR modernisation or the entire oil and gas industry development in the country.

**Q1.B: Indicate the encouraging effects of SOCIR upgrade on the economic environment?**

The outcomes from the above question are accessible in Figure 4.8 further down. These responses are demonstrating the degree of respondents' perception and understanding for the expected impacts of SOCIR upgrade on the economic environment, and comprise the scoring patterns. The statements designated by way of C2C1 to C2C13, which were suggested to respondents to indicate the levels of agreement, neutral or disagreement, are provided in the appendix further below, including the Chi Square p-value.

**Figure 4.8: The Encouraging Effects of SOCIR Upgrade on the Economic Environment**

The following figure shows the encouraging effects of SOCIR upgrade on the economic environment.



The observation from the above statistical significance of responses indicates that the p-values (highlighted) are less than the level of significance of 0.05. This means that the scoring patterns were significantly different. The findings presented in Figure 4.8 above reveals respondents higher positive expectations 96% (C2C2) of SOCIR upgrade effects on the economic environment. Respondents are highly committed

that SOCIR upgrade could generate much revenue that will contribute to the country's GDP growth and facilitate the DRC's oil industry integration, and promote economic diversity 95% (C2C7). There are as well great expectations that SOCIR upgrade could reduce the effects of colonial economic on exporting the entire crude oil output and reduce the cost of imports of oil finished products in the country 93% (C2C1). The respondents admitted that SOCIR upgrade could create the opportunity of attaining the safety of supply of fossil fuels in the country 90% (C2C8) and will promote the market of large and small business 87% (C2C3).

The strongest respondents' higher expectations for SOCIR upgrade impacts on the economic environment can be appreciated between the lower level of respondents' agreement that is above the higher level of neutral 37% (C2C4) and the higher level of disagreement 18% (C2C5).

#### **4.9.3 Social Environment**

The social environment takes account of people's lifestyles, urbanisation, habits, and values which are shaped by culture and, in turn, make certain demands on the organisation such as SOCIR: oil refinery or oil and gas industry (Smit, 2011: 65). This section indicates the degree of respondents' perception and understanding for the challenges experienced by SOCIR in the social environment and explain the potential effects of SOCIR upgrade on social environment.

#### **Q1A: Indicate the challenges experienced by SOCIR in the social environment?**

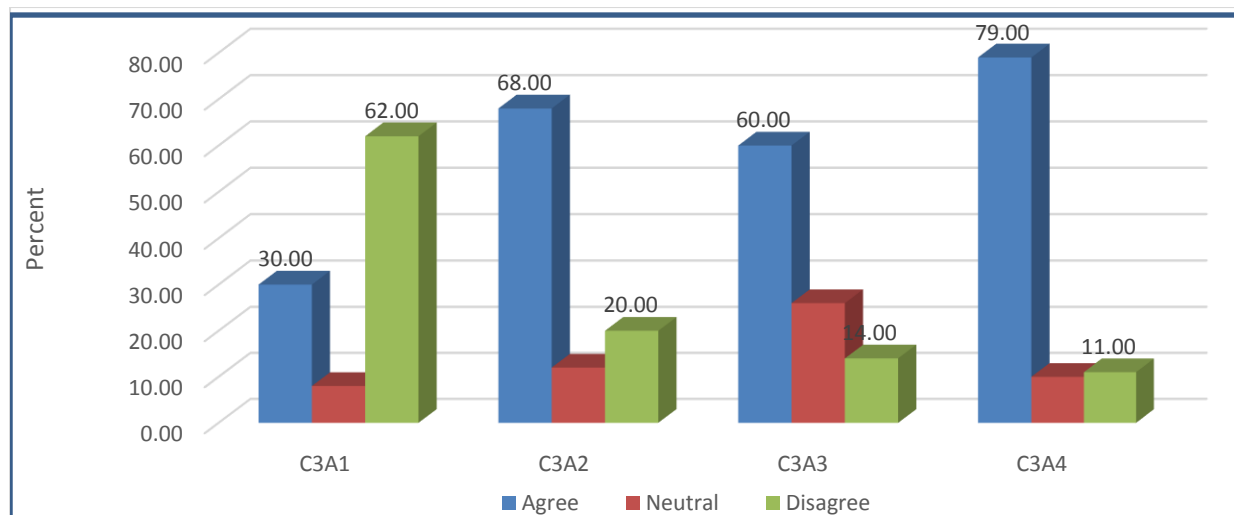
The findings from the question are available in Figure 4.9 further below. These findings are indicating the degree of respondents' perception and understanding of the challenges experienced by SOCIR in the social environment, and comprise the scoring patterns.

The statements designated by way of C3A1 to C3A4, which were suggested to respondents to indicate the levels of agreement, neutral or disagreement are provided in the appendix further down, including the Chi Square p-value.



**Figure 4.9: The Challenges Experienced by SOCIR in the Social Environment**

The below figure displays the challenges experienced by SOCIR in the social environment



From the above statistical significance of the responses, it can be noted that all the p-values (highlighted) are less than the level of significance of 0.05. This implies that the scoring patterns were significantly different. The findings observed from Figure 4.9 above illustrate the potential social challenges levels which are relevant to the lack of transparency in the management of oil operations (C3A4: 79%), to social crisis (misuse, distortion of public funds in the petroleum industry or corruption, poverty, insecurity) in the country (C3A2: 68%), and to the lack of CSR values implementation in the petroleum industry (C3A3: 60%).

These are among the causes of oil industry disintegration and SOCIR crisis in the country, and as well remain the most major causes of SOCIR inactivity, which have also led to oil industry crisis in the country. The level of respondents' disagreement (62% for C3A1) mean that the lack of accredited or credible academic institutions to train qualified or skilled people that have to run petroleum operations in the country in a matter may be directly related to the challenges experienced by SOCIR in the social environment. By considering their views, academic institutions such as IPG (Petroleum and Gas Institute) and other faculty are able to train skilled people that will enter into the oil and gas industry.

These institutions exist and they can be credible, but the challenges experienced by SOCIR in the social environment may be related to other various aspects that could involve the long period of unemployment of many qualified people, which are not socially held in reserve for further training or technically for new potential projects.

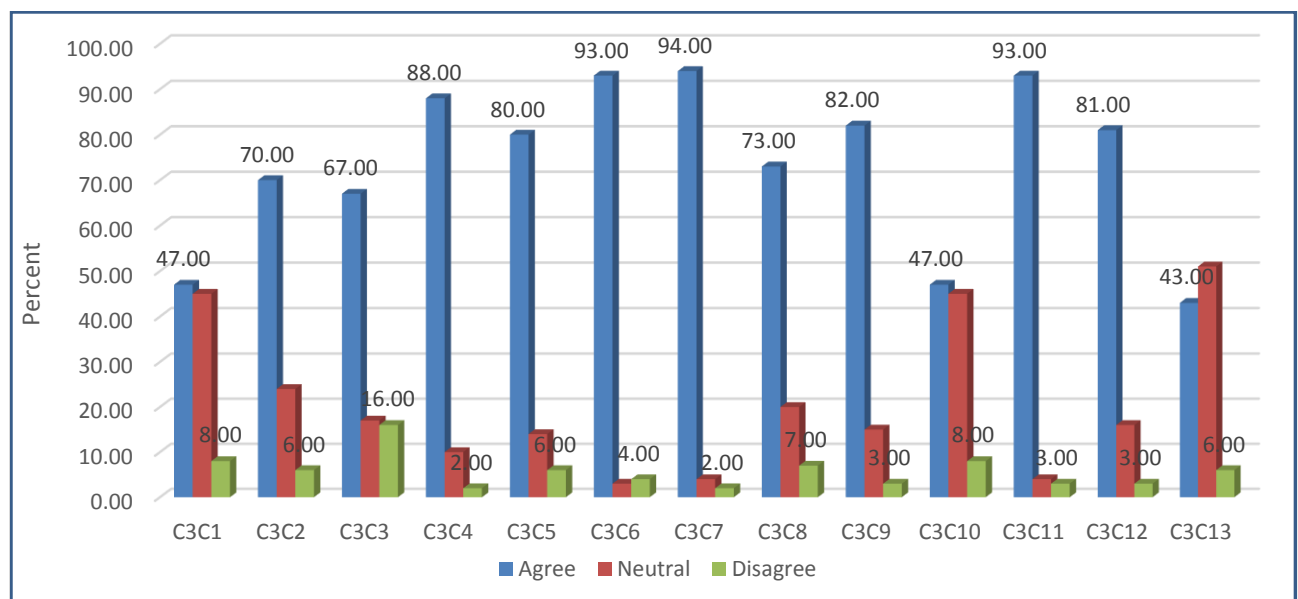
#### Q1.B Indicate the prospective effects of SOCIR upgrade on social environment

The respondents were required to indicate the prospective effects the upgrading of SOCIR would have on the social environment. Figure 4.10 below explains the levels of respondents' perception and understanding concerning the above question. The statements below designated by way of C3C1 to C3C13, which were suggested to respondents to indicate the levels of agreement, neutral or disagreement are provided in the appendix further down, including the Chi Square p-value.

Such as displayed further down in the appendix, it can be observed that all of the p-values (highlighted) are less than the level of significance of 0.05. This simply means that the scoring patterns were significantly different. Figure 4.10 below shows the levels of respondents' views.

**Figure 4.10: The Prospective Effects of SOCIR Upgrade on Social Environment**

The prospective effects of SOCIR upgrade on social environment are shown in this figure below.



The imperative of upgrading SOCIR in the DRC can be justified from the major respondents' levels of responses that can be easily perceived by the degree of agreement displayed through the above figure 4.10. The higher levels of agreement (C3C7: 94%, C3C6: 93% or C3C11: 93% and others) demonstrate sufficiently that SOCIR modernisation could stimulate progressive socio-economic change by contributing to the rural environmental development and promoting new investments or projects in the country.

Respondents perception about the prospective effects of SOCIR upgrade on social environment reflect great expectation of multiplier opportunities that could contribute on jobs creation and reduce unemployment or promote workforce skills into the petroleum industry, poverty reduction in the country, reduce and replace the use of firewood by the majority of rural people in promoting the usage of oil products as energy in the country.

The level of neutral respondents (C3C13: 51%) can be also considered on the fact that the project to upgrade SOCIR could be achieved, but there remain issues related to the PESTIE instabilities to be taking into account during and after the project implementation. Respondents are very reserved about the role that SOCIR upgraded could play to promote CSR values implementation in the oil and gas industry. This also means that efforts are needed from both shareholders and stakeholders to face potential challenges that will continually affect Congolese community as well as the oil and gas industry.

#### **4.9.4 Technological Environment**

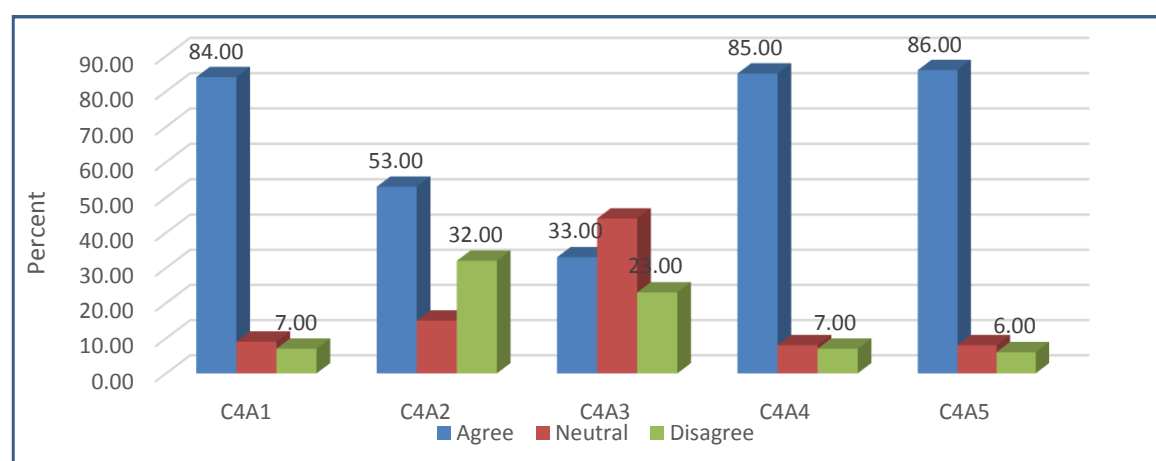
The technological environment refers to the knowledge of how to make something, and is involved in every process of a business operation, from manufacturing to marketing and to managing. It is continually responsible for the pace of innovation and change (Smit, 2011: 72). In this section, it was required to the respondents to indicate their degree of perception and understanding about the most constraints or challenges experienced by SOCIR in the technological environment. Their views and judgements are represented in Figure 4.11 further below.

### Q1.A: Indicate the most constraints or challenges experienced by SOCIR in the technological environment

The results concerning the above question are accessible within Figure 4.11 further below. These findings are indicating the degree of respondents' perception and understanding for the challenges experienced by SOCIR in the technological environment, and comprise the scoring patterns. The statements designated by way of C4A1 to C4A5, which were suggested to respondents to indicate the levels of agreement, neutral or disagreement are displayed in the appendix further down, including the Chi Square p-value.

**Figure 4.11: The Constraints or Challenges Experienced by SOCIR in the Technological Environment**

The figure below indicates the constraints experienced by SOCIR in the technological environment.



The above statistical significance of response indicates that all the p-values (highlighted) are less than the level of significance of 0.05. This suggests that the scoring patterns were significantly different. The respondents have indicated significantly that most constraints or challenges experienced by SOCIR in the technological environment are highly related to SOCIR ageing technological infrastructure, which has remained inefficient and incompatible to local crude oil (C4A5: 86%).

The degree of agreement (85%) means that respondents have perceived the lack of upgrading SOCIR with existing new technologies as an important factor that has retarded the fulfilment of its socio-economic role in the country's development

process, and 84% of respondents indicated that the lack of maintaining SOCIR infrastructure has led to the ageing of its equipment or breakdown. However, 44% of respondents (C4A3) are neutral concerning the statement relative to poor management in terms of recruiting and training employees, and as well as compensating them.

The lower level of agreement (C4A3: 33%) in this part could mean that respondents are not confident about what to say concerning the statement which relates to the poor management of SOCIR as one of the challenges that have contributed to SOCIR inefficiency. But, mostly, the real issue which was indicated by the respondents is the one that consist of constraints or challenges experienced by SOCIR in the technological environment, which relate with the statements involving C4A1, C4A4 and C4A5 in Figure 4.11 above.

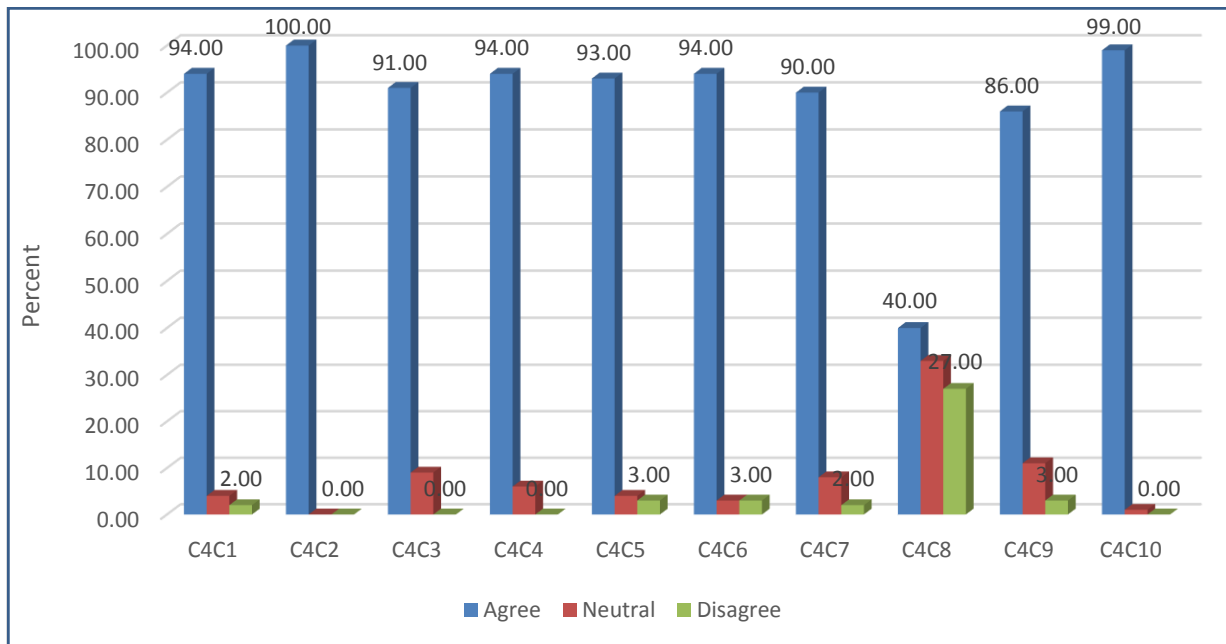
#### **Q1.B: Indicate the probable effects of SOCIR technological improvement in the country's development process**

The respondents were required to indicate their views on the probable effects of SOCIR technological improvement in the country's development process. The responses are indicated in figure 4.12 below. The statements designated by way of C4C1 to C4C10, which were suggested to respondents to indicate the levels of agreement, neutral or disagreement are displayed in the appendix further down, including the Chi Square p-value.

The statistical significance of the responses shows that all the p-values (highlighted) are less than the level of significance of 0.05. This implies that the scoring patterns were significantly different. Figure 4.12 below indicates respondents' levels of view for the probable effects of SOCIR technological improvement in the country's development process.

#### **Figure 4.12: Probable Effects of SOCIR Technological Improvement in the Country's Development Process**

The probable effects of SOCIR technological improvement in the DRC are displayed in the figure below.



The outcomes from respondents' perception and understanding in respect with the probable effects of SOCIR technological improvement in the country's development process are very highly rated. About 100% (C4C2) of respondents' indicated that SOCIR upgrade will create opportunity to increase its processing capacity or technological usage for producing local and international crudes oil (refinement).

The expectation is very great that 99% of respondents have confidence in that SOCIR technological improvement will be competitively advantageous for the oil industry development in country, 94% (C4C1, C4C4, C4C6) of them have acknowledged that SOCIR upgrade will play a key role that will stimulate the business environment improvement in the oil industry; local oil output which is totally exported will be processed in the country; SOCIR will play a strategic role in supplying the local market or serving local customers with sufficient quantity, quality and competitive oil products, and they also agreed that SOCIR upgrade will promote the internal or productivity activities improvement and provide planned operation of oil and gas industry integration.

The lower level of agreement (C4C8: 40%) that is above the higher level of neutral (C4C8: 33%) and disagreement (C4C8: 27%) means that respondents were not totally engaged to acknowledge the statement that relate to the fact that SOCIR will become a real threat for importers which competing in the market of oil products

distribution in terms of costs. They do believe that competition is the way of excellence for the oil and gas industry development.

#### **4.9.5 International Environment**

The international environment takes account of local and foreign trends and events that influence the oil and gas industry and the market environment (Smit, 2011: 65). In this section, respondents were required to indicate their degree of perception and understanding concerning the most constraints or challenges experienced by SOCIR in the international environment.

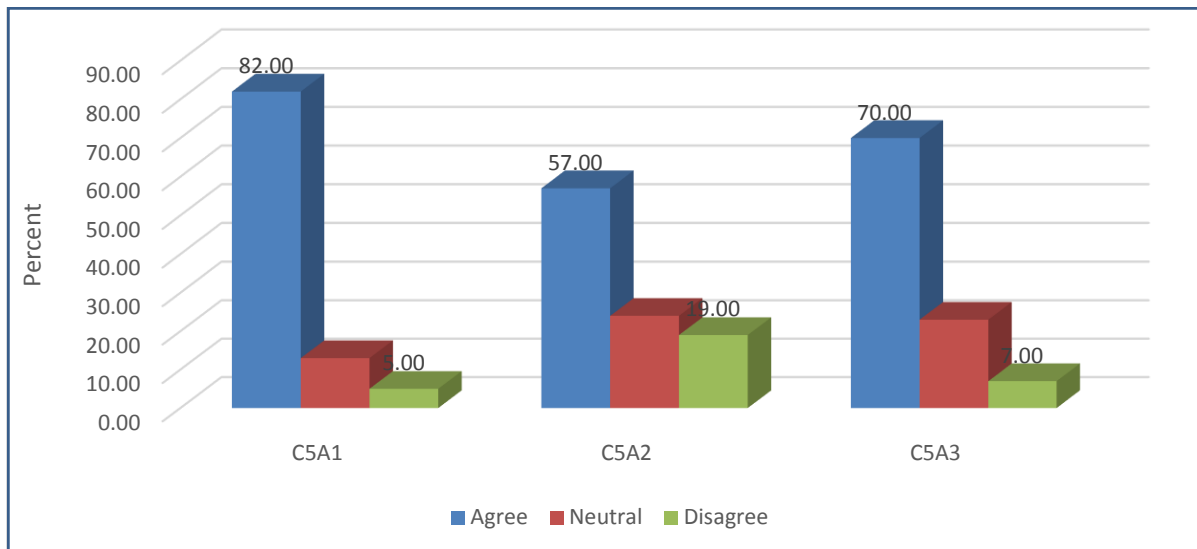
Their opinions and verdicts are represented in Figure 4.13 further down. The following statements designated by way of C5A1 to C5A3, which were suggested to respondents to indicate the levels of agreement, neutral or disagreement, are displayed in the appendix further down, including the Chi Square p-value.

#### **Q1.A: Indicate the most constraints or challenges experienced by SOCIR in the international environment**

The respondents' reactions are showed in figure 4.13 below, and comprise the scoring patterns.

#### **Figure 4.13: The Constraints or Challenges Experienced by SOCIR in the International Environment**

The figure below shows the challenges experienced by SOCIR in the international environment. The statistical significance of the responses is indicating that the p-values (highlighted) are less than the level of significance of 0.05, which means that the scoring patterns were significantly different.



The level of 82% and 70% are highly demonstrating the degree of control, dominance, and total dependence from which the international environment affects the national oil and gas industry. Respondents have agreed that international poor intermediation of conflict resolution in the DRC is one of the major obstacles that affect the socio-economic development process and impede stability of democratic institutions in the country. The high cost of international finance in the DRC, remains as well as one of the major obstacles to socio-economic development (57%).

The business environment grows with more opportunities and threats, if the international dimension is added (Smit, (2011: 77). The findings show that most constraints or challenges experienced by SOCIR in the international environment are highly correlating to the statement that implicate the international-dependence and dominance models through which the oil and gas industry including SOCIR in the DRC operate under international command or mechanism.

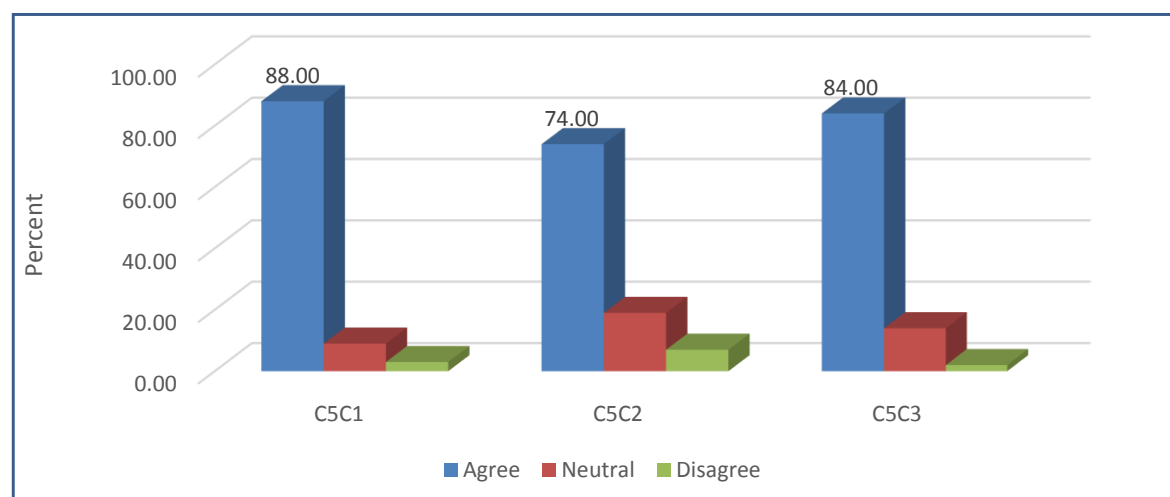
#### **Q1.B: Indicate the probable effects of SOCIR development in the international environment**

This declarative statement required respondents to indicate their opinions and understanding on the probable effects of SOCIR development in the international environment. The responses are indicated in figure 4.14 below. The statements designated by way of C5C1 to C5C3, which were suggested to respondents to indicate the levels of agreement, neutral or disagreement, are shown in the figure the appendix further below, including the Chi Square p-value.



**Figure 4.14: The Probable Effects of SOCIR Development in the International Environment**

The probable effects of SOCIR development in the international environment are showed in the below figure.



The statistics significance of the responses indicated that all the p-values (highlighted) are less than the level of significance of 0.05. This implies that the scoring patterns were significantly different.

Therefore, the findings show that 88% of respondents have agreed to the fact that the oil industry development including SOCIR upgrading in the DR Congo could reduce the effects of international dependence and dominance in the oil field, 84% of them acknowledged that the oil industry including SOCIR modernisation could increase the levels of international private investment and entrepreneurship in the DRC, and 74% of respondents have approved that the oil industry including SOCIR development in the DRC could contribute to reducing the high cost of international finance, by increasing and improving local finance.

Thus, the effect of SOCIR upgrade could produce or attract related investments, which could as well promote socio-economic activities and generate much income for an expected economic diversity ambition. The opportunity for increasing tax income collection is indeed significantly predictable.

#### **4.9.6 Ecological Environment**

The ecological environment comprises natural resources such as flora and fauna, mineral resources, access to water, quality of air, and climate evolution (Smit, 2011: 65). In this section, respondents were required to indicate their perception and understanding about the challenges experienced by SOCIR in the ecological environment, and to point out the degree of perception and understanding concerning the effects the SOCIR upgrade would have on the ecological environment. Their opinions and verdicts are represented in Table 4.16 and Figure 4.15 further down.

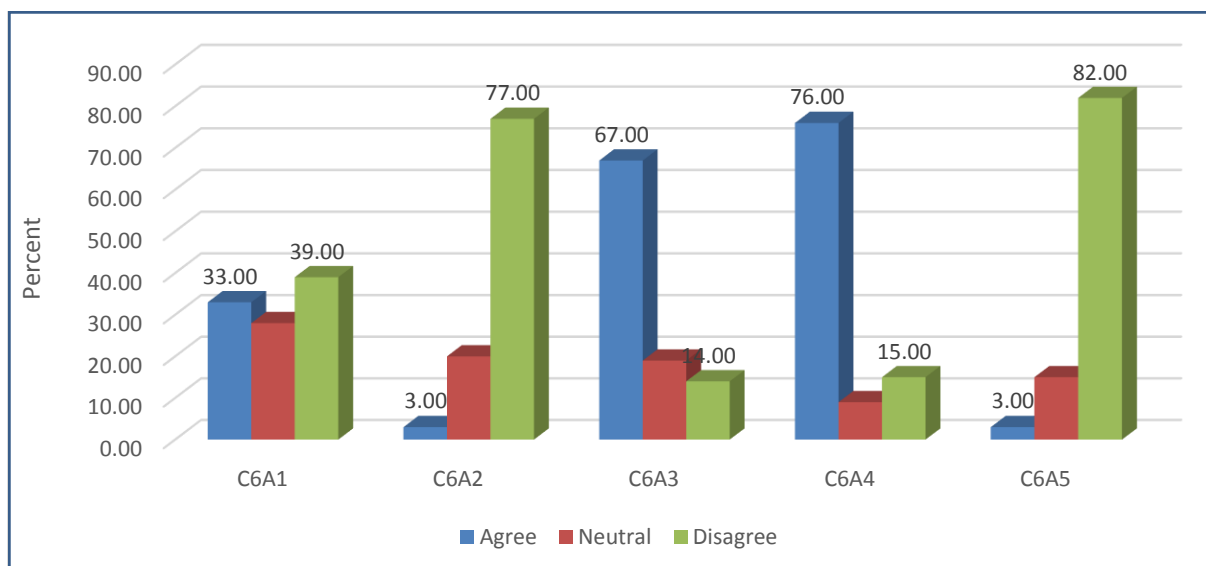
##### **Q1.A Indicate the challenges experienced by SOCIR in the ecological environment**

The responses such as showed in Figure 4.15 are respondents' views or opinions and which comprise the scoring patterns. The statements designated by way of C6A1 to C6A5, which were suggested to respondents to indicate the levels of agreement, neutral or disagreement, are shown in the appendix further down, including the Chi Square p-value.

The statistical significance of the responses indicates that all the p-values (highlighted) are less than the level of significance of 0.05, which means that the scoring patterns were significantly different. Figure 4.15 below provides the levels of respondents' understanding about the challenges experienced by SOCIR in the ecological environment.

##### **Figure 4.15: The Challenges Experienced by SOCIR in the Ecological Environment**

This figure shows the challenges experienced by SOCIR in the ecological environment.



With interest, the findings show that the higher portion of respondents (C6A5: 82%) have confidence in the fact that the DRC's crude oil density or characteristic is not light and 76% (C6A4) of respondents' consent as true that the DRC's crude oil is heavy. However, 77% (C6A2) of respondents' opinions acknowledge that the project to upgrade SOCIR was not affected by the issue of environmental degradation and there was not much pressure from environmental organisations to stop the prospective project that aim to develop SOCIR technological infrastructure or even to establish a new oil refinery in the country.

The findings indicate as well that 67% (C6A3) of respondents agreed the fact that DRC's crudes oil density has been incompatible to SOCIR technology, which has affected SOCIR's to not refine it locally, and 39 % (C6A1) of respondents have disagreed that SOCIR operation has caused a real problem of pollution in the country. The findings are also showing the degree of confusion and misunderstanding of the real quality, characteristic or density of the DRC's crude oil. Only 15% (C6A4) of respondents are thinking that the DRC's crude oil is not heavy and 15% (C6A5) are not confident (neutral) on the real quality of crude oil being exploited in the province of Bas-Congo.

A very few respondents 3% (C6A5) have conviction that the DRC's crude oil could have good quality. Further research needs to be undertaken aiming much clarification with regard to the real density of the DRC's crude oil. But the statistics provided in Chapter 2 and these which were given to the researcher during the

interview by one of the respondents from the DRC's Ministry of Hydrocarbons (indicated as well further below in the second part of this chapter), attest sufficiently that crude oil being exploited in the country and particularly in the province of Bas-Congo have the characteristics (API density: 31.2 – 33.7) that can be comparable to similar light crude oil produced by many other countries.

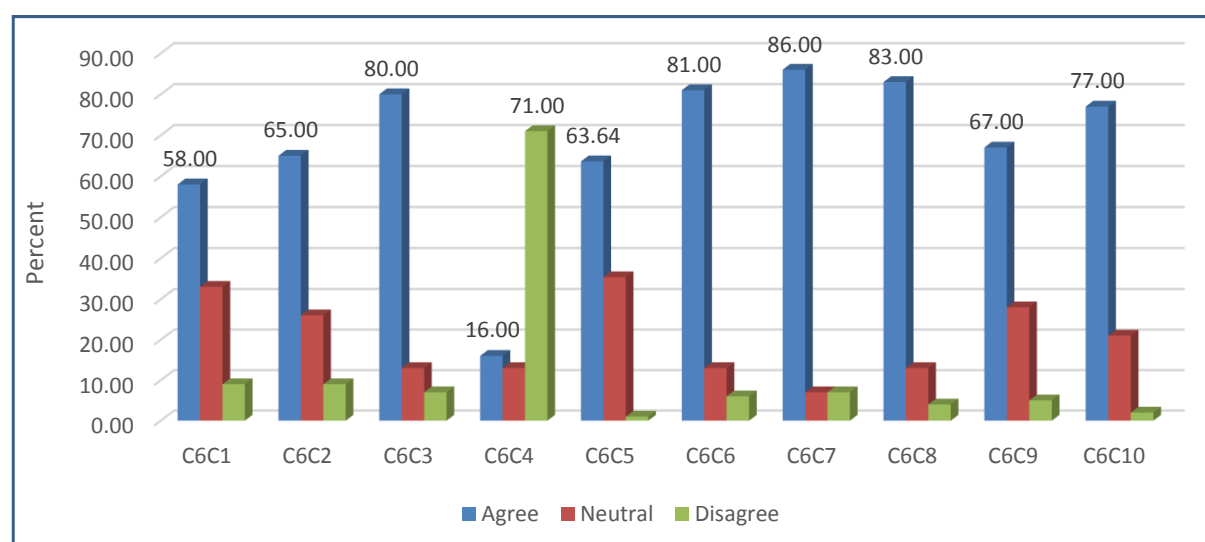
### Q1.B Indicate the effects of SOCIR upgrade in the ecological environment

The findings such as presented in Figure 4.16 below are respondents' views or opinions linking to the declarative that point out the effects of SOCIR upgrade in the ecological environment. The statements designated by way of C6C1 to C6C10, which were suggested to respondents to point out the levels of agreement, neutral or disagreement are indicated in the appendix further down, including the Chi Square p-value.

From these statements, it is observed that the statistical significance of the responses shows all the p-values (highlighted) are less than the level of 0.05, which indicate that the scoring patterns were significantly different. Therefore, Figure 4.16 below implies the degree of respondents' perceptions or understanding about the effects of SOCIR upgrade in the ecological environment.

**Figure 4.16: The Effects of SOCIR Upgrade in the Ecological Environment**

The figure below indicates the effects of SOCIR upgrade in the ecological environment.



The findings such as indicated in this above figure demonstrate the general respondents' positive opinions concerning the effects of SOCIR upgrade in the ecological environment. Major respondents 86% (C6C7) showed that SOCIR upgrade is an opportunity for the government to take steps that will limit, as far as possible, any detrimental effects on the environment, while 71% (C6C4) of respondents does not approve that SOCIR upgrade will increase the risk of ecological threat to the country.

Even if the rate of risk for ecological threat may be increased due to SOCIR modernisation, 93% (C3C6, see effects of SOCIR upgrade on social environment) of respondents have confidence in that the high rate of unemployment in the country will need to be reduced by the effects of new investments on industrial expansion for economic diversity and socio-economic growth, so that SOCIR upgrade will not affect or increase seriously the threat to ecological environment.

But, about 77% (C6C10) of respondents trust that SOCIR upgrading project could stimulate the government of DRC to support the national public or private commission of risk management in improving operations that prevent environmental threats, and 83% (C6C8) of respondents accept as true that SOCIR upgraded with efficient and modern technology, will play a key role in managing environmental safety by reducing potential negative effects of pollution on soil, air and water in the operational area. Other interesting respondents' opinions concerning the effects of SOCIR upgrade can be seen through Figure 4.16 above.

The section below discusses the findings obtained from the interview questionnaire instrument, which is analysed using Nvivo and thematic analysis of interview questions.

## **4.10 MIXING OF QUANTITATIVES AND QUALITATIVES RESULTS**

### **4.10.1 Introduction**

The inductive thematic analysis was used to analyse the interview data. The coding and generation of themes was done using Nvivo software package for the interview responses. The interview responses were grouped according to themes which are compared further below to the main themes related to quantitative results. This section presents the results and discusses findings obtained from both quantitative

and qualitative data. The interview was the second tool that was used to collect data and was focused on five of the administrative managers selected respectively from COHYDRO, Ministry of Hydrocarbons, the Petroleum and Gas Institute and SOCIR. Data collected was analysed using Nvivo Pro software version 11 and thematic analysis. Through Nvivo software package, respondents from these organisations were individually coded as R1 for COHYDRO, R2 and R3 for the Ministry of hydrocarbons, R4 for the Petroleum and Gas Institute, and R5 for SOCIR. The focus for qualitative data collected was on measuring the critical perception and understanding of experienced respondents involved in the DR Congo's oil and gas industry for a certain period of years.

This was done with trends to relay their views to the objectives defined for this study. Furthermore, the interview data consisted of capturing the input of respondents in relation to the socio-economic role of the petroleum refining industry in the DRC's development process, by means of using macro-environment variables. These variables include the following factors: Political, Economic, Social, Technological and Ecological environments.

#### **4.10.1.1 Results, Discussion and Interpretation of Findings**

Creswell (2015: 37), indicated how to merge the two databases, one numeric and one text-based. This is called explanatory sequential design. The purpose of the explanatory sequential design for this study was to analyse the aim and objectives defined by beginning with a quantitative strand (a strand refers to either the quantitative or qualitative component of a study). This was done to both collect and analyse data, and then followed by qualitative research that explain the quantitative results. In this study, the inference about qualitative results helped to explain the quantitative results.

The explanation is made in relation with the objectives of the study, which is relevant to the PESTIE framework. The sub-themes from qualitative results linked to the main themes from quantitative results are many; only the key components relevant to the study are included in the table below. Table 4.18 below relates to Figure 3.1 (Mixed Methods Designs for Data Analysis in the chapter 3) and helps to identify the qualitative results that explain the quantitative results.

**Table 4.18 Inference of Quantitative and Qualitative Results**

Factors	Themes: quantitative results	Sub-themes: qualitative results
Political Environment	<b>Challenges:</b> Lack of public capacity to enforce laws and regulations.	-lack of good governance, justice, stable social climate, security of people and their properties, protection of investors and their investments, and a free and regulated market system, -Lack of transparency in the management of oil industry business, -The lack of political constructive decisions that bring change and development.
	<b>Effects:</b> SOCIR upgrade could allow the government to develop a security plan of fuel supply, reduce the cost of oil refined products imports and the risk of total crude oil export, and promote regulations innovation for oil and gas industry development.	-Sustainable socio-economic growth,  -Promotion of creative regulations, policies and strategies that support the entire oil industry development,  -Government could be financially able to act for basic infrastructures development and fighting corruption by promoting transparency, controlling and monitoring oil activities in compliance with the regulation in force.
Economic Environment	<b>Challenges:</b> Lack of financial capital and unclear or lack of well implementing the fiscal policy on oil and gas activities.	-Lack of economic diversity -Strong international dominance in the oil field, -Low contribution of oil and gas sector in the State budget and GDP growth, -Strong dependence on the primary industry, -Lack of secondary industry development, - Lack of oil refinery's competitiveness in the oil industry, -Lack of appropriate technology to refine local crudes oil.  -Main source of energy for national security of supply,
	<b>Effects:</b> SOCIR upgrade could generate much revenue and promote the market of large and small business in the country.	-Possibility for vertical and horizontal national oil and gas industry integration, -Jobs creation: direct and indirect employments, -Promote the economic growth and affect the general state of the economy, -Contribution to the State budget, -Possible effects on the exchange rate, inflation rate, price of goods, and the transport industry system.
	<b>Challenges:</b> Lack of credible union labour, lack of transparency and lack of CSR values implementation in the oil and gas industry.	-Increasing rate of unemployment, poverty and inequality in the country, -Low contribution to socio-economic infrastructure improvement,

Social Environment		<ul style="list-style-type: none"> <li>-Lack of sufficient training Centre that promote human capital with skilled knowledge to run effectively and responsibly the oil and gas industry operations,</li> <li>-Lack of accurate information in regard with the management of oil operations in the country.</li> </ul>
	<b>Effects:</b> Socio-economic infrastructure improvement	<ul style="list-style-type: none"> <li>-Multiple effects of direct and indirect jobs creation,</li> <li>-Opportunities for people lifestyle change and improvement,</li> <li>-Possible accessibility of community to basic public and private services.</li> </ul>
Technological Environment	<b>Challenges:</b> Ageing and lack of SOCIR technological infrastructure maintenance and innovation.	<ul style="list-style-type: none"> <li>-Lack of SOCIR machinery innovation,</li> <li>-Lack of technical skill or capacity to maintain SOCIR operation,</li> <li>-Incompatibility with local crudes oil characteristics,</li> <li>-Expensive cost to modernise SOCIR,</li> <li>-Lack of financial capital to maintain and keep up to date SOCIR infrastructure.</li> </ul>
	<b>Effects:</b> SOCIR upgrade could create opportunity to increase its capacity with new technological usage of producing local and international crude oil and to become competitively advantageous for the oil and gas industry integration and development.	<ul style="list-style-type: none"> <li>-SOCIR upgrade will become appropriately efficient to process local crude oil,</li> <li>-SOCIR with full cracking technological units for example will become compatible to refine any type of crude oil, and increase the refinery capacity of production per barrel per day,</li> <li>-SOCIR development could attract industrial expansion and promote related businesses growth; for example, petrochemical industry development,</li> <li>-SOCIR upgrade could cause a real change to the actual size of local market that depend totally on the international oil market,</li> <li>-SOCIR upgrade with new technological units could be able to produce good quality of oil products which are environmentally recommended</li> </ul>
	<b>Challenges:</b> The oil and gas industry, including SOCIR in the DR Congo is operating under international dependence and dominance model.	<ul style="list-style-type: none"> <li>-The colonial economic model based on export of natural mineral resources and import of all need on petroleum finished products for example, will not promote the oil and gas industry development,</li> </ul>



<b>International Environment</b>	<b>Effects:</b> SOCIR modernisation and the oil and gas industry integration and development could reduce the effects of international dependence and dominance in the oil field.	and particularly SOCIR improvement.  -SOCIR development could increase public and private investments initiative in the country and promote a non-discriminatory (fair) partnership between DRC and international partners in the oil field.
<b>Ecological Environment</b>	<b>Challenges:</b> Confusion on the physical characteristics or density of crudes oil produced in the DRC, and its incompatibility to be processed locally by SOCIR.	<p>-Strong political involvement and dominance in the management of oil and gas operations has reduced the effects of transparency in the oil field and increased the lack of accurate information in regarding the real quality (crude oil density) and production statistics of crude oil produced and exported in the DRC,</p> <p>-Lack of government accountability or public capacity to monitoring truthfully with rigor oil activities in the country,</p> <p>-Strong corruption in the management of contracts or production sharing agreement between the government and foreign partners, which led the oil and gas industry to become a black hole and an opaque sector of the national economy,</p> <p>-Lack of political good will to approve and implement the appropriate feasibility study that have to be applied for SOCIR and the oil and gas industry development,</p> <p>-Lack of monitoring with rigor all risk related to environmental pollution and degradation.</p>
	<b>Effects:</b> SOCIR and oil and gas industry development could be an opportunity for the country to take steps that will limit, as far as possible, any detrimental effects on the environment and promote a dynamic commission which will deal with issues related to environmental risk, protection and prevention.	<p>-Production of clean oil products in the country,</p> <p>-Reduce threat of air, water and soil pollution,</p> <p>-Possibility for credible union trade to be emerged, which could contribute on rising the awareness of risk or threat to environmental degradation and pollution,</p> <p>-An opportunity for environmental laws and regulations to be continually improved and implemented for the wellbeing of people working and living around the oil field operation area.</p>

Based on Creswell (2015: 37), qualitative results such as analysed in this chapter and described in the table above have additionally explained or justified quantitative results discussed and analysed as well in this chapter. Generally, both results are significantly correlated. The same factors, challenges and effects are discussed in next section.

#### **4.10.1.2 Description and Interpretation of Quantitative and Qualitative Results.**

The general process for achieving this study consisted of identify a problem, determine research questions, collect data, analyse data, and interpret results (Creswell 2015: 4). In mixing results, the following symbols are used:

- Quantitative responses are designated as **QN**,
- Qualitative results as **QL**, and
- **Q1A**, **Q1B**, **Q1C** and **Q1D** symbols indicate questions that were inquired to respondents.

Element of both quantitative and qualitative results are combined and explained as follow:

##### **4.10.1.2.1 Mixing of QN and QL key results related to Political environment**

In the QN data collection, respondents were required to respond to the following question:

**Q1A:** Indicate the major constraints experienced by SOCIR in the political environment.

**The QN results related to political environment are as follows:**

- 86% of respondents were agree that the DRC lack the contemporary petroleum charter which should guide the petroleum industry development, 77% have showed that the country lack public capacity to enforce regulations that should lead to SOCIR restructuring and upgrading project or oil and gas industry development, and 61% of respondents indicated that the political pressure exerted by the consecutive ruling governments and its institutions in the oil and gas business environment are among the constraints experienced by SOCIR in the political environment.

In the QL data collection, respondents were required to respond the following question:

**Q1B:** Indicate the political factor affecting the oil industry development process in the country.

**The QL results related to the political environment are as follows:**

- The lack of laws and regulations implementation are affecting the oil and gas industry development process in the country;
- The improvement of a coherent and transparent management principles collides still with the lack of political good will from political actors to maintain a stable climate of the business environment;
- The opacity of several socio-economic activities that mostly occur out of the formal structure in the country is an amplified example [R4].
- The lack of political decisions-making to improve the oil and gas industry is among the key factors affecting SOCIR innovation.

#### **4.10.1.2.2 Interpretation of QN and QL results about the political factors affecting SOCIR and the oil and gas industry development**

There is significant correlation between QN and QL results, given that QL responses explain accurately the QN results. However, the findings indicate that there exists laws and regulations framework on the hydrocarbon sector. But it is observed that the actual law promotes mostly the upstream industry than the refinery industry. Respondents stated that since 1 August 2015, the president of the republic has promulgated the Law No. 12-015 on the code of hydrocarbons.

Despite this intention, the lack of political good will is still an obstacle to put in place a real structure for oil and gas industry development. The main constraint involves as well the lack of implementing regulations in the oil and gas industry, which are still being framed at the Ministry of Hydrocarbons, particularly through the General Secretary. Conversely, the law concerning oil activities in the country was promulgated to give orientation and to guide the oil industry development. Unfortunately, problem keeps on remaining unresolved. Also, respondents have acknowledged that the lack of putting into practice of these laws is causing a major barrier to national petroleum industry development.

By promulgating and enforcing laws and regulations, the government could influence the oil and gas industry with measures that are usually politically directed, steering oil and gas operations, development process and economic policy in certain direction (Smit, 2011: 76).

#### **4.10.1.2.3 Discussion about the promotion of oil and gas industry development process in the political environment.**

In the QN data collection, respondents were required to respond to following question:

**Q1C:** Indicate the promising effects of SOCIR upgrade on the political environment.

**QN results related to the above question are as follow:**

- 97% of respondents have confidence in that the government of DRC could reduce the costs of oil products imports by promoting local oil refining industry development, which could be efficient and compatible to process local and international crudes oil; 95% of them accept as true that SOCIR upgrade could play a fundamental role in allowing the government to develop a security plan of fuel supply, as well as to manage the stock of exchange rate of the country; and 57% of respondents have faith in that SOCIR development could promote progressive innovation of government regulations on oil and gas activities in the country.

In QL data collection, respondents were required to respond the following:

**Q1D:** Indicate how does the government of DRC expect to promote the oil industry development process in the country.

**QL results related to the above question are as follows:**

- Good governance, justice, stable social climate, security of people and their properties, protection of investors and their investments, and a free and regulated market system will allow the government to promote not only the development of petroleum industry, but also the entire socio-economic activities in the country [R1].
- A feasibility study is the key prior to SOCIR upgrading project [R2 and R3].

Respondents indicate further that the oil industry development including SOCIR upgrading can cause the government to gradually improve the law on hydrocarbons and promote the oil industry integration in the country. Other benefits related to the promotion oil and gas industry involve the following key elements:

- Transparency in the management of the upstream oil industry,
- Create self-sufficiency energetics and support trading of petroleum products in the country or in various regional markets,
- Improving attractive policies, flexible regulations and laws that provide ways for local and international investors to create or develop businesses,
- Upkeep political and socio-economic stability climate in the country, and
- Sustaining flexible fiscal policies that boost small and large business development,
- Possibility to create open doors for new investments that could support the oil and gas refinery's industry transformation.

The political environment, with the government and its political involvement promote the oil and gas industry through policies and legislation as the primary components (Smit 2011: 65). An example would be the improvement of petroleum Charter in the DRC, which gives directions for decision-making for petroleum industry development.

#### **4.10.1.2.4 Interpretation of QN and QL results about political factors promoting SOCIR and the oil and gas industry development**

Significantly, quantitative results are explained by qualitative findings as follows;

- The law gives opportunity by invitation to offer to tender of companies that can be chosen to invest in the oil sector and for its development. And the law provides that in 48 hours the government can facilitate the processing of documents authorising the creation of a company in the oil sector [R1].
- The innovative policies and strategies that promote the entire oil industry with a fair business climate in the oil industry could fascinate and drive the oil industry in becoming fundamental sector that may contribute to socio-economic change.

- A flexible laws and regulations could also motivate international and local investors for more activities in the oil and gas sector [R3].
- A fair management of laws, regulations and policies is fundamental for public and private investments campaign in the oil industry sector.
- The political and socio-economic stability environment is as well the key to a good governance of hydrocarbon resources, based on transparency criterion and a coherent legal framework.
- A stable democratic institution remains the fundamental factor that could promote SOCIR and the business of oil and gas products in the country.
- The political good will is a vital issue to be taken into consideration, in the matter of developing the petroleum industry or attracting potential investors [R4].
- Political actors' decision about promoting any sector of the economy is necessary, because they are decision-makers.
- The government has to be financially able to act for basic infrastructures development, security and peace building or keeping, and ensure that investments safety is guaranteed [R5].
- The business environment stability is therefore considered as the focal factor that may promote SOCIR and the oil and gas development in the country.

There was also accurate correlation concerning respondents' identification of political factors that could influence SOCIR and the oil industry development in the country. Wise and profitable decisions making by the government is a very piloting factor that could create and influence the oil and gas industry development, and keep up a stable political and socio-economic environment change, especially in regard with the kind of resolutions politically decided by the ruling government and its institutions for the business environment well-being (Smit, 2011: 76).

Respondents' view concerning factors creating and maintaining a stable political and socio-economic environment involve the following declarations:

- Considering and monitoring human rights and socio-economic rights implementation in the country is one of the main factors that create stability of the business environment and motivates a sustainable socio-economic growth that usually use to influence political decision for investments [R2].

- Fighting corruption, promoting transparency, controlling and monitoring oil activities and compliance with the regulation in force will ensure a stable political and socio-economic environment and create the smooth of running business activities in the country [R3].

The policy of the DRC in oil and gas industry should aimed at maintaining a market economy, private ownership, and freedom of speech, then the government could intervene where monopolistic or other conditions impede the functioning of the market or their political power (Smit, 2011: 76).

#### **4.10.1.2.5 Mixing of QN and QL key results related to economic environment**

In QN data collection, respondents were required to respond to following:

**Q1A:** Indicate the main challenges experienced by SOCIR in the economic environment.

**The QN results linked to economic environment are as follow:**

- 81% of respondents were agreed on that the lack of financial capital has impede SOCIR infrastructure innovation and upgrading project, and 78% of respondents agreed as well that the colonial economic model of exporting the total oil output for imports of oil products needs has affected SOCIR development.
- 83% of respondents were disagreed on that low consumption or decreased demand for petroleum products in the country has led to SOCIR breakdown, and an average of 59% of them have disagreed on that the exchange rate and the chronic inflation have discouraged SOCIR upgrading project; and that the fiscal policy or tax on imported petroleum products are generator of more income in the country than the option for SOCIR operational manufacturing oil products in the country.

In QL data collection, respondents were required to respond to the following questions:

**Q1B:** Indicate the possible cost the government could engage to upgrade an oil refinery industry or to establish a new oil refinery in the country. And what could be the requirements.

**The QL results related to the economic environment are as follow:**

- A feasibility study is to determine the outstanding modernisation cost of SOCIR [R1and 2].
- The cost to upgrade SOCIR can be nearly similar to the cost of establishing a new refinery in the country [R2].

Findings revealed that:

- A feasibility study is underway. Once implemented, it will reduce the country's external dependence and can promote the security of supply of petroleum products in the country.
- A good business climate with political, economic and social strengths is required to ensure the confidence of investors that are disposed to invest on the petroleum industry,
- Only the ministry and the general secretary of hydrocarbons can determine the cost to modernise or upgrade SOCIR. Workshops on the problematic to revive activities of the refinery, to rehabilitate or improve SOCIR were already initiated and pending for implementation.

Respondents indicated further that:

- It could cost a lot of millions US dollars to upgrade SOCIR.
- A feasibility study might determine what type of technology will be compatible to local and international crudes oil, then the government could consider and opt for the technology that will be economically profitable to the country.
- The cost to upgrade SOCIR depends on certain preambles including the local market needs, the quality of crudes oil to be processed and environmental requirements.
- Certain keys factors will lead the government to decide for the type of technology that is convenient to local and potential crude oil and for the oil industry integration and development.
- The objectives of upgrading an oil refinery are many. This may be influenced by reasons of changing the refinery's complexity and increasing the overall refining capacity to produce lower-sulphur fuel and cleaner oil products specification.



- The type of crudes oil to be processed by a refinery determines the type of technology to be procured. For example, in these days' heavy petroleum resources are becoming significantly more important as the availability of light, sweet crude oil continues to decline. Heavy-oil resources are difficult to extract, transport and refine.
- A new technology to upgrade the existing refinery can be used in the field to economically upgrade and significantly improve the properties of heavy oil by reducing viscosity, increasing gravity and removing contaminants.

According to Fattouh (2012: 9), the upgrading of the Russian oil refining, in particular with the investments in its NORSI refinery has cost \$ 975 million for catalytic cracking complex in 2010. The company is now embarking on further upgrading work at the refinery with a plan to spend an additional \$ 3.8 billion by 2018 on residue hydrocracking and catalytic cracking facilities.

According to Ana (2016), the cost to upgrade South Africa's six crude refineries to produce lower-sulphur fuel will be about \$2.7bn to \$ 3.1 bn to sufficiently supply the domestic market. For the DRC, such as indicated by respondents, the feasibility study will determine the exact cost to be investing for SOCIR upgrading project. But this could cost around US \$ one billion, depending on the government decision and on the type of technology to be used.

#### **4.10.1.2.6 Interpretation of QN and QL results about the challenges experienced by SOCIR in the economic environment**

The QN responses indicates that the levels of agreement are more significant than the levels of disagreement about the factors that affecting SOCIR development in the economic environment. The QL results are more descriptive regarding additional factors or challenges experienced by SOCIR in the economic environment. These include for example:

- The lack of financial capital or the high cost of new processing technology to be engaged for SOCIR innovation,
- The feasibility study that might determine what type of technology will be compatible to local and international crudes oil, and

- The government decision-making for the cost and type of processing technology that should lead to reduce the effect of colonial economic model on exporting the total oil and gas output or on importing the total needs of petroleum products in the country.

The conversion and comparison of QL responses to QN results indicate a very significant complementarity of respondents' understanding about the factors or challenges affecting SOCIR development. This shows a positive correlation on the agreement of these factors. In general, the economic factors such as inflation, recession, exchange rate, the monetary and fiscal policy of the government affects the oil and gas industry in many ways, whether they are stables or not (Smit 2011, 65).

#### **4.10.1.2.7 Discussion about the encouraging effects of SOCIR upgrade on the economic environment**

In QN data collection, respondents were required to respond to the following:

**Q1C:** Indicate the encouraging effects of SOCIR upgrade in the economic environment.

The QN results related to the above question are many, and the effects of SOCIR upgrading project were highly appreciated by the respondents.

#### **The key QN results are as follows:**

- 96% of respondents have agreed that SOCIR upgrade will generate much revenue that will contribute to the country's GDP growth.
- 95% of respondents indicated that SOCIR upgrade could contribute on facilitating the oil and gas industry integration and promote economic diversity of the DRC,
- 93% of respondents showed that SOCIR upgraded could reduce the effects of colonial economic model on exporting the total oil output and reduce the cost of imports of petroleum products in the country,
- 90% of respondents agreed that SOCIR upgraded will create the opportunity of attaining the safety or security of fossil fuels supply in the country and 79%

of them have confidence in that SOCIR modernised will increase local capacity of oil production.

In QL data collection, respondents were required to respond to the following:

**Q1D:** Indicate how the petroleum industry and particularly the oil refining industry could promote the economic environment.

**The QL results are as follow:**

- As source of energy and revenue, the key role of the petroleum and gas industry in the economy can be seen through the inflow of variety of oil products in the economy,
- The attraction of several related industries such as transport and petrochemical industries development,
- SOCIR upgrading and the oil and gas industry development in the DRC could generate great source of energy that is indispensable for national safety stock and security of supply, which is as well necessary for socio-economic prosperity,
- SOCIR could become competitive, once upgraded and modernised and if the country could initiate a project of establishing a new oil refinery in the country, given that exploration research reveal abundance oil discoveries [R3],
- Petroleum industry and the refinery industry affect the economic environment by contributing to GDP growth and the creation of direct and indirect employments in the oil and gas industry, and in other related sectors of the economy [R2],
- The oil industry is one of the very important sectors of the economy, which has impacts on the inflation rate, exchange rate, price of goods; and the transport system depend on crude oil and oil products evolution in the local as well as in the international marketplace [R5],
- Economic diversity and competitiveness of the oil sector or the oil refining industry [R1],

The oil and gas industry is one of the major sectors of the economy, which is responsible of several changes in the economic environment and affects the economy in many ways. The economy in turn is influenced by factors such as

technology, politics, the ecology, the social and the international environments. These dynamic forces constantly cause changes in the economic growth rate, levels of employment, consumer income, and the inflation rate, the exchange rate, and the general state of the economy (Smit, 2011: 73). Further, the changes produced on economic forces ultimately result in prosperity or adversity and have specific impacts on the oil and gas industry and its management.

#### **4.10.1.2.8 Interpretation of QN and QL results about the effects of SOCIR upgrade in the economic environment**

Accurately, from the QN results, the levels of respondents' agreement for the effects SOCIR upgrading project or the oil and gas industry development in the economy are additionally and deeply sustained or explained by QL responses. The effects on economic diversity and contribution to the economic growth (related industries development and direct and indirect employment), and many other components that can be compared and seen from QN and QL results above indicate sufficiently a positive significant correlation between both QN and QL results.

According to smit (2011: 73), the oil and gas industry could be integrated; a real change on the economic growth rate could also influence a tangible change on the levels of employment, consumer income, the rate of inflation, the exchange rate, and affect positively the general state of the economy. Possible changes could be as well expected by positive modifications in other trends including crime reduction, social and technological trends improvement and government's monetary policy (interest rate and exchange rate) or fiscal policy (tax rates and tax reforms) trends improvement, which could be better influenced by the SOCIR upgrading and the oil and gas industry development in the country.

The economic environment not only influences other environments and businesses, but is itself influenced by other trends such as oil and gas products trends, technological trends, and government's monetary policy, which affects the monetary supply, interest rates, and the exchange rate. Fiscal policy affects the oil industry as well as the consumer through tax rates and tax reforms. The tax rates in the oil and gas industry may contribute to raise or lower the impacts of the oil and gas sector in the economy. But, generally, the oil and gas sector is a provider of fresh tax revenue in the State budget and for the economic growth (Smit 2011: 73). Generally, the oil

and gas sector is a provider of fresh tax revenue in the State budget and for the economic growth.

#### **4.10.1.2.9 Mixing of QN and QL key results related to social environment**

In the QN data collection, respondents were required to respond to the following declarative:

**Q1A:** Indicate the challenges experienced by SOCIR in the social environment?

**The QN results are as follow:**

- 79% of respondents have agreed on that of transparency in the management of oil operations has led to oil and gas industry crisis in the country,
- 68% of respondents accepted as true that the social crisis (misuse, distortion of public funds in the petroleum industry or corruption and diverse insecurities or conflicts) in the country is a major cause of SOCIR breakdown or oil industry underdevelopment,
- 60% of respondents agreed that the lack of CSR values implementation in the petroleum industry is among the causes of oil industry disintegration and SOCIR crisis.
- 62% of respondents have disagreed on that the lack of accredited or credible academic institutions to train qualified or skilled people that have to run petroleum operations in the country is the main obstacle to SOCIR development.

In the QL data collection, respondents were required to respond to the following question:

**Q1B:** How do the oil industry and particularly the oil refinery industry affects the social environment?

**The QL results are as follows:**

- Increase or decrease of crude oil and oil products prices in the international or local marketplace have direct or indirect effects on socio-economic environment in many ways (rising prices of goods and services for example),

- The lack of an operational system of transport for a single day can cause real socio-economic disasters because of the lack of petroleum products supply in the country.
- The lack of sufficient energy supply (oil products) can affect negatively socio-economic activities in the country,
- The absence of an operational petroleum refinery in the country can be considered as one of the causes of massive unemployment and the lack of independent energy in the country,
- The country is totally dependent for its energy needs, which also cause real socio-economic problems [3].

#### **4.10.1.2.10 Interpretation of QN and QL results about the challenges experienced by SOCIR in the social environment**

Correlation between QL responses that explain QN results with supplementary elements of social factors affecting SOCIR development can be observed. As source of energy, the lack or low supply of oil products in a situation where there is a strong growth in demand for petroleum products can cause a fatal socio-economic disaster. The challenges experienced by SOCIR in the social environment and the way the oil and gas industry affect the social environment are significantly correlated to each and other. Respondents have showed their disagreement concerning the statement indicating that the lack of accredited or credible academic institutions to train qualified or skilled people that have to run petroleum operations in the country is the main obstacle to SOCIR development.

This means that the DRC does not lack academic institutions or training centre to train people, but lack the public capacity to create jobs for people in quest of employment. The lack of accredited trade union and the lack of CSR values implementation were also indicated as factors affecting SOCIR and the oil and gas industry development, as well as the social factors that led to many social crises such as unemployment, corruption, poverty and inequality among people.

Union labour in the oil and gas industry is expected to play the role of managing and preventing a kind of agreeable and disagreeable relationship between employers and employees (Shirley Miller, 2006: 45), while Hoskins (2012: 130-133) stated that the value of undertaking CSR strategy development and then implementing its

practice offer an effective communications program supporting it, which explains the nature of the activity and how it could benefit community in the oil industry.

#### **4.10.1.2.11 Discussion of QN and QL results about the effects of SOCIR upgrade in the social environment**

In QN data collection, respondents were required to respond to the following:

**Q1C:** Indicate the prospective effects of SOCIR upgrade on social environment.

The levels of respondents' answers indicate a very high expectation of the effects SOCIR upgrading project could have in the DRC's social environment.

**The QN key results are as follow:**

- 94% of respondents have confidence in that if SOCIR is upgraded it could attract industrial economic activities in the rural area and improve rural community's well-being,
- 93% of respondents have conviction that SOCIR upgrade will promote workforce skills in the petroleum industry and contribute to the rural environmental development by promoting new initiative or projects, which will create jobs and reduce unemployment,
- 81% of respondents accepted as true that SOCIR upgrade will promote quality services delivery of oil products in the country, and
- 80% of respondent have confident in that SOCIR upgraded could reduce and replace the use of firewood by the majority of rural people in promoting the usage of oil products (such as gas) as source of energy for cooking and for other diverse needs.

In the QL data collection, respondents were required to respond to the following question:

**Q1D:** How does the society or community can benefit from the oil refinery or oil industry operations in the country?

Many interesting responses were also indicated by respondents in regard with the above question.

**The QL key results are as follows:**

- The chain of massive employment, with expectation of related (the petrochemical) industry development that operate from the existing of the oil refinery industry development in the country,
- Great opportunity for local market of oil products expansion that can cause as well an opportunity for massive jobs creation or for reducing unemployment of many people [R1],
- Great probability for developing the transport system and even building new roads, decent housing for workers, promote education and health infrastructures [R2],
- Reducing the risk of possible interruption associated to international decline of oil products supply, and for the security of the country in terms of crude oil cost and prices fluctuation or oil products price fluctuation in the international market,
- Energetics independence and potential social environment improvement,
- Reducing the cost and other risk related on export of local crude oil or imports of oil products in the country,
- The possibility for vertical and horizontal national oil and gas industry integration, which could promote direct and indirect employments (or jobs creation).

**4.10.1.2.12 Interpretation of QN and QL results about the effects of SOCIR upgrade in the social environment**

Comparing both QN and QL results, it is observed that there is significant link of respondents' view concerning the impacts SOCIR upgrading project could have in the DR Congo's social environment. Correlation between QL responses that confirm QN results with high levels of agreement such as indicated above; prove sufficiently that SOCIR and the oil and gas industry development in the DRC could play a fundamental role in the socio-economic situation Congolese in different ways. The job creation or unemployment reduction is among the most expected element that is predicted by the majority of respondents.

The oil and gas industry is one of the most important sectors of the economy that have considerable impacts on socio-cultural environment. According to Smit (2011: 65), the oil and gas industry could influence and change people's lifestyle, produce



urbanisation and affect rural environment change, change habits and values that are shaped by culture, and in turn, depend for their living condition on the petroleum industry evolution. Generally, respondents have confidence in that the potential life change due to direct and indirect employment and transportation system improvement in the country could be the major social effects.

#### **4.10.1.2.13 Mixing of QN and QL key results related to technological environment**

In QN data collection, respondents were required to respond to the following:

**Q1A:** Indicate the most constraints or challenges experienced by SOCIR in the international environment.

**The key QN results are as follows:**

- 86% of respondents showed that SOCIR ageing processing infrastructure has remained incompatible to local crude oil,
- 85% of respondents indicated that the lack of upgrading the SOCIR equipment with available new technology has retarded the fulfilment of its socio-economic role in the country's development process, and
- 84% of respondents have confident in that the lack of maintenance of SOCIR infrastructure has led to the ageing of SOCIR equipment and its breakdown.

In the QL data collection, respondents were required to respond to the following:

**Q1B:** Indicate the challenges affecting the oil refinery technology in relation with the local crude oil characteristics.

**The QL results are as follows:**

- The aging and the incompatibility of SOCIR's technology to refine local crude oil remains the major problem for the oil industry as a whole. A simple and ageing oil refinery like SOCIR has remained economically not profitable in trying to process the heavy crude oil and particularly the controversial DRC's crude oil [1],
- Few lights oil products and a very important quantity of undesirable residues produced by SOCIR during the past years caused the refinery to become

uneconomic and were forced to close down. This is the case of SOCIR; apart its very ageing technology that has remained incompatible to process local or other international crude oil [R2],

- SOCIR technology is out-dated and inefficient to process any type of crudes oil including the DRC's crude oil.
- A simple refinery although innovated will not be able to refine heavy crude oil, unless if new units are added to process variety of crude oil.
- A complex refinery is what the country needs to refine local crude oil. Heavy crude oil technology is indeed expensive, but environmentally appropriate and efficient for more several operations that require risk management involvement [R4].

#### **4.10.1.2.14 Interpretation of QN and QL results about the challenges experienced by SOCIR in the technological environment**

From the above comparison of QL responses to QN results, it can be observed that the respondents' degree of appreciation relevant to questions asked about the challenges experienced by SOCIR in the technological environment, converge correlatively to the same and one key factor that has affected SOCIR operation to process local or international crude oil. The very ancient processing equipment of SOCIR was mostly identified by respondents as the main cause of its inefficiency to process local crude oil and other diverse international crude oil, which led to its breakdown.

Other important challenges related to poor management and lack of technical skill or knowledge requirement to maintain SOCIR operational were also identified by respondents as one of the causes which led to SOCIR interruption. According to Smit (2011: 72), technology refers to the knowledge of how to do something, whether it is age-old technology or high-tech for manufacturing certain products such as petroleum products. Further, today, technology is involved in every process of a business organisation: from manufacturing to marketing, to managing. Relating to the oil and gas industry, technology not only determines how the organisation makes products or servers customers, but also affects the oil refinery's products markets and its ability to compete in those markets. SOCIR's technological change could

therefore promote the entire oil and gas industry and has strategic implications for oil refinery as well as for many other related industries development.

#### **4.10.1.2.15 Discussion of QN and QL results about the effects of SOCIR upgrade in the technological environment.**

In the QN data collection, respondents were required to respond to the following:

**Q1C:** Indicate the probable effects of SOCIR technological improvement in the country's development process.

**The key results are as follow:**

- 100% of respondents have showed confidents in that SOCIR upgrade will create opportunity to increase its capacity for technological usage of producing local and international crude oils,
- 99% of respondents accept as true that SOCIR technological improvement will be competitively advantageous for the oil and gas industry development in the country, and
- 94% of respondents attested that local oil output which is totally exported will be processed in the country.

Many other respondents' important agreements on valuable statements concerning the effects of SOCIR development in the DR Congo can be better viewed Table 4.13 and Figure 4.12 above.

In the QL data collection, respondents were required to respond to the following question:

**Q1D:** What could be the recent technology appropriate for SOCIR modernisation and which could refine local crude oil in the country?

**The key QL results are as follow:**

- There is variety of technologies available to refine any type of crude oil including the Congolese crude oil. Complex refinery units with modern treatments or processes, e.g. cracking technology, would refine the Congolese crude oil. But a feasibility study will determine the type of

compatible technology that is efficient to process local or international crude oil [R1],

- Recent technologies to refine different type of crudes oil are available in the international market, although they cost a lot of money to launch them. Recently technologies to process crude oil are becoming very complex because of the environmental requirements or exigencies. A refinery with a full cracking technology will be compatible to refine any type of crudes oil, including the DRC's crude oil. But this question is mostly reserved to the specialist in refinery's technology [R3].

The respondents indicated also the following statements:

- SOCIR innovation essentially depends on several factors including the quality of crudes oil to be refine, the market demand requirement, the type oil products to be supplied,
- The type of appropriate technology to refine local or international crudes oil generally will depend on the government decision making and financial capital availability,
- Machineries to be used for SOCIR modernisation will have to include environmental requirements, once it is operational and this equipment is available, although they cost lot of money,
- Convenient technology for local crude oil will be planned through a feasibility study by specialist in this domain and suggestions will be addressed to the government to decide for the type of technology that will be compatible with the local and probably the international crude oil [R5].

Respondents were also required to indicate how does SOCIR upgraded could promote productivity and the oil industry development?

Respondents' feedbacks were as follows:

- The effects of upgrading the oil refinery are various. This include: Increasing the refinery capacity of production and diversifying oil products produced in relation to the local or international market demand. It is expected that the oil industry could be integrated and expanded, and related industries to oil industry could as well be attracted and established in the country, such as

petrochemical industry. Socio-economic activities in the urban and rural region of the country could as well be promoted [R3].

- The complex oil refinery industry could cause a high yield and lead to the integration of the entire national oil and gas industry, and facilitate a modern management system of oil and gas sector [R1].

Respondents' opinions revealed also the following views:

- New efficient and compatible technology will increase production capacity per barrel per day,
- It is possible that SOCIR modernisation will affect importers of oil products and change the actual size of local market,
- There is a great expectation for the oil industry integration, if the country can have SOCIR developed or a new additional refinery can be established in the country,
- New technology will promote new innovation and brings change in the management process and in the processing of raw material [R5],
- There is always a socio-economic impact on upgrading the petroleum refinery and developing the entire oil industry,
- There will be impacts on other industries, and the expected security of supply could be the result of establishing an efficient oil refinery in the country, as the stability of prices of petroleum products could be observed,
- Probably, good quality of oil products or less polluted oil products will be competitively distributed on the national market [R2].

#### **4.10.1.2.16 Interpretation of QN and QL results about the probable effects of SOCIR in the technological environment**

The degree of respondents' understanding and QL responses indicates sufficiently and significantly that there is positive correlation between the levels QN results and the very great input of QL outcomes. This means that respondents have predicted a high expectation of the effects of SOCIR upgraded in the technological environment and consequently in the country's development process. The socio-economic transformation which could be the outcome of technological change in the oil and gas industry, could also lead to economic diversity.

According to James (2007: 16-17), the efficient and compatible technology to any kind of crudes oil is related to complexity of the refinery industry that is characterised by significant upgrading capacity and a high level of integration that is able to change the composition of the crude oil input, taking the low-value, heavy oils and converting them into high-value, light products, supplying the marginal barrel and realising the profit from the base margins.

Thus, it is expected that SOCIR modernisation could contribute to its efficiency, capacity and compatibility with diverse crudes oil and cause local crudes oil to be refined in the country, to reduce total import-export dependency and promote the oil and gas industry integration or development. Although confusion may persist around the physical characteristics of Congolese crude oil, the type of technology desired by respondents (full cracking for example), could be the expected solution for any physical characteristics of local or international crude oil to be processed in the country.

#### **4.10.1.2.17 Mixing of QN and QL key results related to international environment**

In the QN data collection, respondents were required to respond to the following:

**Q1A:** Indicate the most challenges experienced by SOCIR in the international environment.

**The QN key results are as follow:**

- 82% of respondents revealed that the oil and gas industry, including SOCIR in the DRC is operating under the international total dependency or dominance of colonialism model, whether for exploitation and production of crude oil or for imports of petroleum products in the country,
- 70% of respondents indicated that poor intermediation of conflicts resolution by international community in the DRC is a major obstacle to socio-economic activities development, including the delay on the process of oil and gas industry development,
- 57% of respondents showed their agreement on the statement indicating that the high cost of international finance remain an additional important factor that

affect the socio-economic development process and the general state of the country.

In the QL data collection, respondents were required to respond to the following question:

**Q1B:** How does the international environment affect the oil and gas industry development in the country?

**The QL results are as follow:**

- The lack of democracy and lack of credible democratic institutions in the country have led the multinational companies to dominate not only on the oil and gas sector exploitation, but as well the exploitation of all natural mineral resources of the country,
- The lack of well implementing CSR values and socio-economic rights and human rights in diverse sectors of the economy and in the country have led to a situation where minority in power and their international partners are destroying the voice poor majority of Congolese people,
- The lack of existing credible union trade in the oil and gas industry has as well contributed to the on-going colonial model of economic exploitation.

#### **4.10.1.2.18 Interpretation of QN and QL results about the challenges experienced by SOCIR in the international environment**

Respondents levels of agreement from the QN results concerning oil and gas industry dependency, international dominance and the current colonial economic system that drive socio-economic activities in the country, correlate with QL responses that indicate the lack of democracy and lack of credible democratic institutions in the country have led the multinational companies to dominate not only on the oil and gas sector exploitation, but as well the exploitation of all natural mineral resources of the country.

Negative correlation may be observed between QN results and QL responses in reference to other statements of QL outcomes that differ or diverge to QN results. This could be justified by the fact that collective poor situation of majority of Congolese people which are unemployed and those which are working are not

sufficiently able to provide to the needs of their family. Other QL responses, as it can be observed, was given with passion of pain due to many difficult situations that several Congolese are experiencing on this days of multiple political crisis, institutional instabilities, and/or a very critical business environment climate and inequalities in the country. The lack of union trade or lack of CSR values implementation identified by respondents in the QL data collection, mean that these problem exist and they are affecting the general state of the country, including the oil and gas industry. Mostly, union labour in any sector of the economy plays the role of managing and preventing a kind of agreeable and disagreeable relationship between employers and employees (Shirley Miller, 2006: 45).

In the DRC, respondents indicated that there exist unions in the country, but they are not really credible in relation to the law that should protect and defend the workers concerns. Concerning CSR, Hoskins (2012: 130-133) stated that the value of undertaking CSR strategy development and then implementing its practice offer an effective communications program supporting it, which explains the nature of the activity and how it benefits the oil industry. In the DRC, respondents showed that doing good by doing well is absent in the management of most socio-economic activities in the country.

Therefore, the level of performance relative to CSR actions and activities appear difficult to evaluate due to the lack of information concerning the existing or not of text of law relative to CSR implementation. CSR works in respect with human rights or socio-economic rights implementation. The lack or violation of these rights affect community effective participation and make difficult to the expectation for any change to occur in the oil industry and as well in the living condition of Congolese.

#### **4.10.1.2.19 Discussion of QN and QL results about the effects of SOCIR upgrade in the international environment.**

In the QN data collection, respondents were required to respond to the following:

**Q1C:** Indicate the probable effects of SOCIR development in the international environment.

**The QN results are as follows:**



- 88% of respondents revealed that the oil and gas industry development, including SICIR upgraded in the DRC Congo could reduce the effects of international dependency and the effects colonial economic system in the oil and gas industry sector,
- 84% of respondents have confident in that SOCIR upgraded and the oil and gas industry development could increase a transparent partnership with international investors for private investments or profitable entrepreneurship in the DRC, and
- 74% of respondents indicated that the oil and gas industry development, including SOCIR upgraded could contribute on reducing the high cost of international finance, by increasing and improving local finance through socio-economic activities transformation.

In the QL data collection, respondents were required to respond to the following question:

**Q1D:** How international environment can promote SOCIR and the oil and gas industry development in the country?

**The QL results are as follow:**

- The Win-Win partnership based on the respect of production sharing agreement or contracts between both partners could lead to oil and gas industry development and SOCIR innovation,
- Enforcing regulations and laws on oil and gas exploitation, monitoring and controlling socio-economic activities in this sector could help international partners to implement CSR values that require business actors to play a profitable role for both shareholders and stakeholders,
- Processing or refining natural mineral resources in the country could contribute to the expansion, development and integration of the oil and gas industry, and
- Reducing the effects of exporting crude oil by modernising SOCIR with modern equipment could promote the oil and gas industry improvement in the country.

#### **4.10.1.2.20 Interpretation of QN and QL results about the effects of SOCIR upgrade in the international environment**

The observation of both QN and QL results indicate positive and negative correlation. There is significant positive correlation between the QN statement which indicate that the oil and gas industry development, including SICIR upgraded in the DRC could reduce the effects of international dependency and the effects of colonial economic system in the oil and gas industry sector and the QL statement which points out that processing or refining natural mineral resources in the country could contribute to the expansion, development and integration of the oil and gas industry, and also, with statement displaying that reducing the effects of exporting crude oil by modernising SOCIR with modern equipment could promote the oil and gas industry improvement in the country.

There is as well positive correlation between the QN results and the QL responses on that SOCIR upgraded and the oil and gas industry development could increase a transparent partnership with international investors for private investments or profitable entrepreneurship in the DRC, and the statement indicating that the Win-Win partnership based on the respect of production sharing agreement or contracts between both partners could lead to oil and gas industry development and SOCIR innovation.

Meanwhile, the negative correlation implicates the QN and QL results on the following statements: SOCIR upgraded could contribute on reducing the high cost of international finance, by increasing and improving local finance through socio-economic activities transformation and enforcing regulations and laws on oil and gas exploitation, monitoring and controlling socio-economic activities in this sector could help international partners to implement CSR values that require business actors to play a profitable role for both shareholders and stakeholders.

But, in more understanding details, these last two statements can lead to the complementarity of meaning in regard to the implementation of regulations and laws that could lead to socio-economic change in the country.

#### **4.10.1.2.21 Mixing of QN and QL key results related to ecological environment**

In the QN data collection, respondents were required to respond to the following:

**Q1A:** Indicate the challenges experienced by SOCIR in the ecological environment.

**The QN results are as follows:**

- 76% of respondents indicated that the type or characteristics of the DRC's crude oil is heavy therefore, incompatible to SOCIR processing technology,
- 82% of respondents have disagreed that crude oil exploited in the DRC is light, and
- 77% of respondents have disagreed also that SOCIR upgrading project was affected by the issue of environmental degradation.

In the QL data collection, respondents were required to respond the following question:

**Q1B:** How the oil industry and particularly the oil refinery affect the ecological environment?

**The QL results are as follows:**

Respondents indicated that the oil and gas industry out of strict laws and regulations implementation affect negatively the planet at different levels with consequences on air, water and soil pollution, which affect as well climate change and the general environmental concern. The causes of water, soil and air pollutions are mostly related to oil and gas industry's activities due to factors including the lack of prevention or the lack of well fulfilling the existing local or international environmental laws and regulations in the oil and gas industry sector.

The following are the additional factors that contributing to the environmental degradation:

- The lack of control or monitoring with rigor all risk operations associated to petroleum activities, and the political manoeuvring and their slowness in matters of applying measures aimed to reduce pollution and toxic effects that destroy the ecological environment,
- Governments (considered as decision-makers), companies, businesses, the human race as well as local and international institutions are accountable for environmental issues.

#### **4.10.1.2.22 Interpretation of QN and QL results concerning the challenges experienced by SOCIR upgrade in the ecological environment**

Respondents have acknowledged that oil and gas industry, including the oil refining industry are accountable in major part of environmental degradation in today days. Often, toxic products and pollution are the major issues that always people use to worry concerning the oil sector operations whether through the off-shore or the on-shore. The nature of correlation between QN and QL results is that human race, local and international institutions could be involved of all detrimental oil and gas industry's negative impacts on the environment. Respondents from the QN results admitted that SOCIR operational, particularly, in the DRC, where laws and regulations are not well-implemented and not respected at all, could affect the ecological environment in many ways. But, 77% of respondents have disagreed that SOCIR upgrading project was affected by the issue of environmental degradation. The negative correlation between QN and QL results come from the nature of QN and QL questions, and the confusion that exist about the real density of crudes oil exploited in the country.

Respondents in QN data collection indicated that the challenges experienced by SOCIR in the ecological environment are mostly related to the incompatibility of the DRC's crude oil characteristics, which is "heavy"; while the QL data results showed that the challenges experienced by SOCIR in the ecological environment are related to the lack of control or monitoring with rigor all risk operations associated to petroleum activities, and the political manoeuvring and their slowness in matters of applying measures aimed to reduce pollution and toxic effects that destroy the ecological environment and to the governments (considered as decision-makers), companies, businesses, the human race as well as local and international institutions which are accountable for climate change and environmental degradation.

Therefore, the ecological environment degradation takes account of negative effects on elements that include weather, climate and climate change; water, air and soil pollutions which might be caused by oil refinery industry or the entire oil and gas industry worldwide, (Shikhar, 2010: 2).

#### **4.10.1.2.23 Discussion of QN and QL results about the effects of SOCIR upgrade in the ecological environment.**

In the QN data collection, respondents were required to respond the following question:

**Q1.C:** Indicate the effects of SOCIR upgrade in the ecological environment.

**The Key QN results are as follows:**

- 86% of respondents have confidence in that SOCIR upgrade is an opportunity for the government of DRC to take steps that will limit, as fast as possible, any detrimental effects on the ecological environment,
- 81% of respondents accepted as true that SOCIR upgraded could promote the development of the national oil and gas industry and therefore, create an opportunity for the country to enforce the implementation of national and international laws and regulations, which are related to environmental protection and climate change,
- 83% of respondents have acknowledged that SOCIR upgraded will play a key role through providing a flow of quality oil products in the economy that will reduce the negative effects on air pollution.
- 80% respondents indicated that SOCIR innovation could be an opportunity for the country to improve a dynamic commission which will deal with the issue (laws and regulations enforcement) of environmental prevention and protection.

In the QL data collection, the respondents were required to respond to the following question:

**Q1D:** What could be the potential effects of SOCIR innovation in the ecological environment?

**The QL results are as follow:**

- The requirements to innovate SOCIR will involve the fact of minimising the risk for air, water and soil pollution or degradation, and also, to contribute on reducing negative effects related to climate change [R3].
- Modern and new processing technologies, strong ecological laws and regulations worldwide could provide ways to reduce pollution and other

secondary negative effects from the oil and gas industry. SOCIR modernisation will be facing the same environmental concerns, but with low negative impacts on the environment [R2].

The findings indicated that the effects of oil industry and oil refining industry on the environment can be positive or negative. The following are respondents' additional opinions:

- The oil and gas industry play an imperative energetic role in today's society and influence the world in many different aspects. Besides being the main source of energy, petroleum products serve as the essential feedstock for several related industries. As a result, the oil and gas industry contribute on the socio-economic wellbeing with a growing and positive role in the people's lives.
- Despite its potential threats or negative role on the ecological environment, the oil and gas industry remain the key factor of socio-economy dynamic change and of lifestyle improvement for many people. It creates massive direct and indirect jobs, generates a significant volume of tax revenues and royalties to national economy (contribute to GDP growth), revives the four corners of the world with the transportation system, ground to air and sea, and promotes urbanisation of the rural environment.

#### **4.10.1.2.24 Interpretation of QN and QL results about the effects of SOCIR upgrade in the ecological environment**

By comparing both results, a positive correlation between QN and QL results can be observed from the key role that SOCIR upgrade could play on the ecological environment, by providing the flow of quality oil products that could reduce the detrimental effects on air, water and soil pollution; and the requirement for local and international laws and regulations that should be apply by the oil and gas industry's operators, for the viable and sustainable ecological environment protection. Thus, the oil and gas industry development, including SOCIR modernisation may possibly play an imperative role in today's society and influence the country in many different aspects that could involve a real change on the management of natural resources such as flora and fauna, mineral resources, access to clean water, quality of air, and climate evolution (Smit, 2011: 65).

Thus, from converging, discussing and explaining respondents' different views between QN and QL results; it is generally observed that a positive correlation between QN results and QL results has prevailed over the negative correlation between both QN and QL results. Also, in all cases, following the specific observation from the above discussion, it is concluded that the levels of respondents' understanding and agreement have dominated over the levels of respondents' disagreement in most statements.

#### 4.10.1.3 Respondents' general comments about this study

The last question of the interview series required respondents to indicate if there was any concern that they could add as useful information to be taking into account in the course of this study? Their general comments are summarised in the following table 4.19.

**Table 4.19 Respondents' general comments**

Respondents (R)	Additional comments
R1	<i>There is a serious lack of skilled workers in managing honestly public or private activities in the country. Congolese people need to work for individual and general satisfaction. Government needs to work hard in providing creative jobs opportunities for people's lifestyle improvement, through innovative investments involving the socio-economic sustainable development.</i>
R2	<i>The study focusing on SOCIR restructuring and modernisation will really contribute on the effort of promoting and developing the entire oil industry in the country. The minister of industry, Germain Kimbinga, has suggested and recommended to Congolese people to consume Congolese products, including oil products from local refining process. That why SOCIR have to be developed. This will promote socio-economic activities impacts and energy independency in the country.</i> <i>The feasibility study is already engaged for SOCIR to be restructuring and developed. We are all expecting to see the local crudes oil and international crudes oil being refined in the country.</i>
R3	<i>This study is very capital for the oil industry improvement in the country; it will help and contribute as additional source of information to people that will continue research for the best of the national oil industry. God said we have to develop the world, we as human have to work to develop our self through</i>

	<p>research initiative for the progress of socio-economic investments, such as SOCIR and the oil industry development in the country.</p> <p>Importers of petroleum products are fighting the project to modernise SOCIR; you should continue with your research and provide conferences to raise the awareness of petroleum industry crisis among authorities and the Congolese people in the matter of SOCIR upgrading project and petroleum activities improvement in the country.</p> <p>The entire oil industry development with SOCIR upgrading or a probable new oil refinery development in the country could generate much economies in the country and promote lifestyle change through massive jobs creation, and reduce the unstopped growing rate of unemployment in the country. As said previously, the country will become more independent in regard to oil products, safe source of supply and as well in promoting national socio-economic activities.</p>
R4	<p>I think given that the petroleum refining industry is not operational since 2001, it will be more difficult to explore its socio-economic role. Exploring the problematic of SOCIR restructuring and modernisation in a prospective background could be as well good contribution to the nation. Research for oil industry development inside or outside of the country will constitute a boomerang effect for socio-economic change and improvement.</p>
R5	<p>Not much to add, I have said what is important for the change to come in the national oil industry. The research such as you are doing will contribute to the advancement of the entire oil industry. The research is the key for the development of the oil sector and as well for the whole country. But, you are dealing with very sensitive issues. A producer is free to sell his product wherever he wants. The oil is like any agricultural product; the producer is free to decide whenever or wherever he wants to sell it products or process it according to his will. It is not compelling to transform it locally.</p>

#### 4.10.1.4 Chapter Summary

This chapter described data analysis methods, followed by the presentation of results and discussion of the research outcomes. Quantitative and qualitative data analysis methods were used for the analysis of data from the questionnaires and the interviews respectively. Data findings were described as correlated to the study variables and presented as tabulations.



Findings of the study were found to be consistent with findings of various studies previously conducted by other researchers in relation with the aim and objectives defined for this study. Findings indicate that the PESTIE instabilities, the lack of economic diversity, the lack of industrialising industries, total dependence on colonial economic model or the lack of economic freedom, and multiple armed conflicts in the country led to socio-economic crisis, which is very perceptible through constant human rights and socio-economic rights violation, discrimination, deliberate impunity and corruption, poverty and inequalities among the majority of Congolese people. The results also show that SOCIR challenges are related to the PESTIE environment's uncertainties, the ageing technology (inefficient and incompatible to process local and international crude oil) and to the lack of financial capital necessary to upgrade SOCIR infrastructure. The findings revealed that SOCIR upgrade could play a fundamental socio-economic role through supplying the country with sound commercial and environmental oil products and basically through multiplier effects including direct, indirect and induced jobs creation and other public and private socio-economic activities development.

It is also indicated that the choice to invest on SOCIR innovation could procure more profitable socio-economic impacts and revenue to the State budget than the option for tax collected from import of petroleum products. The following chapter presents a summary of the major findings in respect of the research questions and the general conclusions. It makes recommendations as well and discusses future research. The implications of the findings for the entire oil and gas industry development and particularly SOCIR upgrading project will be discussed as well in the next chapter.

## **CHAPTER 5: GENERAL CONCLUSION AND RECOMMENDATIONS**

### **5.1 INTRODUCTION**

The previous chapter focused on statistical evidence with assistance of SPSS software package for quantitative approach, and Nvivo software package and thematic analysis for qualitative approach. Outcomes were compared to the literature review in order to outline the strategies used for exploring the socio-economic role of the petroleum refining industry in the DRC. This chapter will indicate the way the objectives of the study were achieved, discuss the main findings, and explain their significance.

The limitations, gaps and directions for future research are considered and presented as well. This chapter will end up with a final summary of the impact of the research undertaken and demonstrate how the recommendations relate to the research questions.

### **5.2 GENERAL CONCLUSIONS**

The research aimed to explore the socio-economic role of the petroleum refining industry in the DRC through the case study of SOCIR (The only one company of oil refining industry in the DRC). In order to achieve the purpose, the following objectives were set:

- Evaluating the factors affecting the socio-economic development in the DRC.
- Evaluating the challenges experienced by SOCIR in the macro-environment.
- Identifying the socio-economic effects, the upgrading of SOCIR could have on the socio-economic situation in the DRC.

In addition, questions to assist the research achieve its objectives were formulated, and used to explore relevant theories in the literature. An analysis of the data collected was discussed and its relationship with the literature outlined. The recommendations for the oil and gas industry development, and specifically for SOCIR modernisation, including concluding remarks are thereafter provided.

### **5.2.1 Objective 1: Factors affecting the socio-economic development in the DRC**

The study revealed that the most alarming and critical concerns that were highly pointed as factors affecting the socio-economic development in the DRC are these involving:

- The lack of economic diversity,
- The lack of credible democratic institutions,
- Multiple instabilities, and massive violation of socio-economic rights and human rights in the country, and
- The lack of enforcing regulations that could promote the socio-economic development in the DRC.

Respondents acknowledged that the lack of economic freedom or total dependence on colonial economic are matters that involve a well-controlled or managed situation of insecurities and uncertainties of the PESTIE environments by international politics and multinational companies which are negatively affecting the socio-economic development process in the DRC. Poverty, corruption, inequality and high unemployment rate were indicated as results of business environment instabilities in the DRC.

### **5.2.2 Objective 2: Challenges experienced by SOCIR in the Macro-environment**

The challenges experienced by SOCIR in the macro-environment were analysed following the PESTIE framework:

#### **5.2.2.1 Political Environment**

Respondents indicated with higher concern (86%) that consecutive governments are responsible of many crises which are happening in the national oil and gas industry and accountable for the lack of decision or political good will to implement the existing Petroleum Charter that should guide the petroleum industry development. Respondents also indicated that the DRC's consecutive governments have lacked public capacity to enforce regulations that should lead to SOCIR restructuring and upgrading project or to the entire oil and gas industry development.

In relation to the promising impact of SOCIR upgrade on the political environment, a number of encouraging effects were identified as contributing to political environment, including the following:

- 57% of respondents have confidence in that SOCIR development could promote progressive innovation of government legislation in the oil and gas industry,
- 97% of them believed that the government of DRC could reduce the costs of oil refined products imports by promoting local oil refined products production and distribution in the country, and
- 95% of respondents have considered that SOCIR upgrade could play a fundamental role in allowing the government of DRC to develop a security of fuel supply, as well to manage the stock of exchange rate in the country.

#### **5.2.2.2 Economic Environment**

A number of challenges experienced by SOCIR in the economic environment were identified, which involve the following aspects:

- The lack of financial capital that has impede SOCIR infrastructure innovation or upgraded project was highly indicated (81%) by respondents as one of the main challenges experienced by SOCIR in the economic environment,
- 78% of respondents accepted as true that the colonial economic model of exporting the total oil output for imports of oil refined products needs in the country has affected SOCIR's development, and
- 83% of respondents have disagreed on the statement signifying that the low consumption or decreased demand for petroleum products in the country has led to SOCIR's breakdown.

Contrary, the encouraging effects of SOCIR upgrade on the economic environment were richly appreciated by respondents as follows:

- SOCIR upgrade will generate much revenue that will contribute to the country's GDP growth (96%),
- SOCIR development will facilitate the DRC's oil industry integration and promote economic diversity process in the country (95%),

- 93% of respondents acknowledged that SOCIR upgrade will reduce the effects of colonial economic model on exporting the entire crude oil output and reduce the costs of imports of oil finished products in the country, and
- SOCIR upgrade will improve and increase local capacity of oil production in the country (79%), and promote socio-economic infrastructure development in the country (76%).

### **5.2.2.3 Social Environment**

The following statements were identified by respondents as the challenges experienced by SOCIR in the social environment:

- An overall of 79% of respondents indicated that the lack of transparency in the management of oil operations has led to oil industry crisis in the country, and that social crisis (misuse, distortion of public funds in the petroleum industry or corruption, poverty, unemployment, inequality and insecurity) in the country has been accentuated by the lack of economic diversity, relating as well to the crisis of oil and gas operations, including SOCIR's inactivity (68%), meanwhile,
- Respondents (60%) have acknowledged that the lack of CSR values implementation in the petroleum industry is among the factors causing the oil industry disintegration and SOCIR crisis in the country,
- Respondents have rejected or not accept as true the fact that the lack of accredited academic institutions to train qualified or skilled people that have to run petroleum operations in the country is the main obstacle to SOCIR's development.

Opposing to the factors affecting SOCIR upgrading project in the country, respondents showed an impressive interest about the prospective effects the upgrading of SOCIR would have on the social environment. These sound effects include the statements such as:

- SOCIR upgrade could contribute to the rural environmental development by promoting new initiative or projects, which will create jobs and reduce unemployment, and as well promote workforce skills in the petroleum industry (93%),

- SOCIR upgrade may produce products that will replace and reduce the use of firewood in the rural area and promote the usage of oil products as energy, especially for cooking and other socio-economic activities (80%), and
- SOCIR's development could attract industrial economic activities in the rural area and improve rural community's wellbeing (94%), and also contribute to poverty reduction of the rural people (88%).

#### **5.2.2.4 Technological Environment**

The outdated or ageing technology in Africa and in the DRC relating to oil refinery's industry remain the key problem that reduces their ability to produce more and better oil products and reduces their capacity to compete with international modern refineries that are using innovated technologies which have extended capacity and facilities to produce a wide-ranging of oil and gas products variety. Therefore, the most indications of respondent's observation in relation to the challenges experienced by SOCIR in the technological environment take account of:

- SOCIR's incompatibility with refining local crude oil (86%),
- The lack of upgrading SOCIR machinery with available new technology (85%) has retarded the fulfilment of its socio-economic role in the country's development process,
- The lack of maintenance of SOCIR infrastructure has led to the ageing of SOCIR equipment or breakdown (84%), and 53% of respondents linked the cause of SOCIR's technological inefficiency to the lack of technical skill or knowledge requirement to transform SOCIR resources into final products.

Therefore, SOCIR has missed out the opportunities of competing economically that should create socio-economic change and prosperity in the country. In the meantime, respondents have showed strong confidence in the probable effects of SOCIR's technological improvement in the DRC's development process. The most valuable effects indicated by the respondents stated that:

- SOCIR upgrade will create opportunity to increase its capacity for technological usage of producing local and international crudes oil (refinement), 100%,

- 99% of respondents acknowledged that SOCIR's technological improvement is competitively advantageous for the oil industry integration and development in the country,
- 94% of respondents have faith in that SOCIR upgrade will play a key role that will stimulate the business environment improvement in the oil and gas industry, and that local oil output which is totally exported will be processed in the country, as well as promote the internal activity improvement or productivity and provide strategic implementation of oil and gas industry integration;
- It is expected that SOCIR's development will create significant opportunities for industrial expansion (90%), and play a key role in supplying the local market with sufficient quality, quantity and competitive oil products (93%).

#### **5.2.2.5 International Environment**

Respondents were required to indicate the constraints or challenges experienced by SOCIR in the international environment. The following are the degree of their understanding and perception:

- 82% showed their concern on the fact that the oil industry including SOCIR in the DRC is operating under international total dependence and dominance models, and the poor intermediation of conflict resolution in the DRC remains a major obstacle to oil and gas industry development and as well to socio-economic development (70%). The opacity and the lack of well monitoring oil and gas activities in the country are also due to the current institutional instabilities or diverse insecurities that continually affecting the oil and gas industry and the socio-economic development of the country,
- Additionally, respondents (57%) have associated international threats to oil and gas industry to the fact that the high cost of international finance has reduced or limited the possibility for SOCIR restructuring and upgrading project, and is affecting the entire socio-economic development process of the DRC.

Therefore,

- About 88% of respondents indicated that the probable effects of SOCIR's development in the international environment could be linked at the fact of reducing the effects of total influence or dependency on the international fluctuation of crudes oil and oil products costs and as well dominance in the national oil field,
- Respondents (84%) indicated that the oil and gas industry development, including SOCIR upgrading in the DRC could increase the level of international private investments and entrepreneurship in the country,
- And 74% of respondents agreed that SOCIR development may reduce the high costs of international finance, by increasing and improving local finance through massive tax collection at a well transparent point.

#### **5.2.2.6 Ecological Environment**

Concerning the challenges experienced by SOCIR in the ecological environment, respondents indicated the following opinions:

- The majority of respondents (82%) have shown their disagreement concerning the statement declaring that DRC's crude oil is light. This means 82% of respondents assumed that DRC's crude oil is heavy and therefore 76% of respondents have agreed that DRC's crude oil density has been incompatible with SOCIR technology, which has affected its operation,
- An average of 77% of respondents has disagreed that SOCIR upgrading project was affected by the issue of environmental degradation. This also means that the problem affecting SOCIR was not related to the ecological factor, but principally to the technological factor.

Accordingly, respondents have shown a better impression about the effects of SOCIR upgrade in the ecological environment. Some of these impressions include the following statements:

- SOCIR upgrade could be an opportunity for the government of DRC to take steps that will limit, as possible, any detrimental effects on the environment (86%),



- SOCIR upgrade will play a key role in managing environmental safety through producing clean products, which will not contribute to air and water pollution in the operational area (83%),
- SOCIR upgrade will be an opportunity for the country to implement the international and national ecological criteria or regulations regarding the issue of climate change (81%), and
- 80% of respondents have confidence in that SOCIR upgrade could lead the government of DRC to improve a dynamic commission which will deal with the issue of preventing and protecting environmental degradation.

### **5.2.3 Objective 3: The Socio-economic benefits the upgrading of SOCIR could have in the DR Congo**

The strategy of upgrading SOCIR in the DRC could produce diverse potential socio-economic effects, such as those that are summarised in Figure 5.1 below. The above sections related to the PESTIE analysis have as well indicated the factors, challenges and effects of SOCIR upgrade in the business environment.

**Figure 5.1: Potential impacts of SOCIR's upgrading effects on socio-economic development in the DRC**



**Source:** Self-generated by the researcher, based on literature review theories

The potential role or effects of SOCIR upgrading on the socio-economic situation of the DRC can be better seen in Figure 2.7, Figure 2.7.1 and Figure 2.7.2 in Chapter 2, which describes the expected support of jobs creation through three channels: Direct, indirect and induced effects.

Firstly, SOCIR upgraded will proceed to recruit and employs qualified people directly to run the refinery (direct effect), secondly SOCIR will refine local crude oil as input from the upstream oil and gas industry, refine it and supply it to the downstream (transportation, distribution and marketing); which also creates massive employment (indirect effect) and thirdly, the whole oil industry: upstream, midstream and downstream employment or jobs created (direct and indirect employees) will spend their wages in supporting other businesses (induced effect or employment).

This multiplier effect could finally produce the socio-economic improvement and oil and gas industry integration and development in the country. Therefore, respondents were also required to indicate the levels of their perception and understanding concerning the promising effects of SOCIR upgrade in the macro-environment, which comprise political, economic, social, technological, international and ecological environments.

### **5.3 GENERAL RECOMMENDATIONS**

The general recommendations are related to the nature of the study objectives. The recommendations are as follows:

#### **5.3.1 Socio-economic development process in the DRC**

The DR Congo, a country full of endless strengths and opportunities, a country full of potential natural resources, a future country, a country of hope, but is today a country full of challenges, instabilities and threats; a country which needs a solid improvement of the PESTIE environments. Unemployment, insecurity, discrimination and inequality, human rights and socio-economic rights violation are calamities among many others that are facing more than 70% of Congolese which are living below the poverty line. Effort needs to be deployed by Congolese themselves to create a very stable democratic country, where justice, laws and regulations are on top of all institutions and where socio-economic activities are subordinate to the strict respect of human rights and socio-economic rights.

Socio-economic change and improvement in the DRC can only be possible if economic diversity is built through the process of industrialising industries for local natural mineral resources transformation in the country and where peace building and keeping are politically sustained.

### **5.3.2 The Government of the DRC**

The energy sector is a very strategic and key sector for socio-economic growth and sustainable development. The petroleum industry and several oil products are always calling for a particular consideration from international and national community policy makers. As a strategic sector of the economy, governments constantly are affected by the course of international cost of crude oil and oil products. Therefore, the success of any government programs is influenced or depends on the process of policy-making for the success of local oil and gas industry.

The DRC has updated a new law on the hydrocarbons to regulate all activities linked to oil and gas industry in the country. The law on hydrocarbons mostly envisages promoting the upstream and downstream operations with a large number of articles that define the exercise of investing in oil and gas processes. The refinery sector which is not developed in the country has only three articles that covered this important sector of the oil and gas industry. One of the three articles is stating that the beneficiary of refining and processing authorisation are required to obtain primarily, at a comparable quality and equal price the hydrocarbons in the national territory.

This seem to be a very encouraging statement that aims to promote the oil and gas industry development in the country, but unfortunately in the DRC, laws and policies are mainly on papers and remain theoretically powerless in the absence of implementation. Policy-makers should not only improve regulations and laws on hydrocarbons, but ensure that they are well-implemented to promote and secure oil and gas activities in the country.

### **5.3.3 The Economic Environment of the DRC**

The economic environment of the DRC is vulnerable and totally dependent on the primary industry or on the export of raw natural mineral resources. The colonial

economic model of exporting the total oil output for imports of oil refined products needs is continually affecting the country in terms of unemployment, unstable economic growth, the rate of inflation, the exchange rate, and the general state of the economy. The lack of innovating and developing SOCIR in the DRC has limited the country to enjoy the socio-economic benefits that can be caused by an operational oil refinery industry.

Therefore, the government should engage proper effort to create a stable economic environment that attracts and promotes public-private cooperation for SOCIR upgrading project and for oil and gas industry development. A fair fiscal policy or progressive tax reforms in the oil and gas industry could also help the country to become investors' pole of interest. More transparency and less political involvement in the oil and gas industry could lead to the oil and gas industry (management) improvement, development and integration.

#### **5.3.4 Social Environment in the DRC**

It has been stated that the environmental variable that is probably most sensitive to cross-influence by other variables, especially technological and the economy is social change. Indeed, people are products of their society. Congolese people everywhere they go, they reflect in many ways the culture that they adopted from the past history of different socio-political regimes. That is, they learn its language, value, faith, expectations, laws, and customs. The culture of unemployment, corruption, impunity, discrimination and many more factors have led to crime and massive violation of human rights and socio-economic rights violation, which reduced Congolese people to all the indignities associated with poverty.

Therefore, the oil and gas industry development including SOCIR upgrading project in the country could be at the centre of social change. On the one hand, it is expected to contribute to social change; on the other hand, it should always keep up with the major influences on its social trends. The government of DRC should promote socio-economic infrastructure that may contribute further on social change and national unity and cohesion. This may be possible only if the government will have the capacity to ensure credible and stable democratic institutions and the stability of business environment. The business environment stability and the industrialisation of the economy are the essential key for social change in the DRC.

### **5.3.5 Technological Environment in the DRC**

The DRC has abundant raw material, but lacks available and appropriate technological skill or capacity to transform natural mineral resources to finished products that are socio-economically profitable and for sustainable development. It is expected that SOCIR upgrading project and the oil and gas industry development in the DRC could promote the combination of innovation and competition that will affect the oil business most. The most basic effect of SOCIR upgrading project or technological innovation is probably higher productivity, which will result in keener competition and the ability to produce more and better oil products. The country should therefore, be able to assess continually available technology and the related cost through:

- Identification of modern appropriate technology for available crudes oil in the country;
- Analysis of potential change in current and future oil technologies, including taking into account environmental change;
- Analysis of the competitive impact of important oil technologies;
- Analysis of the oil and gas industry's technological strengths and weaknesses; and
- A list of priorities which should be included in a technology strategy for SOCIR and the oil and gas industry development.

SOCIR upgrading with appropriate new equipment or technology is expected to affect the oil and gas industry as a whole, including its products, lifecycle, supply of oil products, production processes, and its approach to management. These influences all require the ministry of hydrocarbons and the government of DRC to keep well-informed of oil technological revolution.

### **5.3.6 International Environment in the DRC**

It has been indicated further above that the international environment involves local and foreign trends and events that to the extent that it influences the oil and gas industry and the market environment. International and multinational companies operating in the DRC affect to greater and lesser the oil and gas industry development. It creates opportunities and as well threats to the well-being of national

oil and gas industry. But generally, globalisation in the DRC and particularly in the oil and gas industry does not offer great opportunities or a real socio-economic change. Most contracts or cooperation between the DRC and foreign partners in any economic sector and particularly in the oil and gas industry are officially negotiated out of legitimate way. These kinds of contracts are based on exploitation of natural mineral resources and do not promote human capital resource development.

The colonial economic system that consist of taking advantage (manipulation) by industrialised countries and multinational companies to oppress Congolese people for natural resources exploitation and export only, and for it to be refined anywhere else indicate sufficiently that government is powerlessly reliant on international control. With this kind of control, no effort can be projected to industrialise the economy, no change of socio-economic situation can be predicted or expected in the country.

Forced by globalisation and intense exploitation of natural mineral resources, the DRC will have to focus on diversifying the economy, by investing on restructuring and innovating the existing industries, including SOCIR if possible, and focus on other core competitive advantages, namely hydroelectric barrage, agriculture, water, forest, tourism and many others, to anticipate the increasing demand driven by the future exploding African and Asian economies. Further, the DRC government will have to constantly assess possible global threats to national interest and to ecological environment, when signing contracts with foreign partners.

### **5.3.7 Ecological Environment in the DRC**

In these days, an international quest for lower carbon dioxide emission is putting pressure on the car industry to manufacture cars that are less dependent on fossil fuel and more dependent on electricity. Furthermore, most international meetings on climate change are focused on significantly calling business organisations to become increasingly aware of the natural environment and the interdependence between business organisations and the natural environment. Business organisations present opportunities for socio-economic environment as well as threats to ecological environment. In the case of DRC, companies operating in the mining, forestry and in the oil and gas industry for example, are creating more ecological threats than socio-economic opportunities.

Threats include risk for shortage of natural resources, the cost of pollution and environmental degradation not well managed by the ruling government and companies involved in natural resources exploitation, and damage to the country's ecological resources (soil, water, air, pollution and forest devastation). The DRC's consecutive governments and international community are held accountable for national ecological environment destruction.

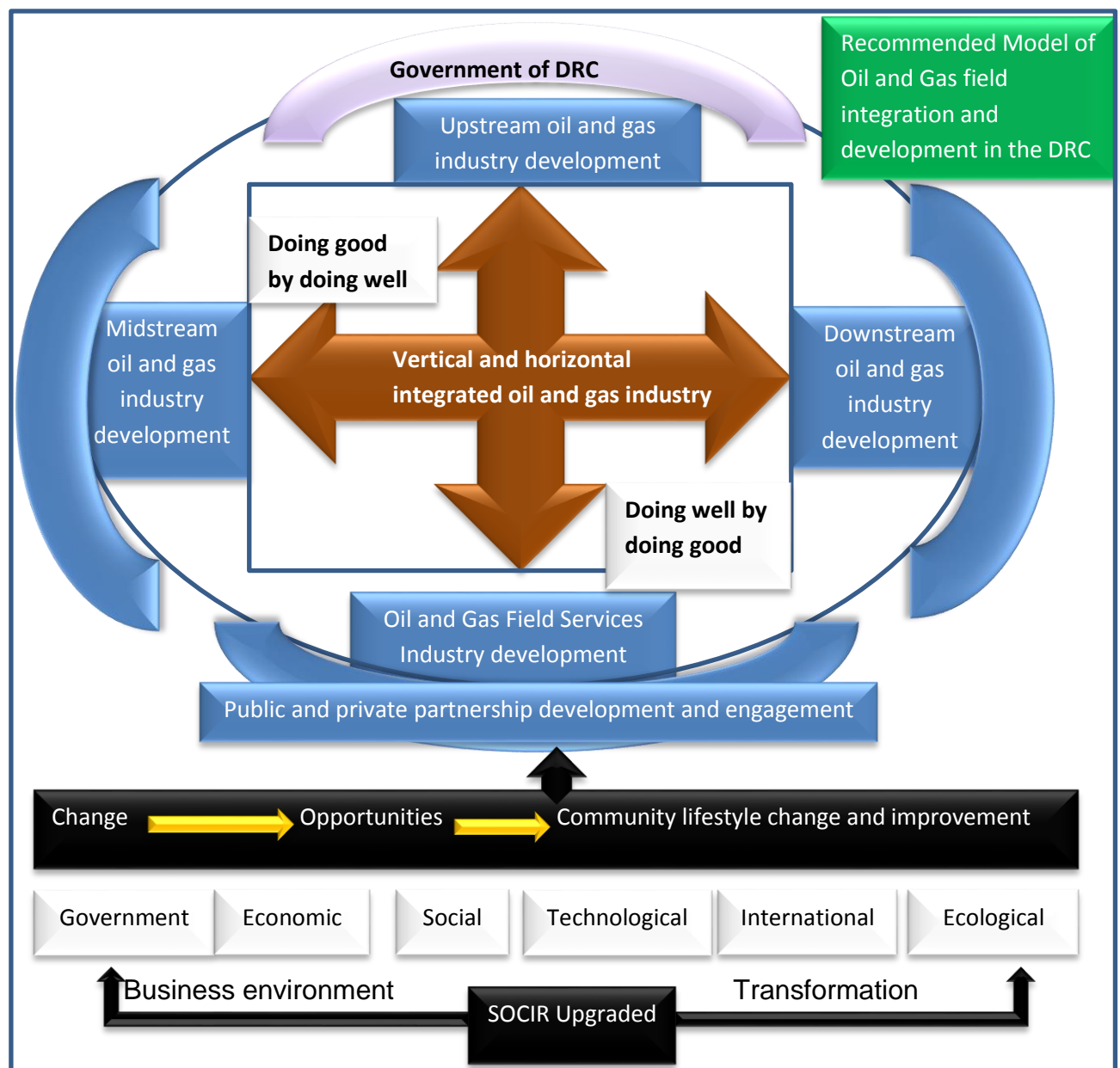
Meanwhile, the DRC's government will have to take timely strong measures and steps to limit, as far as possible, any detrimental effects the companies involved in exploitation of natural resources may have on the environment, not only to prevent unfavourable attitudes towards the companies, but, most importantly, in order to conserve, protect, maintain, and manage the country's deteriorating natural resources. The government will have also to create opportunity for ecological environment to be profitable to Congolese people now and into the future.

#### **5.4 OPTIONAL INTEGRATED FRAMEWORK FOR OIL AND GAS INDUSTRY DEVELOPMENT IN THE DRC**

SOCIR in the DRC was expected to play a fundamental role that should lead to the national oil and gas industry development and integration, guide the country to have a secure source of oil products supply, create opportunities for petrochemical industries development and contribute to socio-economic growth. The lack of a proper model with SOCIR upgraded at the Centre of oil and gas industry development and integration could be one of the challenges experienced by the oil sector in the country. The figure below is a typical framework which can be used as the model of oil and gas industry integration and development in the DRC. Figure 5.2 below represents the simple recommended model that shows the effects the SOCIR upgraded could have on entire oil and gas industry development process, which also refers to Figure 2.7.2 in Chapter 2.



**Figure 5.2: Recommended framework for oil and gas industry development in the DRC**



**Source:** Self-generated by the researcher.

This simple integrated model for oil and gas industry development in the DRC includes seven main aspects involving the government of DR Congo, the upstream oil and gas industry development, the midstream oil and gas industry development, the downstream oil and gas industry development, the oil and gas field services industry development, eventual business environment transformation and public and private partnership development and engagement.

Unemployment, poverty, inequality and other socio-economic crises are the core concerns among community in the DRC, which result from the factors and challenges affecting the business environment, which also affect the socio-economic development and the oil and gas industry development in the country. Congolese community are almost disconnected with economic activities such as oil and gas activities processes, following their inability to find jobs, inability to access easily the basic or public services, and inability to effectively enjoy the fruit of their natural mineral resources. By the lack of CSR values implementation in the country, the Congolese community is as well effectively disconnected to participate in planning and decision making processes.

The oil industry as a whole, and in particular, the petroleum refining industry can only develop when the government and the Congolese people will have the courage to face the major challenges that impede their development, and focus with willpower on how to evaluate them, and also how to identify appropriate policies that will help to resolve these challenges and reduce their negative effects by multiplying the implementation efforts of the projects that could lead to change and development. Alternatively, DRC can only develop by having the courage to face its history and recognise the problems that hinder its socio-economic development. And this history and these problems will have to be investigated through the business environment (macro, micro and market environments, and especially by considering the PESTIE factors).

The study shows that the business environment improvement, SOCIR and the oil and gas industry development in the DR Congo could create opportunities for present and future Congolese community lifestyle improvement. But, specifically, in the oil and gas industry, the following aspects need to be taken into account:

- 1. The government of DRC:** The ruling government and its institutions will play the role that influence the oil and gas industry as a regulating force by promulgating and enforcing laws which guarantee monitoring and transparency of oil and gas activities in the country, and ensure that it influences the management of oil and gas lifecycle with measures that are socio-economically directed and which steering economic policy and development in a certain direction.

Change is expected to come not with government opinion on how to regulate the oil and gas industry, but with the government good example on well implementing regulations, civil rights and socio-economic rights, which are human rights. Thus, the Congolese should learn from CSR theories, the principle of doing well by doing good.

- 2. Upstream oil and gas industry development:** The government have to ensure that contracts for oil and gas exploration, site development, crude oil and gas extraction or production will be meeting the requirements of the existing laws, preventing the procedure which should routing local crude oil and gas output in the midstream (refinery industry) for processing or refinement, and if possible, the exceeded quantity not refined locally may be exported to other regional marketplace.
- 3. Midstream oil and gas industry development:** Crude oil and gas from the upstream will have to be transported, storage and refined or processed in the midstream industry (local oil refining industry). Therefore, oil products and gas from the refining industry will have to be steering to the downstream. The project for SOCIR upgrade is one of the broader programmes to be initiated for the national oil and gas industry development and for the production of clean fuels in the DRC.

The project expects to include modern technology such as residual fluid catalytic cracking unit, naphtha processing units and the LPG storage unit. The project aims at modernising existing facilities to increase capacity of crude oil processing from fixed volume to improved oil products quality, and adapting to meet international specifications for gasoline. The objective consists of:

- The oil refinery's modernisation with new technology that will help SOCIR to optimise the various process units. This will help to sustain the production of clean fuels both for the local and export markets, as well as prevent or reduce maintenance and plant shutdown costs,
- To increase crude oil processing capacity, SOCIR efficiency and effectiveness, and ensure that SOCIR can produce gasoline at specifications similar to those used throughout Europe,
- To provide high levels of accuracy and reliability in demanding refinery applications,

- Contributing to socio-economic improvement and growth in the DRC.
4. **Downstream oil and gas industry development:** Petroleum products and gas from the midstream will have to be transported, storage, distributed firstly in the local marketplace and the exceeded quantity could be exported to international marketplace.
  5. **Oil and gas field services development:** The oil and gas field services industry development will provide support services on oil and gas fields operations (sites development, maintenance and training services for human capital development) on a contract basis to companies involved in oil and gas activities. Furthermore, the oil and gas field services industry development will involve also companies that provide the infrastructure, equipment, intellectual property and services needed by the international oil and gas industry to explore, extract, and transport crude oil and natural gas from the earth to the refinery, and eventually to the consumer.
  6. **Business environment transformation:** Indeed, the PESTIE factors leading to socio-economic challenges are also the gateway opportunities that could generate new thinking, which produce great ideas about resolving problems that create real change for coherent public-private partnership, economic development and social transformation. It is hopeful and optimistic that the oil and gas industry integration and development in the DRC, free from international omnipotence, could cause progressive change of the macro-environment, micro-environment and market environment factors.
  7. **Public and private partnership development and engagement**

Theories of development most often point out why and how socio-economic activities lead to outcomes with assumption that results, whether intermediate or long-term, are due to short-term activities, and these results from a direct engagement implemented. Continual public and private engagement, based on Win-Win partnership model, is specifically required in order to achieve SOCIR upgrading project, oil and gas industry development and integration, and socio-economic transformation in the country.

The government of DRC should engage and make interactions, develop partnership and cooperation with various stakeholders in order to promote

synergy and the achievement of good results during which gaps are identified early and interventions to resolve them are implemented.

The government is as well required to continually monitor and evaluate the implementation of policies, programmes and projects. Monitoring and evaluating includes oversight by political leadership within the oil and gas industry and management of the department of hydrocarbons. Consequently, there could be an improvement of socio-economic activities in the country.

## **5.5 RECOMMENDATIONS FOR FURTHER RESEARCH**

The research highlights the socio-economic role of the petroleum refining industry in the DRC. Due to the scope of the study, further research should be undertaken on various aspects of oil and gas industry development in the DRC, where not significantly explored. This includes research on oil and gas field services development. It is recommended that the contribution of petroleum refining industry and the whole oil and gas industry development effects in the socio-economic environment be further examined. Further studies in relation to the business environment stability and socio-economic improvement in the DRC need to be conducted.

## **5.6 CONCLUSION OF THE STUDY**

The findings of this study indicate that the socio-economic environment and the oil and gas industry operations in the DRC are influenced by the course of much instabilities and challenges which are related to the business environment. The environment in which organisations or companies operate in the oil and gas industry, the economic fluctuations, the ways of life of many Congolese, international and ecological environment, as well as political trends, are continually and ultimately affecting the oil and gas industry development, including SOCIR upgrading project in the DRC.

The study revealed also that challenges experienced by SOCIR in the macro-environment are an open doors opportunity for the country to experience new possibilities for knowledge of trends in the PESTIE environments, and identification of environmental dimensions that largely determine the effects the oil and gas industry integration and development could have in the socio-economic situation of

Congolese people now and into the future. The knowledge of keys drivers for SOCIR innovation, economic growth, transport sector development, population growth and rural zone development; the socio-economic effects the upgrading of SOCIR would have in the DRC and the business environment change, is necessary for decision making in order to invest profitably on local refining industries upgrading, for economic diversity and social change. This knowledge requires that the business environment should be regularly examined and improved to enable public and private partners to identify threats and challenges in the oil and gas industry in good time and, where possible, to transform these into opportunities.

The results of the study should finally help in the formulation of policies, programs, means and interventions which will enable the government of the DRC to promote the industrialising industries of natural mineral resources. Indeed, a real change in the business environment and particularly in the PESTIE factors could generate great opportunities for socio-economic change and transformation in the DRC. Creative and innovative policies and regulations implementation are therefore the key to the expected economic and social transformation. Thus, the study has entirely re-joined and fulfilled the research aim and objectives.

## LIST OF REFERNCIES

Adeyeye, O. 2012. *Corporate social responsibility of multinational corporations in Developing Countries: Perspective on Anti-Corruption*. Cambridge: Cambridge University Press.

AFP-Global Agenda. 2014. *Israeli-Owned Mining Company Discovers Vast Oil Reserves in DRC*. Available:

<http://www.israelnationalnews.com/News/News.aspx/183950#.VT765uJlIU>

(Accessed 22 April 2015).

African Bulletin. 2010. *DRC: The Origins of the informal sector*. Available:

<http://www.african-bulletin.com/5920-drc-the-origins-of-the-informal-sector.html>

(Accessed 6 July 2015).

African Development Bank. 2014. *Democratic Republic of Congo Economic Outlook*.

Available: <http://www.afdb.org/en/countries/central-africa/democratic-republic-of-congo/democratic-republic-of-congo-economic-outlook/> (Accessed 8 July 2015).

African Development Bank. 2013. *Regional Department Centre: Democratic Republic of Congo, 2013-2017 country strategy paper*. Available:

[http://www.chevron.com/news/inthenews/article/02052013\\_energyeconomy.news](http://www.chevron.com/news/inthenews/article/02052013_energyeconomy.news)

(Accessed 22 February 2015).

African Great Lakes. 2014. *Polle Institute, Intercultural Institute in the Great Lakes Region. Fuelling conflict or development? Cross-border oil & gas resources in the African Great Lakes*. Available: [http://www.pole-](http://www.pole-institute.org/sites/default/files/FUELLING%20CONFLICT.pdf)

[institute.org/sites/default/files/FUELLING%20CONFLICT.pdf](http://www.pole-institute.org/sites/default/files/FUELLING%20CONFLICT.pdf) (Accessed 3 March 2016).

African Magazine. 2009. *Congo with \$24 trillion in mineral wealth BUT still poor*.

Available: <http://www.newsaboutcongo.com/2009/03/congo-with-24-trillion-in-mineral-wealth-but-still-poor.html> (Accessed 15 July 2015).

International Crisis Group. 2012. *Black gold in the Congo: Threat to stability or development opportunity?* Africa Report No 188. Available: [http://www.crisisgroup.org/~media/Files/africa/central-africa/dr-congo/188-black-gold-in-the-congo-threat-to-stability-or-development-opportunity-english.pdf](http://www.crisisgroup.org/~/media/Files/africa/central-africa/dr-congo/188-black-gold-in-the-congo-threat-to-stability-or-development-opportunity-english.pdf) (Accessed 3 March 2016).

Alex, K.N. and Dolores, K.S. 2015. *Congo - D.R. - Oil & Gas Regulation 2015*. Available: <http://www.iclg.co.uk/practice-areas/oil-and-gas-regulation/oil-and-gas-regulation-2015/congo-d-r> (Accessed 5 May 2015).

Alina, B. 2015. *International Energy Statistics*. Available: <http://drcongo.opendataforafrica.org/tphpylg/democratic-republic-of-the-congo-crude-oil-and-petroleum-products-import-and-export-1986-2012>, (Accessed 4 August 2015).

American Association of Petroleum Geologists (AAPG). 2015. *Petroleum through time, what is Petroleum*. Available: <http://www.aapg.org/about/petroleum-geology/petroleum-through-time/what-is-petroleum#sthash.e9QB2vHj.dp> (Accessed 25 January 2015).

American Petroleum Institute. 2013. *Economic impacts of the oil and natural gas industry on the US economy in 2011*. Available: [http://www.Api.org/-/media/Files/Policy/jobs/Economic\\_impacts\\_Ong\\_2011.pdf](http://www.Api.org/-/media/Files/Policy/jobs/Economic_impacts_Ong_2011.pdf), (Accessed 24 August 2015).

ANAPI. 2012. *Invest in Congo*. Available: <http://photos.state.gov/libraries/congo/76240/pdfs/ANAPI%20Invest%20in%20DRC.pdf> (Accessed 22 August 2015).

Antonio, B. 2013. *Challenges and solutions in an upstream and downstream oil and gas operation*. Available: <http://globalenergy.pr.co/65678-challenges-and-solutions-in-an-upstream-and-downstream-oil-and-gas-operation> (Accessed 19 August 2015).

Anthony, A., Richard, K., Lattanzio, Robert, P., James. D., Werner, Brent, D. and Yacobucci, B. D. 2014. *Small refineries and oil field processors: Opportunities and Challenges*. Available: <https://www.fas.org/sgp/crs/misc/R43682.pdf> (Accessed 19 September 2015).



- Augood, R. 2010. *Challenges facing the African Refining sector*. Available: [http://www.petroleumafrica.com/en/photos/1267626997\\_downstream\\_focus\\_.pdf](http://www.petroleumafrica.com/en/photos/1267626997_downstream_focus_.pdf) (Accessed 8 December 2015).
- AVEC. 2015. *Challenges facing African refineries*. Available: <http://www.avec.co.za/eng-focus-challenges.php> (Accessed 14 September 2015).
- Bafala, J. 2006. *L'industrie Petroliere en RDC. Des reseaux d'interets croises pour le profit d'aujourd'hui ou de demain*. 2nd ed. Kinshasa: PUK Press.
- Bargorett, E. and Bernie, W. 2014. *Macro-environmental Analysis for the Alberta midstream oil and gas sector*. Available: <http://dtpr.lib.athabascau.ca/action/download.php?filename=mba14/open/BargorettE vans.pdf> (Accessed 29 September 2015).
- Barry, C., Plomp, A.J., Kroon, P., McAlpine, I. and Mozaffarian, M. 2015. *Refinery emissions from a competitive perspective*. Available: <http://www.vnpi.nl/Files/file/VNPI.pdf> (Accessed September 28, 2015).
- Basil, U. E. and Osheyen, S.O. 2015. *The Impact of petroleum activities on the socio-economic life of resident population of Uvwie Local Government Area of Delta State, Nigeria*. Available: [http://www.idosi.org/mejsr/mejsr23\(7\)15/10.pdf](http://www.idosi.org/mejsr/mejsr23(7)15/10.pdf) (Accessed 21 August 2015).
- Benjamin, A. and Rose, N. 2013. *Eastern Africa: A new oil and gas frontier*. Available: [http://observatoire-grands-lacs.org/wp-lacs/uploads/note\\_1\\_hydrocarbures\\_final.pdf](http://observatoire-grands-lacs.org/wp-lacs/uploads/note_1_hydrocarbures_final.pdf) (Accessed 3 March 2016).
- Boardman Energy Partners. 2015. *Facts about crude oil*. Available: [http://benergypartners.com/Facts\\_About\\_Crude\\_Oil.html](http://benergypartners.com/Facts_About_Crude_Oil.html) (Accessed 27 July 2015).
- Canadian Fuels Association. 2013. *The economics of petroleum refining: Understanding the business of processing crude oil into fuels and other value added products*. Available: [www.canadianfuels.ca/.../Economics%20fundamentals%20of%20Refining%20](http://www.canadianfuels.ca/.../Economics%20fundamentals%20of%20Refining%20) (Accessed 9 April 2015).

Chevron. 2004. *Chevron Texaco press release: Chevron Texaco confirms sales of Democratic Republic of Congo subsidiary*. Available: [http://www.chevron.com/chevron/pressreleases/article/07202004\\_chevrontexacoconfirmssaleofdemocraticrepublicofcongosubsidiary.news](http://www.chevron.com/chevron/pressreleases/article/07202004_chevrontexacoconfirmssaleofdemocraticrepublicofcongosubsidiary.news) (Accessed 21 Octobre 2015).

CIA World Factbook. 2015. *Congo, Democratic Republic of the – CIA*. Available: <https://www.cia.gov/library/publications/the-world-factbook/geos/cg.html> (Accessed 7 July 2015).

Consiglio, M., Witchalls, B., Armstrong, K., Stampa, M., Madec, A., Abdullah, M., Depraz, S. and Fraser, E. 2006. *A Guide to social impact assessment in the oil and gas industry*. Available: <https://www.commdev.org/guide-social-impact-assessment-oil-and-gas-industry> (Accessed 1 July 2015).

Creswell, J. W. 2015. *A concise introduction to mixed methods research*. California: Sage.

Creswell, J. W. 2011 and Clark Vicki L. 2011. *Designing and conducting mixed methods research*. 2<sup>nd</sup> ed. Los Angeles: Sage.

Creswell, J. W. 2009. *Research design: quantitative, qualitative, and mixed methods approaches*. 3<sup>rd</sup> ed. Los Angeles: Sage.

David, M. 2015. *Canadian Oil Industry: Impact of PESTLE changes on the Canadian oil industry*. Available: <http://davidmadeley.madeleyandvenner.com/wp-content/uploads/2015/02/PESTLE-Analysis-on-Canadian-Oil-industry.pdf> (Accessed 13 October 2015).

Dejan, T. and Andre, D. L. 2009. *Strategic and financial analysis in the oil industry: Petrobas Shareholders Value Potential and Fair Value of Stock*. Available: <http://pure.au.dk/portal-asb-student/files/8058/M.THESIS.pdf> (Accessed 8 October 2015).

East African Community Secretariat report 2008. *Strategy for the development of the regional refineries*. Available: [http://www.eac.int/energy/index.php?option=com\\_docman&task=doc\\_download&gid=13&Itemid=70](http://www.eac.int/energy/index.php?option=com_docman&task=doc_download&gid=13&Itemid=70) (Accessed 13 October 2015).

Emeka, D. 2004. *Managing oil revenues for socio-economic development in Nigeria: the case for community-based trust funds*. Stanford Law School - Stanford University. Available: <https://www.law.stanford.edu/sites/default/.../DuruigboEmeka-ft2004.pdf> (Accessed 10 April 2015).

ERM Eurasia Limited EIA. 2008-2009. *Environmental and Social Impact Assessment (ESIA) for the oil Refinery (stage 1) of the TANECO oil refinery and Petrochemical complex, Nzhnekamsk, Republic of Tatarstan, Russian Federation*. Available: [www.agaportal.pdf/nachhaltigkeit/eia\\_refinerie.pdf](http://www.agaportal.pdf/nachhaltigkeit/eia_refinerie.pdf) (Accessed 22 September 2015).

Evan, J. R. 2013. *Meta-Analysis for public management and policy*. San Francisco: Jossey-Bass.

Fernandez, R. 2013. *Natural gas star technology transfers pre-Conference workshop*.  
[https://www3.epa.gov/gasstar/documents/workshops/techtransfer/Methane\\_Emission\\_Reduction\\_Opportunities.pdf](https://www3.epa.gov/gasstar/documents/workshops/techtransfer/Methane_Emission_Reduction_Opportunities.pdf) (Accessed 10 May 2016).

Fidan, A. 2011. Brief introduction into oil and gas industry. Available: [www.slideshare.net/.../brief-introduction-into-oil-gas-industry-by-fidan-a](http://www.slideshare.net/.../brief-introduction-into-oil-gas-industry-by-fidan-a) (Accessed 25 February 2015).

Fink, A. 2010. *Conducting research literature review*. 3<sup>rd</sup> ed. Los Angeles: Sage Publications.

Fourie and Frederick, C. V. N. 2009. *How to think and reason in Macroeconomics*. 3<sup>rd</sup> ed. Lansdowne, Cape Town: Juta.

Francis, M. 2015. *Oil refinery construction to begin before December*. Available: <http://www.monitor.co.ug/News/National/Oil-Refinery-construction-to-begin-December/-/688334/2783780/-/index.html> (Accessed 14 September 2015).

Oil Review Africa. 2015. Uganda to start building oil refinery this year. Available: <http://www.oilreviewafrica.com/downstream/downstream/uganda-to-start-building-oil-refinery-this-year> (Accessed 14 September 2015).

Gassesse, J. 2014. *DR of Congo: an oil tank of 3 billion barrels discovered on the Lake Albert*. Available: <http://www.africatopsuccess.com/en/2014/08/11/dr-of-congo-an-oil-tank-of-3-billion-barrels-discovered-on-the-lake-albert/> (Accessed 30 June 2015).

Genesis Group. 2015. *Crude oil definitions*. Available: <http://www.genesisny.net/Commodity/Oil/ODefinitions.html> (Accessed 27 July 2015).

Geoff, H., Kate, H., Bhavna, S., Kate, B. and Diana, C. 2009. *Poverty and poverty reduction in sub-Saharan Africa: An overview of the issues*. Available: <http://www.odi.org/resources/docs/860.pdf> (4 February 2016).

Guillaume, M. 2012. *Democratic Republic of Congo – Southern African Development Community*. Available: <http://www.sadc.int/member-states/dr-congo/> (Accessed 23 April 2015).

Giuseppe, C. 2014. *Oil of DR Congo: Significant oil reserves in Lake Albert*. Available: <http://www.offshoreenergytoday.com/oil-of-drcongo-significant-oil-reserves-in-lake-albert/> (Accessed 26 June 2015).

Government of Uganda. 2013. *Introduction to Uganda refinery project*. Available: <http://www.petroleum.go.ug/uploads/resources/IntroductiontotheUgandaOilRefineryProject,Oct2013.pdf> (Accessed 3 August 2015).

Graziano, A. and Raulin, M. 2013. *Research methods: a process of inquiry*. 8th ed. New Jersey: Pearson.

HEAR CONGO. 2013. *Natural Resources in the Democratic Republic of Congo: A Cursed Blessing* (Blog). Available: <http://www.hearcongo.org/natural-resources-in-the-democratic-republic-of-congo/> (Accessed 22 April 2015).

Heike, B., Elizabeth, D., Alex, V., and Markus, W. 2011. *The effects of oil company' activities on the environment, health and development in Sub-Saharan Africa*. Available: [http://www.chathamhouse.org/sites/files/chathamhouse/0811ep\\_report\\_0.pdf](http://www.chathamhouse.org/sites/files/chathamhouse/0811ep_report_0.pdf) (Accessed 20 July 2015).

Hildgunnur, E. 2011. *Colonial Legacy in the Great Lakes Region*. Available: [http://skemman.is/stream/get/1946/8169/21580/1/BA\\_ritger%C3%B0\\_Hagfr%C3%A6%C3%B0i\\_-\\_Hildgunnur\\_-\\_Skemman\\_-\\_2011.pdf](http://skemman.is/stream/get/1946/8169/21580/1/BA_ritger%C3%B0_Hagfr%C3%A6%C3%B0i_-_Hildgunnur_-_Skemman_-_2011.pdf) (Accessed 21 September 2015).

Hoskins, T. 2012. *Corporate social responsibility handbook: making csr and narrative reporting work for your business*. 3rd ed. London: ICSA Information & Training Ltd.

IBISWorld. 2016. *Oil & Gas Field Services in the US: Market Research Report*. Available: <http://www.ibisworld.com/industry/default.aspx?indid=141> (Accessed 7 March 2016).

Ilunga, Y. Y. 2015. *Why dependence on natural resources is bad for the DRC*. Available: <https://theconversation.com/why-dependence-on-natural-resources-is-bad-for-the-drc-48788> (Accessed 2 December 2015).

Index Mundi. 2015. *Democratic Republic of the Congo - Country Profile – 2014*. Available: [http://www.indexmundi.com/democratic\\_republic\\_of\\_the\\_congo/.#sthash.fVZVnoj3.dpuf](http://www.indexmundi.com/democratic_republic_of_the_congo/.#sthash.fVZVnoj3.dpuf) (Accessed 31 July 2015).

Index Mundi. 2015. *Democratic Republic of the Congo – country profile - 2013: Oil - proved reserves*. Available: [http://www.indexmundi.com/democratic\\_republic\\_of\\_the\\_congo/](http://www.indexmundi.com/democratic_republic_of_the_congo/) (Accessed 22 April 2015).

International Monetary Fund. 2007. *Democratic Republic of Congo: Poverty Reduction Paper, IMF Country Report*. (Online). Available: [https://en.wikipedia.org/wiki/Social\\_issues\\_in\\_the\\_Democratic\\_Republic\\_of\\_Congo](https://en.wikipedia.org/wiki/Social_issues_in_the_Democratic_Republic_of_Congo) (Accessed 12 September 2015).

IPIECA. 2004. *A Guide to social impact assessment in the oil and gas industry*. Available: [http://commdev.org/files/671\\_file\\_SIADocumentFinal.pdf](http://commdev.org/files/671_file_SIADocumentFinal.pdf) (Accessed 12 August 2015).

James, H., Gary, Glenn, E., Handwerk, Mark, J., and Kasier 2007. *Petroleum Refining. Technology and Economics*. 5th ed. London, New York: CRC Press.

Jechura, J. 2016. Petroleum refining overview. Available: [http://inside.mines.edu/~jjechura/Refining/01\\_Introduction.pdf](http://inside.mines.edu/~jjechura/Refining/01_Introduction.pdf) (Accessed 3 May 2016).

Jechura, J. 2015. Petroleum refining overview – Insides Mines. Available: [http://inside.mines.edu/~jjechura/Refining/01\\_Introduction.pdf](http://inside.mines.edu/~jjechura/Refining/01_Introduction.pdf) (Accessed 23 October 2015).

Jeff, R. 2014. *An Israeli billionaire, a whole lot of oil & the state of Congo oil*. Available: <http://oilpro.com/post/6254/top-israeli-billionaire-company-just-discovered-oil-congo> (Accessed 25 April 2015).

Jody, L. L. 2014. Lake Tanganyika, floating health clinic: From curse to cure. Available: [http://floatingclinic.org/newsite/wp-content/uploads/2014/09/WAVE\\_LTFHC\\_Oil\\_and\\_Gas\\_Paper\\_FINAL-10-Sep-2014.pdf](http://floatingclinic.org/newsite/wp-content/uploads/2014/09/WAVE_LTFHC_Oil_and_Gas_Paper_FINAL-10-Sep-2014.pdf) (Accessed 3 March 2016).

Jukwaa, I. S. 2014. *The Democratic Republic of Congo: worth in excess of US\$ 24 trillion*. Available: [http://www.jamiiforums.com/jukwaa-la-siasa/579163-the-democratic-republic-of-congo-worth-in-excess-of-us\\$-24-trillion.html](http://www.jamiiforums.com/jukwaa-la-siasa/579163-the-democratic-republic-of-congo-worth-in-excess-of-us$-24-trillion.html) (Accessed 2 July 2015).

KPMG. 2009. *Challenges and opportunities for today's global refining industry*. Available: <https://www.kpmg.com/TT/en/IssuesAndInsights/ArticlesPublications/Documents/Challenges%20and%20Opportunities%20for%20Todays%20Global%20Refining%20Industry.pdf> (Accessed 19 September 2015).

KPMG. 2013. *Oil and Gas in Africa. Africa's reserves, potential and prospects*. Available: <https://www.kpmg.com/Africa/en/Issuesandinsights/Articles-Publications/Documents/Oil%20and%20Gas%20in%20Africa.pdf> (Accessed 25 April 2015).

Labaree, R. 2013. *Theoretical framework-organizing your social science*. Available: <http://libguides.usc.edu/writingguide/theoreticalframework> (Accessed 16 October 2015).

- Liam, M. 2012. *More challenges than opportunities in emerging DRC oil industry*. Available: <http://www.futuredirections.org.au/publications/energy-security/27-energy-security-swa/619-more-challenges-than-opportunities-in-emerging-drc-oil-industry.html#sthash.kJINvtFx.dpuf> (Accessed 30 June 2015).
- Liebenberg, S. 2010. *Socio-Economic Rights. Adjudication under a transformative constitution*. Cape Town: Juta & Co.
- Lucky, S. 2014. *Democratic Republic of Congo Fuel*. Available: <http://dlca.logcluster.org/display/public/DLCA/3.1+Democratic+Republic+of+Congo+Fuel>. <http://www.hydrocarbures.gouv.cd/minhydro.php?page=aval-petrolier> (Accessed 31 July 2015).
- Mayimona, T. L. 2012. *DR. Congo's oil production: a black hole. The potential*. (Online). Available: <http://news.focascongo.co.za/2012/03/06/dr-congos-oil-production-a-black-hole/> (Accessed 4 May 2015).
- Mbendi Information Services. 2015. *Oil and gas in Democratic Republic of Congo*. Available: <http://www.mbendi.com/indy/oilg/af/zr/p0005.htm> (Accessed 23 April 2015).
- Mbendi Information Services. 2015. *Oil Refining in Africa – Overview*. (Online). Available: <http://www.mbendi.com/indy/oilg/ogrf/af/p0005.htm> (Accessed 14 September 2015).
- Mehta, V. 2012. *The Economics of killing: how the west fuels war and poverty in the Developing World*. London: Pluto Press.
- Michael, R., Mwangi, S., Kimenyi and Brandon, R. 2013. *The Imperative of boosting Africa's oil refinery investments*. Available: <http://www.brookings.edu/blogs/africa-in-focus/posts/2013/12/11-africa-oil-refinery-kimenyi> (Accessed 3 March 2016).
- Michalis, C. and Myrto, K. 2012. *Safety of offshore oil and gas operations: Lessons from past accident analysis*. Available: <http://publications.jrc.ec.europa.eu/repository/bitstream/JRC77767/offshore-accident-analysis-draft-final-report-dec-2012-rev6-online.pdf> (Accessed 7 September 2015).

Mika P. J 2010. *Oil activist in DRC slams repression & Perenco secrecy during interview*. Available: <http://platformlondon.org/2010/12/23/oil-activist-in-drc-slams-repression-perenco-secrecy-during-interview/> (Accessed 2 July 2015).

Miles, L. 2012. *Oil extraction in Lake Albert*. Available: <http://www.mileslitvinoff.info/dcs/Lake-Albert.pdf> (Accessed 28 April 2015)

Mohamed, H. 2007. *Meeting oil industry challenges: An OPEC Perspective*. Available: [http://www.opec.org/opec\\_web/en/863.htm](http://www.opec.org/opec_web/en/863.htm) (Accessed 2 July 2015).

Mohammad, R. N. and Noor, E. A. B. 2011. *A case study for environmental impact assessment of oil refinery in Iran with emphasis of environmental and Social Action Plan (ESAP)*. Available: <http://www.ipcbee.com/vol6/75-F10010.pdf> (Accessed 22 September 2015).

Mukanova, D. K., Tleuberdinova and Aizhan, T. 2013. *The concept and content of socio-economic development of the region*. Available: <http://search.proquest.com.dutlib.dut.ac.za/docview/1470791853?pq-origsite=summon> (Accessed 17 June 2015).

Nashaat, N. N. 2013. *Petroleum Refinery Introduction*. Available: <http://elearning.najah.edu/OldData/pdfs/911PR-S2013-L01-Introduction.pdf> (Accessed 22 August 2015).

Ngwube, A. 2013. *The Challenges facing democratic consolidation in the Democratic Republic of Congo*. *Journal of Studies in Social Sciences*, 3 (2): 113-128. *Federal university Oye-Ekiti, Ekiti State Nigeria*. Available: <http://infinitypress.info/index.php/jsss/article/viewFile/114/112> (Accessed 3 September 2015).

Nkurayija, Dr. and Jean, C. 2011. *The Requirements for the African Continent's Development: Linking Peace, Governance, Economic Growth and Global Interdependence*. Available: <http://www.culturaldiplomacy.org/academy/content/pdf/participant-papers/africa/Jean-De-La-Croix-Nkurayija-The-Requirements-For-The-African-Continent's-Development-Linking-Economic-Growth.pdf> (Accessed 16 February 2016).



Norton, R. F. 2013. *Proposed amendments to the DRC oil and gas legislation*.

Available:

<http://www.nortonrosefulbright.com/knowledge/publications/104735/proposed-amendments-to-the-drc-oil-and-gas-legislation/> (Accessed 6 May 2015).

OECD. 2015. *Democratic Republic of the Congo (COD). Top 5 Products imported by The Democratic Republic of the Congo*. Available:

<https://atlas.media.mit.edu/en/profile/country/cod/> (Accessed 3 August 2015).

Oil Review Africa. 2015. *Uganda to start building oil refinery this year*. Available:

<http://www.oilreviewafrica.com/downstream/Uganda-to-start-building-oil-refinery-this-year> (Accessed 18 February 2016).

IPS. 2014. *Oil of DR Congo: Significant oil reserves in Lake Albert?* Available:

<http://www.offshoreenergytoday.com/oil-of-drcongo-significant-oil-reserves-in-lake-albert/> (Accessed 3 March 2016).

Olivier, P. 2014. *Perenco in the Democratic Republic of Congo: when oil makes the poor poorer*. Available: [http://multinationales.org/Perenco-in-the-Democratic-](http://multinationales.org/Perenco-in-the-Democratic-Republic)

[Republic](http://multinationales.org/Perenco-in-the-Democratic-Republic) (Accessed 5 May 2015).

Olowonirejuaro R. 2014. *The Petroleum Industry Bill: Achieving its intended reform objectives?* Available: [http://omojuwa.com/2014/03/the-petroleum-industry-bill-](http://omojuwa.com/2014/03/the-petroleum-industry-bill-achieving-its-intended-reform-objectives-oluwayomi-ope-agbe-and-chinwe-ekene-ezeigbo/)

[achieving-its-intended-reform-objectives-oluwayomi-ope-agbe-and-chinwe-ekene-ezeigbo/](http://omojuwa.com/2014/03/the-petroleum-industry-bill-achieving-its-intended-reform-objectives-oluwayomi-ope-agbe-and-chinwe-ekene-ezeigbo/) (Accessed 5 September 2015).

OPEC. 2007. *Meeting Oil Industry Challenges: An OPEC Perspective*. Available:

[http://www.opec.org/opec\\_web/en/863.htm](http://www.opec.org/opec_web/en/863.htm) (Accessed 2 November 2015).

OPEC. 2013. *Oil and gas industry. I need to know: An Introduction to the Oil Industry & OPEC*. Available:

[http://www.opec.org/opec\\_web/static\\_files\\_project/media/downloads/publications/ChildrenBook2013.pdf](http://www.opec.org/opec_web/static_files_project/media/downloads/publications/ChildrenBook2013.pdf) (Accessed 22 August 2015).

Parkin, P. and Matthews 2008. *Economics*. 7 ed, London: Pearson Education Limited.

- Pauw, J. 2014. *Khulubuse Zuma's R100bn oil deal* - City Press. Available: <http://citypress.co.za/news/khulubuse-zuma-r100bn-oil-deal/> (Accessed 16 September 2015).
- Perenco. 2015. *Perenco - oil and gas: A leading independent exploration*. Available: <http://www.perenco-drc.com/> (Accessed 30 April 2015).
- Peter, N. 2015. *Uganda: Russians to build US\$2.5 billion refinery*. Available: <http://allafrica.com/stories/201503022492.html> (Accessed 4 August 2015).
- Peter, J. 2014. *UPDATE 3-Israeli billionaire finds 3 bln barrels of oil in Congo*. Available: <http://in.reuters.com/article/2014/08/07/congodemocratic-oil-gertler-idINL6N0QD40I20140807> (Accessed 24 April 2015).
- Petroleum Online. 2015. *Oil & Gas Industry Overview - Overview – Petroleum*. Available: <http://www.petroleumonline.com/content/overview.asp?mod=1> (Accessed 27 January 2015).
- Pierre, R. N. 2014. *SAPIA. African Refiners Association (ARA). The Value of African Refining*. Available: [http://www.sapia.co.za/literature\\_212538/The\\_Value\\_of\\_African\\_Refining](http://www.sapia.co.za/literature_212538/The_Value_of_African_Refining) (Accessed 10 June 2015).
- Pratik, P. V. 2014. *The Overview of Global Oil Scenario*. Available: [http://www.theglobaljournals.com/ijar/file.php?val=July\\_2014\\_1404222636\\_24.pdf](http://www.theglobaljournals.com/ijar/file.php?val=July_2014_1404222636_24.pdf) (Accessed 20 April 2015).
- PWC. 2013. *Economic impacts of the oil and gas industry on the US economy in 2011*. Available: [http://www.api.org//media/Files/Policy/Jobs/Economic\\_impacts\\_Ong\\_2011.pdf](http://www.api.org//media/Files/Policy/Jobs/Economic_impacts_Ong_2011.pdf) (Accessed 13 October 2015).
- Rachel, B. 2015. *World population expected to reach 9.7 billion by 2050*. Available: <http://news.nationalgeographic.com/2015/07/world-population-expected-to-reach-9-7-billion-by-2050/> (Accessed 7 September 2015).
- Regeneris Consulting. 2013. *A final report to Falkland Island Government. Socio-economic study of oil and gas development in the Falklands*. Available:

<http://www.falklands.gov.fk/assets/Falklands-Oil-and-Gas-Socio-Economic-Study-Final-Report.pdf> (Accessed 24 August 2015).

Robert, P. 2007. *Petroleum refining: economic performance and challenges for the future*. Available: <https://www.hSDL.org/?view&did=472607> (Accessed 23 September 2015).

Rohwerder, B. 2015. Political economy and governance in the Democratic Republic of Congo (DRC). Available: <http://www.gsdrC.org/wp-content/uploads/2015/08/HDQ1252.pdf> (Accessed 8 April 2016).

Rubondo, E. N. T. 2014. *Developments and investment opportunities in Uganda's petroleum industry sector*. Available: <http://unctad.org/meetings/en/Presentation/5-OILGASMINE%20Special%20Event%202015-16%20Oct%202014-RUBONDO-en.pdf> (Accessed 18 February 2016).

Sage Publications, Inc. 2012. *Sage Brief Guide to Corporate Social Responsibility*. Los Angeles: Sage Publications.

Sebastien, L. 2015. *The Colonial Legacy of the DR Congo*. Available: [http://www.getlound.ca/en/gpi\\_issues.asp?id=11](http://www.getlound.ca/en/gpi_issues.asp?id=11) (Accessed 21 September 2015).

S  raphine, W. and Ernest, B. 2014. *Congo, Democratic Republic – African economy overview*. Available: [http://www.africaneconomicoutlook.org/fileadmin/uploads/aeo/2014/PDF/CN\\_Long\\_EN/CongoRD\\_EN.pdf](http://www.africaneconomicoutlook.org/fileadmin/uploads/aeo/2014/PDF/CN_Long_EN/CongoRD_EN.pdf) (Accessed 29 September 2015).

Sekaran, U. and Bougie, R. 2010. *Research methods for business: a skill-building*. 5<sup>th</sup> ed. Chichester: Wiley and Sons.

Sekaran, U. and Bougie, R. 2013. *Research methods for business, a skill-building approach*. 6<sup>th</sup> ed. Chichester: Wiley and Sons.

Shikhar, V. 2010. *Term paper Business environment: Pestle analysis of oil and gas Petroleum industry*. Available: <https://www.scribd.com/doc/31803171/Pestle-analysis-of-oil-and-petroleum-industry> (Accessed 29 September 2015).

Shirley, M. and Tanya, V. M. 2006. *Industrial relations in the oil industry in South Africa*. Available: [http://www.ilo.org/wcmsp5/groups/public/---ed\\_dialogue/---sector/documents/publication/wcms\\_161190.pdf](http://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---sector/documents/publication/wcms_161190.pdf) (Accessed 22 September 2016)

Smit, C. B. 2011. *Management principles*. Cape Town: Junta and company.

South African Oil and Gas Alliance (SAOGA). 2014. *Overview of Oil & Gas in the Sub-Saharan Africa Region*. Available: <http://www.saoga.org.za/oil-gas-hubs/overview-oil-gas-sub-saharan-africa-region> (Accessed 24 April 2015).

STI Group. 2013. *The three oil and gas energy markets: what is the midstream?* Available: [www.setxind.com/midstream/energy-markets-what-is-midstream/](http://www.setxind.com/midstream/energy-markets-what-is-midstream/) (Accessed 6 October 2015).

Susan, F. and Michael, R. 2007. *Gulf of Guinea Oil and Gas Overview and Outlook*. Available: <http://trade.gov/td/energy/otc%202007%20pfc%20gog.pdf> (Accessed 27 October 2015).

The Global Economy. 2015. *The World Bank: DR Congo Unemployment rate*. Available: [http://www.theglobaleconomy.com/Democratic-Republic-of-the-Congo/Unemployment\\_rate/](http://www.theglobaleconomy.com/Democratic-Republic-of-the-Congo/Unemployment_rate/) (Accessed 7 July 2015).

The Perryman Group. 2014. *The economic benefits of oil and natural gas production: an analysis of effects on the United States and major energy-producing states*. Available: <http://perrymangroup.com/wp-content/uploads/Perryman-Oil-Impact-Study.pdf> (Accessed 24 November 2015).

The World Fact Book – CIA. 2015. *Crude oil proved reserves – country comparison to the world*. Available: <https://www.cia.gov/library/publications/the-worldfactbook/fields/2244.html> (Accessed 22 April 2015).

The World Bank Report. 2013. *Congo, Democratic Republic of - Economic governance program*. Washington DC: World Bank. Available: <http://documents.worldbank.org/curated/en/2013/01/17210200/congo-economic-governance-program> (Accessed 20 July 2015).

The World Bank. 2013. *Congo, Democratic Republic of - Country Assistance Strategy for the period FY13 - FY16*. Available: <http://documents.worldbank.org/curated/en/2013/04/17722428/congo-democratic-republic-country-assistance-strategy-period-fy13-fy16> (Accessed 22 July 2015).

The World Bank. 2013. *Congo, Democratic of – Economic governance program*. Available: <http://documents.worldbank.org/curated/en/2013/01/17210200/congo-economic-governance-program>. PDF (Accessed 12 October 2015).

The World Bank. 2015. *Democratic Republic of Congo Overview - World Bank*. Available: <http://www.worldbank.org/en/country/drc/overview> (Accessed 20 July 2015).

The World Bank. 2006. *Congo, Democratic Republic of - World Bank*. Available: <http://siteresources.worldbank.org/CDFINTRANET/Overview/21458651/Congo,DemocraticRepublicofFINALDecember312006.doc>, (Accessed 16 March 2016).

Todaro, M. P. and Smith, S. C. 2015. *Economic development*. 12<sup>th</sup> ed. Boston: Pearson.

Tollow Oil. 2015. *Oil life Cycle*. Available: <http://www.tulloil.com/about-us/oil-life-cycle> (Accessed 22 August 2015).

United Nations. 2007. *The Effects of Oil - the United Nations*. Available: [http://www.un.org/esa/socdev/unpfii/documents/workshop\\_IPPE\\_pyagbara.doc](http://www.un.org/esa/socdev/unpfii/documents/workshop_IPPE_pyagbara.doc) (Accessed 21 August 2015).

UNEP. 2011. *UNEP study confirms DR Congo's potential as environmental powerhouse but warns of critical threats*. Available: <http://www.unep.org/NEWSCENTRE/default.aspx?DocumentId=2656&ArticleId=8890> (Accessed 13 July 2015).

Van, W. B. 2010. Research design and methods. Part 1. Post Graduate enrolment and throughput. University of the Western Cape. Available: [https://uwc.ac.za/Students/Postgraduate/.../Research\\_and\\_Design\\_I](https://uwc.ac.za/Students/Postgraduate/.../Research_and_Design_I) (Accessed 12 May 2015).

Varian, H. R. 2010. *Intermediate microeconomics: a modern approach*. 8th ed. New York: W. W. Norton.

Western Cape Government of South Africa. 2014. *Know Your Socio-Economic Rights*. Available: <https://www.westerncape.gov.za/general-publication/know-your-socio-economic-rights> (Accessed 2 September 2015).

Williams, B. 2014. *Macro-environment analysis for the Alberta Midstream Oil and Gas sector*. Available: <http://dtpr.lib.athabascau.ca/action/download.php?filename=mba-14/open/BargorettEvans.pdf> (Accessed 8 October 2015).

William, L. L. 2008. *Petroleum Refining in non-technical language*. 4th ed. Tulsa, Okla: Penn Well.

William, W. 2013. *Aliko Dangote builds up manufacturing with \$9bn Nigeria refinery*. Available: <http://www.ft.com/cms/s/0/66f9e0fc-2440-11e3-a8f7-00144feab7de.html> (Accessed 31 July 2015).

World Press. 2012. *Our Class Congo Blog. Oil in the Congo*. Available: <http://blogs.uww.edu/congoblog/2012/03/15/17/> (Accessed 23 June 2015).

World Vision. 2015. Social, economic and politic effects of rapid population growth from a global perspective. Available: <http://revisionworld.com/gcse-revision/geography/population/social-economic-political-effects> (Accessed 8 September 2015).

Yong, A.G. and Pearce, S. 2013. *A Beginner's Guide to Factor Analysis: Focusing on Exploratory Factor Analysis*. Available: <http://tqmp.org/Content/vol09-2/p079/p079.pdf> (Accessed 8 September 2016).

# APPENDICES

Appendix1: Factors affecting the socio-economic development and potential strategies that could promote socio-economic development in the DR Congo.

<b>Issues and Obstacles to socio-economic development in the DR Congo.</b>	<b>Factors Categories</b>	<b>Strategies to improve socio-economic development in the DR Congo</b>
<b>Weak public financial management system at national and provincial levels.</b>	Political & Economic factors	Improve public financial management at national and provincial level
<b>Inadequate capacity at national and provincial levels resulting in budget overruns.</b>	Political factor	Pursue the decentralization process
<b>Poor human resource management in the public service.</b>	Political & Social factors	Promoting quality training and human building capacity
<b>Lack of transparency in public procurement.</b>	Political	Improve and enforce legislation or regulation implementation
<b>Poor management of forest, oil and mining resources due to weak legal framework.</b>	Political & Economic factors	Improve transparency and governance in the management of natural resources.
<b>Lack of enforcement mechanisms and weak institutional capacity generally.</b>	Political factor	Improve traceability of Government revenues issued from natural resources and Increase its contribution to domestic economy and local communities welfare
<b>Weak enforcement capacity and Lack of transparency in the management of SOEs.</b>	Political & Social factors	Improve transparency, performance management of key State-Owned Enterprises (SOEs) and Influence from vested interest Ineffective government oversight of strategic SOEs

<b>Years of conflict have undermined the capacity of private enterprises to thrive and therefore are not contributing to the growth of the economy.</b>	Political & Economic factors	Pursue structural economic reforms to promote private sector development
<b>Lack of access to finance and Public enterprises are a major bottleneck to private sector development in DRC.</b>	Economic & Political factors	Create and build the public and private capacity that provides access for all to finance, and stimulate the promotion of private sector development in the country.
<b>Poor quality of infrastructure, High cost of movement of goods, people and services and Lack of technical capacity Weak M&amp;N system</b>	Social, Economic & technological factors	Improve infrastructure capacity covering the road Sector, railways, telecoms and electricity.
<b>Landline telephone network almost completely destroyed</b>	Social, Economic & Technological factors	Build a modern national infrastructure for telecoms
<b>Costly broadband internet and phone access;</b>	Social, Economic & Technological factors	Improve the access rate to telecoms and new technologies
<b>Over dependence on satellite technology, no national fibre optic backbone</b>	Economic & Technological factors	Strengthen the liberalization and competitiveness of the sector to attract private investments
<b>Wide spread supply shortfalls, Inadequate transmission of networks, High cost of power, and Weak institutional capacity</b>	Economic & Political factors	Increase the production and transmission capacity of electrical energy, Develop infrastructure for the supply of energy to improve households' access to electricity, and



Develop renewable energy source		
<b>Low agriculture productivity Farmers, lack access to agriculture input Weak</b>	Economic Political factors	& Increase agriculture productivity
<b>Weak institution to manage agricultural and rural development</b>	Political Economic factors	& Increase public capacity to manage agriculture and rural development
<b>Lack of institutional capacity to deliver clean water throughout the country</b>	Political Ecological factors	& Increased access to potable water
<b>Low coverage and poor quality of health service</b>	Social economic factors	& Improve delivery of primary health care
<b>Low coverage of education services, Lack of sustainable financing mechanism for the delivery of education services, and Low quality of education</b>	Social, Economic political factors	& Increase access and equity to the various levels of education, and particularly in basic education, especially for girls
<b>Widespread poverty due to lack of social safety net programs to assist the poor</b>	Social Political factors	& Enhance safety net through improved access to basic social services
<b>Weak State capacity to provide public services , Lack of accountability in the management of public finances, Volatile political and security environment</b>	Political factor	Leveraging national policy dialogue to strengthen accountability and effectiveness of state institutions in support of peace consolidation
<b>Lack of employment opportunities, Limited access to services by the population</b>	Social Economic factors	& Strengthening societal capabilities and resilience for peace consolidation, and sustainable development in the East.

**Source:** Adapted and modified from the World Bank report (2013: 49). Democratic Republic of Congo: Country Assistance Strategy for the period FY13 - FY16

## Appendix 2: Rotated Component Matrix of all factors/ Variables

Component Matrix <sup>a</sup>	
	Component
C1A: Government role in the oil and gas industry	1
The oil industry including SOCIR in the DR Congo is operating under the international-dependence and dominance models	0.633
The high cost of international finance remain a major obstacle to socio-economic development of the DR Congo	0.772
The high cost of international finance remain a major obstacle to socio-economic development of the DR Congo	0.696
Extraction Method: Principal Component Analysis.	
a. 1 components extracted.	

## Rotated Component Matrix: The role of SOCIR upgrade on the political environment

Rotated Component Matrix <sup>a</sup>		
	Component	
C1C: The role of SOCIR upgrade on the political	1	2
The Oil industry development including SOCIR upgrading in the DR Congo could reduce the effects of international dependence and dominance in the oil field	0.804	0.377
The oil industry including SOCIR development could reduce the high cost of international finance, by increasing and improving local finance	0.852	-0.291
The oil industry including SOCIR modernisation could increase the levels of international private investment and entrepreneurship in the DR Congo	-0.006	0.949
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.		
a. Rotation converged in 3 iterations.		

## Rotated Component Matrix: Main challenges experienced by SOCIR in the economic environment

Rotated Component Matrix <sup>a</sup>			
C2A	Component		
	1	2	3
The lack of financial capital has impeded SOCIR infrastructure innovation or upgrading project	0.557	0.287	-0.328
The fiscal policy of the consecutive governments has been less attractive for SOCIR development	0.801	0.111	0.015
The chronic high Inflation in the country has discouraged and negatively affected SOCIR operation or development	0.083	0.892	-0.059
Exchange rate fluctuation in the country has discouraged the SOCIR upgrading project by local and international investors	0.186	0.568	0.571
Continual socio-economic crisis in the country is a major cause of SOCIR inactivity	0.782	0.050	0.321
Low consumption or decreased demand for petroleum products in the country has led to SOCIR breakdown	0.029	0.033	0.925
The colonial economic model of exporting the total oil output for imports oil refined products needs has affected SOCIR development	0.121	0.590	0.097
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.			
a. Rotation converged in 5 iterations.			

## Rotated Component Matrix: Encouraging effects of SOCIR upgrade on the economic environment.

Rotated Component Matrix <sup>a</sup>			
C2C	Component		
	1	2	3
SOCIR upgrade will reduce the effects of colonial economic on exporting the entire crude oil output and reduce the cost imports of oil finished products in the country	0.320	0.405	0.080
SOCIR upgrade will generate much revenue that will contribute to the country's GDP growth	0.744	0.375	0.185
The upgraded petroleum refining industry will promote the market of large and small business	0.749	0.459	-0.042

The new SOCIR will stabilize the country's exchange rate and inflation	-0.050	0.730	0.213
The SOCIR upgrade will develop the local competitive market for oil products distribution process in the country	0.679	-0.282	0.369
The SOCIR development will facilitate the DR Congo's oil industry integration and promote economic diversity	0.772	0.289	0.070
The SOCIR upgrade will create the opportunity of attaining the safety of supply of fossil fuels in the country	0.791	0.045	-0.019
SOCIR upgrade will improve and increase local capacity of oil production	0.454	0.557	-0.121
SOCIR development will contribute to improvement in the community's lifestyle and social wellbeing	0.115	0.728	-0.018
SOCIR upgrade will promote socio-economic infrastructure development in the country	0.354	0.554	0.315
SOCIR upgrade will increase and improve the regime of oil products demand and supply in the country	0.069	0.173	0.904
Extraction Method: Principal Component Analysis.			
Rotation Method: Varimax with Kaiser Normalization.			
a. Rotation converged in 5 iterations.			

### Rotated Component Matrix: Challenges experienced by SOCIR in the social environment.

Component Matrix <sup>a</sup>	
C3A	Component
	1
The lack of accredited or credible academic institutions to train qualified or skilled people that have to run petroleum operations in the country is the main obstacle to SOCIR development	0.445
Social crisis (misuse, distortion of public funds in the petroleum industry or corruption, poverty, insecurity) in the country is a major cause of SOCIR inactivity	0.864
The lack of CSR values implementation in the petroleum industry is among the causes of oil industry disintegration and SOCIR crisis in the country	0.844
The lack of transparency in the management of oil operations has led to oil industry crisis in the country	0.831
Extraction Method: Principal Component Analysis.	
a. 1 components extracted.	

**Rotated Component Matrix: Prospective effects of SOCIR upgrade on social environment.**

Rotated Component Matrix <sup>a</sup>			
C3C	Component		
	1	2	3
SOCIR upgrade will contribute and promote the implementation of contemporary education and health system in the country	0.622	0.353	0.085
SOCIR development will stimulate the country's urbanization	0.615	0.179	0.364
SOCIR upgrade will influence Congolese habits in terms of consumption	0.562	-0.151	0.476
SOCIR upgrade could contribute on poverty reduction in the country	0.534	0.436	0.417
SOCIR development will reduce and replace the use of firewood by the majority of rural people in promoting the usage of oil products as energy in the country	-0.045	0.088	0.752
SOCIR upgrade will contribute to the rural environmental development by promoting new initiative or projects, which will create jobs and reduce unemployment	0.197	0.242	0.739
SOCIR development will attract industrial economic activities in the rural area and improve rural community's wellbeing	0.458	0.023	0.724
SOCIR upgrade will facilitate the creation of accredited or credible academic institutions to train skilled people that will drive the petroleum industry development	0.622	0.447	0.197
SOCIR upgrade will contribute to reduce social crisis such as employment in the country	-0.117	0.709	0.482
SOCIR upgrade will facilitate the creation of a strong and credible trade union in the petroleum industry	0.401	0.722	-0.130
SOCIR upgrade will promote workforce skills in the petroleum industry	0.117	0.695	0.090
SOCIR upgrade will promote quality service delivery of oil products in the country	0.639	0.107	-0.049
SOCIR upgrade will help to promote CSR values implementation in the country	0.241	0.659	0.110
Extraction	Method:	Principal	Component
Rotation Method:	Varimax with Kaiser Normalization.		Analysis.
a. Rotation converged in 9 iterations.			

### Rotated Component Matrix: Most constraints or challenges experienced by SOCIR in the technological environment

Rotated Component Matrix <sup>a</sup>		
C4A	Component	
	1	2
Lack of maintenance of SOCIR infrastructure has led to the ageing of SOCIR equipment or breakdown	-0.025	0.739
Lack of technical skill or knowledge requirement to transform SOCIR resources into final products have led to SOCIR breakdown	0.056	0.718
Poor management in terms of recruiting and training employees, and as well as compensating them have contributed to SOCIR inefficiency	0.234	0.566
Lack of upgrading the SOCIR machinery with available new technology has retarded the fulfillment of its socio-economic role in the country's development process	0.805	0.279
SOCIR technological infrastructure remain incompatible to local crude oil	0.871	-0.060
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.		
a. Rotation converged in 3 iterations.		

### Rotated Component Matrix: Probable effects of SOCIR technological improvement in the country's development process

Rotated Component Matrix <sup>a</sup>			
C4C	Component		
	1	2	3
SOCIR upgrade will play a key role that will stimulate the business environment improvement in the oil industry	0.129	0.656	0.466
SOCIR upgrade will create opportunity to increase its capacity for technological usage of producing local and international crude oil (refinement)	0.751	0.032	-0.068
SOCIR development will increase its capacity of providing ecological or conventional oil products in the country	0.750	-0.234	-0.139
Local oil output which is totally exported will be processed in the country	0.809	0.075	0.059
SOCIR will play a key role in supplying the local market or serving local customers with sufficient quantity, quality and competitive oil products	0.736	0.180	0.386
SOCIR upgrade will promote the internal activity improvement or productivity and provide strategic implementation of oil industry integration	0.733	0.217	-0.031
SOCIR development will create significant opportunities for industrial expansion	0.562	0.612	-0.103

SOCIR will become a real threat for importers competing in the oil products distribution market in terms of costs	-0.185	0.205	0.681
SOCIR upgrade will balance the oil market operations in the country	-0.020	0.710	-0.078
SOCIR technological improvement is competitively advantageous for the oil industry development in country	0.140	-0.356	0.746
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.			
a. Rotation converged in 4 iterations.			

### Rotated Component Matrix: Most constraints or challenges experienced by SOCIR in the international environment

Component Matrix <sup>a</sup>	
C5A	Component
	1
The oil industry including SOCIR in the DR Congo is operating under the international-dependence and dominance models	0.564
The high cost of international finance remain a major obstacle to socio-economic development of the DR Congo	0.777
Poor intermediation of conflict resolution in the DR Congo is a major obstacle to socio-economic development	0.802
Extraction Method: Principal Component Analysis.	
a. 1 components extracted.	

### Rotated Component Matrix: Probable effects of SOCIR development in the international environment

Component Matrix <sup>a</sup>	
C5C	Component
	1
The Oil industry development including SOCIR upgrading in the DR Congo could reduce the effects of international dependence and dominance in the oil field	0.808
The oil industry including SOCIR development could reduce the high cost of international finance, by increasing and improving local finance	0.785
The oil industry including SOCIR modernisation could increase the levels of international private investment and entrepreneurship in the DR Congo	0.665

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

### Rotated Component Matrix: Challenges experienced by SOCIR in the ecological environment

Rotated Component Matrix <sup>a</sup>		
C6A	Component	
	1	2
SOCIR operation has caused a real problem of pollution in the country	0.845	0.181
SOCIR upgrading project was affected by the issue of environmental degradation	0.851	-0.158
DR Congo's crude oil density has been incompatible to SOCIR technology, which has affected SOCIR's operation	0.171	0.803
DR Congo's crude oil is heavy	-0.150	0.811
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.		
a. Rotation converged in 3 iterations.		

### Rotated Component Matrix: Effects of SOCIR upgrade in the ecological environment.

Rotated Component Matrix <sup>a</sup>			
C6C	Component		
	1	2	3
SOCIR upgrade will produce clean oil products in the country, which will not affect environmental pollution	0.031	0.806	-0.023
SOCIR upgrade will promote environmental sustainability and safety of people in the area concerned	0.028	0.770	-0.046
SOCIR upgrade is an opportunity for the country to improve a dynamic commission which will deal with the issue of environmental prevention and protection	0.541	0.040	0.593
SOCIR upgrade will increase the ecological threat to the country	-0.258	-0.074	0.838
SOCIR upgrade will motivate the creation of a credible trade union which will fight against environmental deterioration, degradation or pollution	0.595	0.431	0.075
SOCIR upgrade is an opportunity for the country to implement the international and national ecological criteria or legislation regarding the	0.880	-	0.139



issue of climate change		0.022	
SOCIR upgrade is an opportunity for the government to take steps that will limit, as far as possible, any detrimental effects on the environment	0.815	-0.074	-0.014
SOCIR upgrade will play a key role in managing environmental safety through clean air and water in the operational area	0.667	0.155	-0.207
SOCIR upgrade will contribute to sustain and manage the country's natural resources and environmental protection	0.584	0.045	-0.168
A government commission of risk management will be operational to prevent environmental threats	0.747	0.073	0.035
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.			
a. Rotation converged in 4 iterations.			

### Appendix 3: Statements and the Chi Square p-value relative to SOCIR and the oil and gas industry development in the DRC.

#### 1. Factors affecting the socio-economic development in the DRC

Statements	Chi- Square p-value
<b>B1:</b> International politics on DRC are negatively affecting socio-economic development process in the DRC.	0.000
<b>B2:</b> Multinational company's operating in the DRC is negatively affecting socio-economic development process in the DRC.	0.000
<b>B3:</b> The lack of credible democratic institutions is affecting socio-economic development in the DRC.	0.000
<b>B4:</b> Multiple instabilities in the country are factors affecting socio-economic development in DRC.	0.000
<b>B5:</b> The volume of economic (businesses) activities that are occurring out of the formal structure is a factor affecting socio-economic development in the DRC.	0.000
<b>B6:</b> The lack of economic diversity is an important factor affecting the socio-economic development in DRC.	0.000
<b>B7:</b> The lack of enforcing legislation affects the socio-economic development in DRC.	0.000
<b>B8:</b> The lack of economic freedom or total dependence on colonial economics is affecting the socio-economic development in the DRC.	0.000

#### 2. The major constraints experienced by SOCIR in political environment

Statements	Chi Square p-value
<b>C1A1:</b> DRC's consecutive governments have not provided a contemporary petroleum charter that should guide the petroleum industry development	0.000
<b>C1A2:</b> SOCIR has been affected by the political pressure exerted by the consecutive ruling governments and its institutions in the oil business environment	0.000
<b>C1A3:</b> The DRC lacks public capacity to enforce regulations that should lead to SOCIR restructuring and upgrading project or the oil industry development	0.000

### 3. The promising effects of SOCIR upgrade on the political environment.

Statement	Chi Square p-value
<b>C1C1:</b> SOCIR upgrade could play a fundamental role in allowing the government to develop a security plan of fuel supply, as well to manage the stock of exchanges rate of the country.	0.000
<b>C1C2:</b> SOCIR development could promote progressive innovation of government legislation in the oil industry.	0.000
<b>C1C3:</b> The government could reduce the cost of oil refined products imports by promoting local oil refined products production and distribution in the country.	0.000

### 4. The main challenges experienced by SOCIR in the economic environment.

Statement	Chi Square p-value
<b>C2A1:</b> The lack of financial capital has impeded SOCIR infrastructure innovation or upgrading project.	0.000
<b>C2A2:</b> The fiscal policy of the consecutive governments has been less attractive for SOCIR development.	0.000
<b>C2A3:</b> Fiscal policy or tax on imported petroleum products are a generator of more income in the country than SOCIR operational products manufacturing in the country.	0.000
<b>C2A4:</b> The chronic high Inflation in the country has discouraged and negatively affected SOCIR operation or development.	0.000
<b>C2A5:</b> Exchange rate fluctuation in the country has discouraged the SOCIR upgrading project by local and international investors.	0.000
<b>C2A6:</b> Continual socio-economic crisis in the country is a major cause of SOCIR	0.000

inactivity.

**C2A7:** Low consumption or decreased demand for petroleum products in the country has led to SOCIR breakdown. 0.000

**C2A8:** The colonial economic model of exporting the total oil output for imports oil refined products needs has affected SOCIR development. 0.000

## 5. The encouraging effects of SOCIR upgrade on the economic environment

Statements	Chi Square p-value
<b>C2C1:</b> SOCIR upgrade will reduce the effects of colonial economic on exporting the entire crude oil output and reduce the cost imports of oil finished products in the country.	0.000
<b>C2C2:</b> SOCIR upgrade will generate much revenue that will contribute to the country's GDP growth.	0.000
<b>C2C3:</b> The upgraded petroleum refining industry will promote the market of large and small business.	0.000
<b>C2C4:</b> The new SOCIR will stabilise the country's exchange rate and inflation.	0.000
<b>C2C5:</b> he SOCIR upgrade will motivate the government to increase the tax rate on the import of petroleum products.	0.000
<b>C2C6:</b> The SOCIR upgrade will develop the local competitive market for oil products distribution process in the country.	0.000
<b>C2C7:</b> The SOCIR development will facilitate the DRC's oil industry integration and promote economic diversity.	0.000
<b>C2C8:</b> The SOCIR upgrade will create the opportunity of attaining the safety of supply of fossil fuels in the country.	0.000
<b>C2C9:</b> The new Public-Private Partnership Law implementation in the petroleum industry will facilitate the country's industrialization to achieve economic expansion program.	0.000
<b>C2C10:</b> SOCIR upgrade will improve and increase local capacity of oil production.	0.000
<b>C2C11:</b> SOCIR development will contribute to improvement in the community's lifestyle and social well-being.	0.000
<b>C2C12:</b> SOCIR upgrade will promote socio-economic infrastructure development in the country.	0.000
<b>C2C13:</b> SOCIR upgrade will increase and improve the regime of oil products demand and supply in the country.	0.000

## 6. The challenges experienced by SOCIR in the social

## environment

Statements	Chi Square p-value
<b>C3A1:</b> The lack of accredited or credible academic institutions to train qualified or skilled people that have to run petroleum operations in the country is the main obstacle to SOCIR development.	0.000
<b>C3A2:</b> Social crisis (misuse, distortion of public funds in the petroleum industry or corruption, poverty, insecurity) in the country is a major cause of SOCIR inactivity.	0.000
<b>C3A3:</b> The lack of CSR values implementation in the petroleum industry is among the causes of oil industry disintegration and SOCIR crisis in the country.	0.000
<b>C3A4:</b> The lack of transparency in the management of oil operations has led to oil industry crisis in the country.	0.000

## 7. The promising effects of SOCIR upgrade on social environment.

Statements	Chi Square p-value
<b>C3C1:</b> SOCIR upgrade will contribute and promote the implementation of contemporary education and health system in the country.	0.000
<b>C3C2:</b> SOCIR development will stimulate the country's urbanisation.	0.000
<b>C3C3:</b> SOCIR upgrade will influence Congolese habits in terms of consumption.	0.000
<b>C3C4:</b> SOCIR upgrade could contribute on poverty reduction in the country.	0.000
<b>C3C5:</b> SOCIR development will reduce and replace the use of firewood by the majority of rural people in promoting the usage of oil products as energy in the country.	0.000
<b>C3C6:</b> SOCIR upgrade will contribute to the rural environmental development by promoting new initiative or projects, which will create jobs and reduce unemployment.	0.000
<b>C3C7:</b> SOCIR development will attract industrial economic activities in the rural area and improve rural community's well-being.	0.000
<b>C3C8:</b> SOCIR upgrade will facilitate the creation of accredited or credible academic institutions to train skilled people that will drive the petroleum industry development.	0.000
<b>C3C9:</b> SOCIR upgrade will contribute to reduce social crisis such as employment in the country.	0.000
<b>C3C10:</b> SOCIR upgrade will facilitate the creation of a strong and credible trade union in the petroleum industry.	0.000
<b>C3C11:</b> SOCIR upgrade will promote workforce skills in the petroleum industry.	0.000

**C3C12:** SOCIR upgrade will promote quality service delivery of oil products in the country. 0.000

**C3C13:** SOCIR upgrade will help to promote CSR values implementation in the country. 0.000

## 8. The challenges experienced by SOCIR in the technological environment.

Statements	Chi Square p-value
<b>C4A1:</b> Lack of maintenance of SOCIR infrastructure has led to the ageing of SOCIR equipment or breakdown.	0.000
<b>C4A2:</b> Lack of technical skill or knowledge requirement to transform SOCIR resources into final products have led to SOCIR breakdown.	0.000
<b>C4A3:</b> Poor management in terms of recruiting and training employees, and as well as compensating them have contributed to SOCIR inefficiency.	0.037
<b>C4A4:</b> Lack of upgrading the SOCIR machinery with available new technology has retarded the fulfilment of its socio-economic role in the country's development process.	0.000
<b>C4A5:</b> SOCIR technological infrastructure remains incompatible to local crude oil.	0.000

## 9. The probable effects of SOCIR technological improvement in the country's development process

Statements	Chi Square p-value
<b>C4C1:</b> SOCIR upgrade will play a key role that will stimulate the business environment improvement in the oil industry.	0.000
<b>C4C2:</b> SOCIR upgrade will create opportunity to increase its capacity for technological usage of producing local and international crude oil (refinement).	0.000
<b>C4C3:</b> SOCIR development will increase its capacity of providing ecological or conventional oil products in the country.	0.000
<b>C4C4:</b> Local oil output which is totally exported will be processed in the country.	0.000
<b>C4C5:</b> SOCIR will play a key role in supplying the local market or serving local customers with sufficient quantity, quality and competitive oil products.	0.000
<b>C4C6:</b> SOCIR upgrade will promote the internal activity improvement or productivity and provide strategic implementation of oil industry integration.	0.000
<b>C4C7:</b> SOCIR development will create significant opportunities for industrial expansion.	0.000
<b>C4C8:</b> SOCIR will become a real threat for importers competing in the oil products distribution market in terms of costs.	0.281

**C4C9:** SOCIR upgrade will balance the oil market operations in the country. 0.000

**C4C10:** SOCIR technological improvement is competitively advantageous for the oil industry development in country. 0.000

## 10. Challenges experienced by SOCIR in the international environment

Statements	Chi Square	p-value
<b>C5A1:</b> The oil industry including SOCIR in the DRC is operating under the international-dependence and dominance models.	0.000	
<b>C5A2:</b> The high cost of international finance remains a major obstacle to socio-economic development of the DRC.	0.000	
<b>C5A3:</b> Poor intermediation of conflict resolution in the DRC is a major obstacle to socio-economic development.	0.000	

## 11. Probable effects of SOCIR development in the international environment

Statements	Chi Square	p-value
<b>C5C1:</b> The Oil industry development including SOCIR upgrading in the DRC could reduce the effects of international dependence and dominance in the oil field.	0.000	
<b>C5C2:</b> The oil industry including SOCIR development could reduce the high cost of international finance, by increasing and improving local finance.	0.000	
<b>C5C3:</b> The oil industry including SOCIR modernisation could increase the levels of international private investment and entrepreneurship in the DRC.	0.000	

## 12. The challenges experienced by SOCIR in the ecological environment

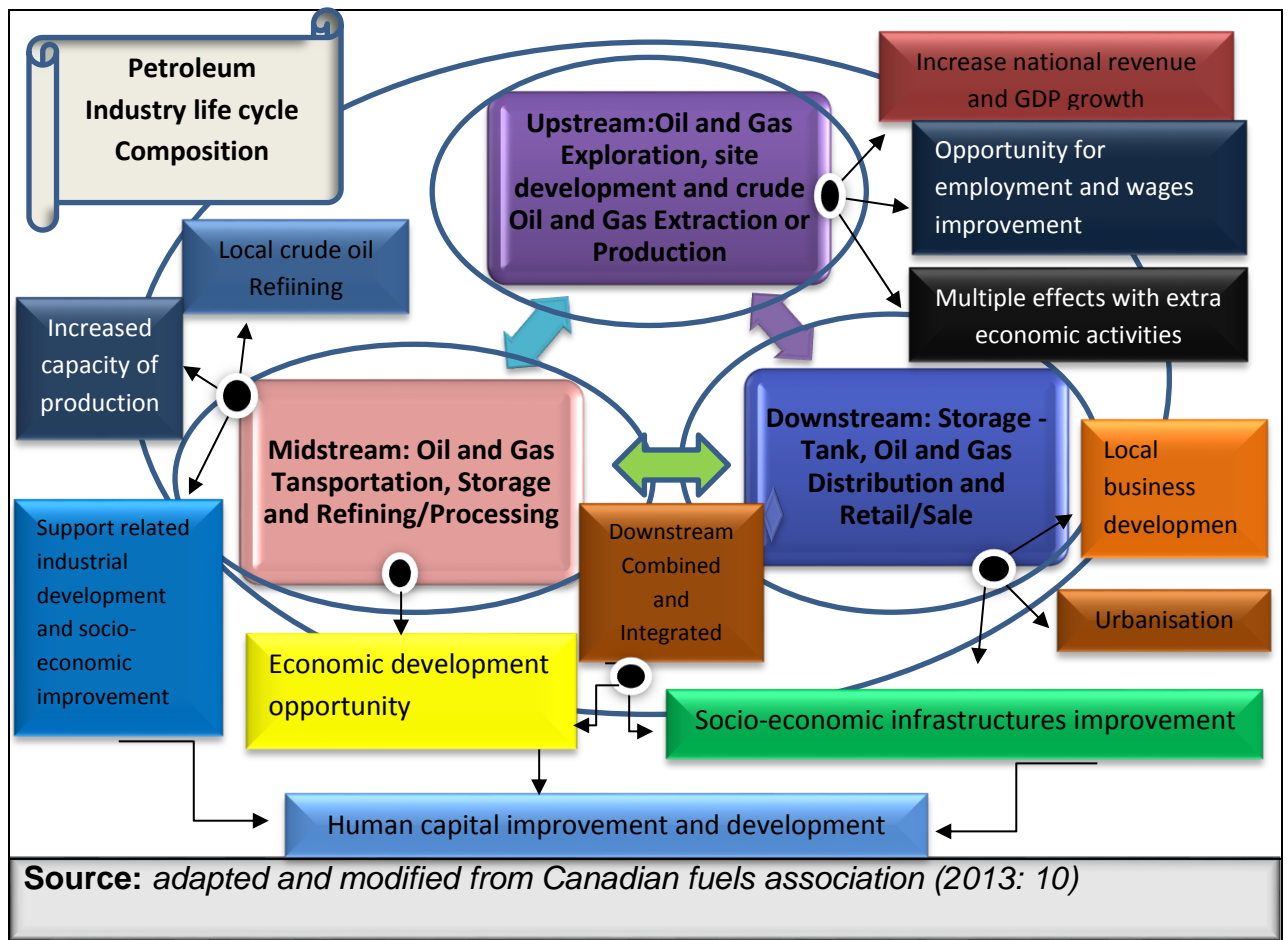
Statements	Chi Square	p-value
<b>C6A1:</b> SOCIR operation has caused a real problem of pollution in the country.	0.000	
<b>C6A2:</b> SOCIR upgrading project was affected by the issue of environmental degradation.	0.000	
<b>C6A3:</b> DRC's crude oil density has been incompatible to SOCIR technology, which has affected SOCIR's operation.	0.000	
<b>C6A4:</b> DRC's crude oil is heavy	0.000	

<b>C6A5:</b> DRC's crude oil is light	<b>0.000</b>
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### 13. The effects of SOCIR upgrade in the ecological environment

Statements	Chi Square p-value
<b>C6C1:</b> SOCIR upgrade will produce clean oil products in the country, which will not affect environmental pollution	<b>0.000</b>
<b>C6C2:</b> SOCIR upgrade will promote environmental sustainability and safety of people in the area concerned	<b>0.000</b>
<b>C6C3:</b> SOCIR upgrade is an opportunity for the country to improve a dynamic commission which will deal with the issue of environmental prevention and protection	<b>0.000</b>
<b>C6C4:</b> SOCIR upgrade will increase the ecological threat to the country	<b>0.000</b>
<b>C6C5:</b> SOCIR upgrade will motivate the creation of a credible trade union which will fight against environmental deterioration, degradation or pollution	<b>0.000</b>
<b>C6C6:</b> SOCIR upgrade is an opportunity for the country to implement the international and national ecological criteria or legislation regarding the issue of climate change	<b>0.000</b>
<b>C6C7:</b> SOCIR upgrade is an opportunity for the government to take steps that will limit, as far as possible, any detrimental effects on the environment	<b>0.000</b>
<b>C6C8:</b> SOCIR upgrade will play a key role in managing environmental safety through clean air and water in the operational area	<b>0.000</b>
<b>C6C9:</b> SOCIR upgrade will contribute to sustain and manage the country's natural resources and environmental protection	<b>0.000</b>
<b>C6C10:</b> A government commission of risk management will be operational to prevent environmental threats	<b>0.000</b>

### Appendix 4: Oil and gas industry lifecycle and potential socio-economic benefits



## Appendix 5: CSR and sustainable development framework





## Appendix 6: Civil and political rights and socio-economic rights

Civil and political rights	Socio-economic rights
<ul style="list-style-type: none"><li>▪ Equality</li><li>▪ Human dignity</li><li>▪ Freedom of security of person</li><li>▪ Privacy</li><li>▪ Freedom of religion, belief and opinion</li><li>▪ Freedom of expression</li><li>▪ Assembly, demonstration, picket and petition</li><li>▪ Freedom of association</li><li>▪ Political rights</li><li>▪ Citizenship</li><li>▪ Freedom of movement</li><li>▪ Freedom of trade, occupation and profession</li><li>▪ Labor rights</li></ul>	<ul style="list-style-type: none"><li>▪ Right to education</li><li>▪ Right to food</li><li>▪ Right to health</li><li>▪ Right to land</li><li>▪ Right to water</li><li>▪ Environmental Rights</li><li>▪ Right to social security</li><li>▪ Right to housing</li></ul>
<p>Source: <i>Western Cape Government of South Africa: Know Your Socio-Economic Rights, March 2014.</i></p>	

## Appendix 7: Editor's Certificate

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### EDITING CERTIFICATE

Re: **Kikasu, T**

I confirm that I have edited this dissertation and the references for clarity, language and layout. I am a freelance editor specialising in proofreading and editing academic documents. My original tertiary degree which I obtained at the University of Zimbabwe is a Bachelor of Education specialising in English and Literature. In addition, I have a BSc Hons in Sociology and Gender Development Studies from Women's University in Africa, Zimbabwe. Lastly, I obtained a Master of Public Health from the University of Cape Town. I have been a high school teacher and also a part time lecturer in the Department of English and Communication at Durban University of Technology.

Doreen Mheta  
**25 Nov. 16**  
*electronic*





