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The Impact of Economic Diversification on Economic Development in Oil-Producing Middle-Income Countries

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The Impact of Economic Diversification on Economic Development in Oil-Producing Middle-Income Countries

By

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ETHICS

Certificate of Ethical Approval

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Abstract

Over the years, crude oil, which is a depletable natural resource has been a great contributor to economic growth across countries. However, it may not be sustainable for the development of strategic economic development plans for the future for oil-producing middle-income countries. The IMF recommends that economic diversification, i.e., diversification away from the oil sector is essential to solving this problem. Thus, the purpose of this thesis is to investigate the impact of economic diversification on economic development in oil-producing middle-income countries.

This thesis applied different econometric methods to examine the effect of economic diversification on economic development in oil-producing middle-income countries including pooled OLS, fixed effect model and random effect model, the two-step generalised method of moments (GMM), generalised linear method (GLM), the Johansen Co-integration test and Vector Error Correction Model (VECM) for the time series analysis in the case study chapter. Furthermore, the study used GDP per capita growth to proxy economic growth and human development index (HDI) to proxy human development as the dependent variables whereas the variables for economic diversification, i.e., agricultural sector production, manufacturing sector production and service sector production, were adopted used as the main explanatory variables. Other explanatory variables include crude oil production, exchange rate, corruption perception index which was the variable for institutional quality as well as gross capital formation and labour force participation which were used as control variables.

The results indicate that the effect of economic diversification on economic growth measured by GDP per capita growth rate in oil-producing middle-income countries was negative and insignificant except for the services sector which was negative but significant and thus shows that economic diversification does not appear to lead to economic growth. However, oil production appeared to have a positive but insignificant contribution to economic growth in

oil-producing middle-income countries which was unexpected for oil-producing middle-income countries.

Further results revealed that the impact of economic diversification does not entirely contribute to human development measured by HDI in oil-producing middle-income countries, as only one sector, i.e., the manufacturing sector had a positive impact and the other two sectors, i.e., agriculture and service sectors were negative. From the results obtained, the evidence shows that the oil-producing middle-income countries should put more focus on achieving economic diversification and relying less on oil production as both scenarios indicate sustainable economic development would be achieved by better-targeted policies on economic diversification

The case study chapter revealed that crude oil production does not influence human development while economic diversification significantly influences human development in Nigeria and for economic growth, both the crude oil production and the economic diversification have a significant influence on Nigeria economy except the manufacturing sector. Thus, if human development is the targeted focus of policy, then the policies that target the growth of the economic diversification like agriculture, manufacturing, and services sector among others not just oil sector growth should be intensified to achieve more economic diversification and to improve the living standards of Nigerians. Conversely, this research showed that crude oil production, in the long-term has no influence on human development in the Nigerian economy and would not be a great option for the future in Nigeria.

Dedication

This thesis is dedicated to Almighty God who saw me all through my time of study at Coventry University. This is also dedicated to my father Engr. Justice Nnamdi Elliot Chuku, who passed on during this PhD. We dreamt of this together. I also dedicate this thesis to my mother and friend, Barr. (Mrs.) Juliana Chuku and to my siblings, Eruomachi, Godness and Mercy Chuku.

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List of Acronyms

Acronyms	Full explanation
ADF	Augmented Dickey-Fuller
AGR	Agricultural sector production
AIC	Akaike Information Criterion
CAP	Gross Capital Formation
CPI	Corruption Perception Index
ECM	Error Correction Model
EXCR	Exchange Rate (Official)
FE	Fixed Effects
GDP	Gross Domestic Product
GDPCG	Gross Domestic Product Per Capita Growth Rate
GLM	Generalised Linear Models
GMM	Generalised Method of Moments
GNI	Gross National Income
GNP	Gross National Product
HDI	Human Development Index
HDR	Human Development Report
IEA	International Energy Agency
IMF	International Monetary Fund
LAB	Labour Force Participation
MAN	Manufacturing Sector Production
NNPC	Nigerian National Petroleum Corporation
OLS	Ordinary Least Squares
OPR	Oil Production
PP	Phillips Peron
PPP	Purchasing Power Parity (PPP US$)
RE	Random Effects
SAP	Structural Adjustment Programme
SER	Service Sector Production
SNA	System of National Accounting
UNDP	United Nations Development Program
VAR	Vector Auto Regression
VECM	Vector Error Correction Model
ADF	Augmented Dickey Fuller

Chapter 1

INTRODUCTION

1.1 Background
1.2 Research aims and objectives
1.3 The scope of the study
1.4 Research motivation
1.5 Outline of thesis

1 Introduction

1.1 Background

Oil-producing countries are regularly urged to diversify their economic output away from oil to combat their price fluctuations, plan for the potential loss of resources and to prevent a larger resource curse which in the long run results from poor institutions (Auty, 2001; Cherif *et al.*, 2016; Giri *et al.*, 2019; Lederman & Maloney, 2006; McMillan & Rodrik, 2011; Sachs, 2007; Sy *et al.*, 2012; Van der Ploeg & Venables, 2011). Since mid-2014, the oil price decline has caused financial distress and has led to a renewed call for economic diversification in several oil-exporting nations (Ross, 2019). The International Monetary Fund (IMF) describes diversification as a move to a more diversified production structure including the development of new goods (including higher-quality products) or the extension of them (IMF, 2014).

An increasing initiative by numerous countries to curb emissions of greenhouse gases by cutting oil consumption makes it much more imperative to diversify oil exporters. Resource producing countries, especially oil-producing countries, i.e. both low and middle-income countries, whose economic diversification can be hampered by the Dutch disease, may not be able to apply any of the scarce research available into the concept of diversification (Lashitew *et al*., 2020). The phenomenon of Dutch disease was first identified when the discovery of vast gas reserves in the North Sea occurred. This resulted in the Netherlands seeing a significant rise in its prosperity in the 1960s. Inadvertently, the seemingly positive trend had a substantial influence on important sectors of the economy as the Dutch guilder strengthened. Non-oil exports from the Netherlands grew more expensive and hence less competitive (IMF, 2020).

In several countries around the world, including but not limited to resource-rich exporters, this syndrome has been shown. The notion of 'Dutch disease' has also become a key subject of the literature on the association between natural resources and non-resource economic development (Bjornland *et al.*, 2019). Similarly, the term 'resource curse' which refers to a paradox where the discovery and mining of natural resource wealth of a country lead to less economic success Alsharif *et al.* (2017), has been identified as a vital subject in the literature on economic diversification. As a result of the resource curse, the proceeds from the income generated by mining and all other extractions often limits investments into other sectors of the economy. This, therefore, leads to goods and services coming from other sectors becoming less competitive and hence costly.

Another problem that arises from this paradox is that the revenues obtained from raw materials mining could be mismanaged or misused by the government and public officials. As a result of this, the fiscal and economic fate of the nation could be left to hang by unpredictable global commodity prices for example crude oil, especially for smaller and less diverse economies. This paradox was introduced by Sachs and Warner (1995) who first pointed to the "resource curse" showing a significant negative link between the dependency on natural resources and gross domestic product (GDP) per capita growth. The debate around the resource curse has recently been centred on why resource-rich countries seem to develop more slowly and are less successful than resource-poor ones in their economic growth (Bergougui & Murshed, 2020).

Diversification and economic growth have been discussed in some studies in the economic development literature. The results differ from study to study according to the methodology, data set and steps for diversification (Benedictis *et al.*, 2009). Cadot *et al.* (2011) argue that

diversification should not be considered an economic goal for two reasons; in the first place, the emphasis should be on the significance of specialisation and not diversification. Secondly, the Heckscher-Ohlin model denotes that export trends are primarily dictated by the level of endowments, which focus the emphasis on factor accumulation rather than diversification. However, policymakers in less developed and resource-rich nations are continuously worried about diversification, which they believe is the path to better economic progress according to Papageorgiou and Spatafora (2012).

Similarly, Gylfason (2011) contends that economic diversification can encourage development through the attraction of new economic activity that prevents unsustainable dependence on some natural resource-based industries. This new economic activity, therefore, encourages the labour transfer from low-paid jobs in the low-level industry, for example, farming in agriculture into profitable employment in higher-skilled, jobs in manufacturing. Gylfason however further argues that the reliance on natural resources might be suitable for development if it is controlled and used to ensure the economy is diversified. Moreover, diversification of exports could assist countries to upgrade their resource-based industries, moving from unrefined primary exports into more sophisticated goods and services (Gelb & Grasmann, 2010).

A greater reliance on revenue from natural resources makes diversification harder, however, countries rich in natural resources strive to diversify (Gelb & Grasmann, 2010). In countries where there are more diversified exports, the diversification is often linked to the higher longer-term economic growth of the country (Mudenda *et al.*, 2014). This occurs when the manufacturing sector is engaged; it allows for more of a dynamic learning process which

increases its citizen's income and subsequent productivity (Frankel, 2011). Finally, the effect of the prices of natural resources in the global markets is reduced because of economic diversification.

However, the purpose of economic development is to provide people with a greater quality of life i.e. human welfare (Ranis, 2004). Human welfare means an expansion of the liberty, opportunity and well-being of the people who reside in society. Human welfare development also reflects developing human resources, which is acknowledged as one of the key factors in the true wealth of nations (Folloni & Vittadini, 2010). It determines the growth of an individuals' capacity to boost economic efficiency utilizing their level of education, income-earning ability, and health. This capacity-building, therefore, has a significant impact on a country's economic growth (Rahman *et al.*, 2020). Economic growth therefore can be defined as the rise in the number of products and services which have been produced in a country in a year (Kuznets, 1973). When the population capacity increases, labour productivity also increases, and this is therefore positively linked to the economic development of the country (Rahman *et al.*, 2020).

However, the concept of human development relates to the notion created by Amartya Sen in which he questions the usual approach to social welfare by combining wealth characteristics with well-being components (Sen, 1983). The human development method (also referred to as the capacity approach) understands the necessity of extending commodities and services, yet it recommends that improvement in the quality of life should be considered and that the examination of traditional welfare would expand economic potential. The primary premise behind the human development approach is that a mere quantity of commodities often

measured by GDP accessible in the market does not always indicate the true condition of welfare in an economy without looking at the way the economic agents may perform with the goods that are accessible in the economy. It is an alternative to the neoclassical welfare conception.

The capacity approach also proposes to integrate the measure of 'capacity to perform' in the analysis of welfare in consideration of the aspects connected to economic freedom and rights. Gains towards the levels of education and the health status, as well as improvements in per capita income, are equally essential for human development. Education and health in the welfare analysis should thus have the same weight as the per-capita income. A powerful strength of Sen's approach is its adaptability and it is not limited to defined ideas and most evaluation is based upon inclusion and exclusion of the ideas and their weights. The critics of the capability approach still see its adaptability as inadequate (i.e. lack of full capacity identification) (Clark, 2005).

However, in conceptualising the methodology of human development, the measurement of human development has also been explored throughout the decades. Many studies in the past have questioned traditional welfare measurements for example GDP or Gross National Product (GNP) per-capita since the reporting of economic growth is usually concerned with monetary terms. It overlooks income distribution and tries to correlate good economic situations to bad economic situations (Hicks & Streeten, 1979). The human development index (HDI) was then initially proposed, as an alternative, in the 1990 human development report (HDR) of the United Nations Development Program (UNDP) (Addison, 1993). It was adopted by the UNDP in 1990. HDI's general goal is to assess human welfare by certain proxy variables, including

life expectancy, Gross National Income (GNI) and education. The HDI value will differ between 0 and 1, in which 0 is the lowest and 1 being the highest human development achieved. The HDR 1990 has established the 'Human Development' language in literature as a well-being metric and has offered a broad range of national indicators that evaluate well-being worldwide.

1.2 Research aims and objectives

This thesis aims to investigate the impact of economic diversification on economic and human development in oil-dependent middle-income countries from 2000 - 2017. The specific objectives to ensure this is achieved are enlisted below:

1. To examine how economic diversification impacts economic growth and human development in oil-producing middle-income countries. (Chapter 4)
2. To critically evaluate the impact of oil production on economic growth and human development. (Chapter 5)
3. To propose a policy guideline on how oil-producing countries could avoid the resource curse. (Chapter 7)

1.3 The scope of the study

The scope of this study covers the effect of economic diversification on economic development in oil-producing middle-income countries for a period of 18 years (2000 - 2017). In this study, the following variables were adopted: economic growth, human development, agricultural sector production, manufacturing sector production, service sector production, labour, capital, oil production, and corruption perception index which were all adopted from several research papers indicated in the literature review chapter. According to World Bank (2020), 30 middle-income countries who are also oil-producers, as defined by the International Energy Agency

(IEA) were adopted for this thesis (IEA, 2020). The methodology chapter will provide further insight into these countries.

1.4 Research motivation

The move towards sustainable and cleaner energy worldwide is of great interest as it changes the way we do things and impacts oil-dependent economies. The depletion of the ozone layer has led to agreements among countries to go for cleaner sources of energy to reduce the risks of rays from the sun on the earth (Witze, 2020). Crude oil production which leads to the production of fuel and diesel used in cars is one of the main suppliers of carbon monoxide, depleting the ozone layer (Uherek *et al*., 2010). This agreement is of great interest to oil-rich countries who have crude oil production and sale as the mainstay of their economy e.g., Nigeria, Saudi Arabia, Iran, Kuwait, and Angola etc. and have increased calls to diversify away from crude oil.

Similarly, the move from some countries, for example, the United Kingdom to end the sale of gasoline and diesel cars by the year 2030 and lean more towards electric vehicles has become a cause of concern to get other sources of income for the economies (Brand *et al.*, 2020). This is worthy of interest to the large oil producers as a potential cut in the market for crude products will not be as lucrative, hence the plan to diversify is now pertinent for these oil-producing countries. This thesis partly investigates the way oil-rich middle-income countries have measured their economic progress and the impact of the output of oil and non-oil sectors on the welfare of the citizens of that country. With the benefits of oil sales, it is ironic, that some resource-rich countries have suffered from the 'Dutch disease'. The focus of this thesis is not on the 'Dutch disease' but on the resultant impact of countries dependent on oil production for revenue, who make efforts to diversify their economies but have not necessarily had a great

standard of living for citizens despite the oil riches. An example is Nigeria, Africa's largest oil producer with oil contributing more than 80% of revenue to the economy (Abogan *et al*., 2014).

With the global agreement to make conscious efforts not to deplete the ozone layer by 193 nations towards the goal of 2030 now been carried out, more efforts are now being made to grow the non-oil sector for economic diversification as a means for the economies of resource-rich countries to survive this move away from oil. This research explores the impact of economic diversification on economic development in oil-producing middle-income countries. The results from this thesis could proffer solutions to the right sectors which can aid in achieving diversification away from an oil-dependent economy for these countries. More of the motivation is expounded in the research gap section.

1.5 Outline of thesis

This thesis is structured into 7 chapters. The first chapter introduces the background to the study, the research question, and the objectives of this research. Furthermore, in chapter two, the empirical and theoretical literature are conducted. Chapter three outlines what methodologies were adopted to analyse that data set and includes the information on the data set. The results from the data would be presented and discussed in detail in chapter four for economic growth and chapter five for human development. An in-depth case study chapter to find out the impact of economic diversification on economic and human development in Nigeria is done in chapter six. Finally, conclusions and recommendations would be presented in chapter seven.

Chapter 2

LITERATURE REVIEW

2.1 Introduction

2.2 Measurement of progress

2.3 Limitations of GDP as a measure of progress

2.4 The concept of human development

2.5 The concept of human development index (HDI)

2.6 The impact of dependence of oil in oil-producing countries

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2 Literature review

2.1 Introduction

The focus of this chapter is to introduce concepts that help to understand how progress is measured, the concept of human development and the human development index. Also, past evidence on the impact of dependence of oil in oil-producing countries as well the need for diversification among oil-dependent countries is explored. Furthermore, the impact of economic diversification on human and economic development as well as the presentation of the relevant theory for this thesis are presented. Finally, the gap which this thesis fills is identified, and the contributions of this study are listed in this chapter.

2.2 Measurement of progress

It has become a common practice to constantly measure the progress of individuals, organisations and countries to ascertain performance levels (Enrico *et al*., 2011; Stiglitz *et al.*, 2009). This norm has become the case as society as we know it is now more than ever performance-oriented, constantly expecting results. However, what we measure influences our outcomes; that is through what we do and what we aim at on different levels (individuals, organisations and countries impact what we measure) (UNDP, 2016). When the policymakers of a country try to steer their country's economy, they can be likened to pilots who must chart a course in the air and hence, they need a dependable compass to guide decision making.

The decisions they make depends largely on what was initially measured, how it was measured and the means of interpreting what has been measured. They would be flying blind if the metrics they make use of to arrive at economic decisions give them a limited viewpoint. Traditionally, the tool used to measure progress or economic development among countries has been the Gross Domestic Product (GDP). Using this measure to understand how countries

have progressed has come under fire as economists believe that other metrics could present more insights to determine better policies that directly affect the citizens of a country.

2.3 Limitations of GDP as a measure of progress

GDP, according to Costanza *et al.* (2009), was the most widely used metric for more than half of a century to determine a country's economic progress. The metric GDP, which is an estimate of a country's market by combining the final value of goods and services that are produced and traded within a country in a year (Kuznets, 1973). A breakdown of how GDP is calculated is by adding the nation's total personal consumption expenditures (i.e., the combined total of payments for goods and services by households in that country), the total expenditure by the government (i.e., the total public expenditure, the provision of infrastructure, goods and services, servicing of debt, etc), net capital (i.e., the total increase in the valuation of monetised capital goods stock in that nation) and net exports (i.e., total value of exports minus imports for that country).

The estimate of GDP is calculated by using national survey data which is stored in the system of national accounts (SNA) in a country. It is collected regularly both annually and quarterly and is derived from economic survey data and data from the population. It includes retail sales, total housing starts, and all shipments shipped by manufacturers (Marcuss & Kane, 2007). It measures the entire flow of goods and services which are traded publicly for money. Other "non-market" products, such as government spending on the military, and non-profit expenditure on health care are included in GDP. However, some other key economic activities including social capital formation for building healthy family units, costs of crime, work done by volunteers, the total depletion of natural resources, are completely omitted from GDP calculations.

Economists who study GDP and the SNA methodology have argued that since its inception, GDP has only indicated economic activity rather than indicating economic well-being (Michael *et al.,* 2018). The chairman of the U.S. accounting system, Simon Kuznets, warned in 1934 of the equation of GDP growth with social or economic well-being. He addressed the limitations of GDP as well and its adoption to Congress in 1934. After providing a detailed list of GDP measurements, Kuznets pointed out that "the limits of a country's national income still have to be specified and, in addition to the above, several other services can also be seen to be an appropriate part of the end product of the national economy" (Costanza *et al*., 2009). He also included other variables such as housewives and family services, rescue and charity services, long-term goods owned services as well as incomes obtained from illicit pursuit and odd jobs (Kuznets, 1934). There are many explanations why these variables are excluded from GDP calculation, however, he aimed to make the GDP an accurate and above all specialised instrument that only measures a small sector of society's operation. He expressed that GDP's simplicity could lead to misuse below:

"The valuable capacity of the human mind to simplify a complex situation in a compact characterization becomes dangerous when not controlled in terms of definitely stated criteria. With quantitative measurements especially, the definiteness of the result suggests, often misleadingly, a precision and simplicity in the outlines of the object measured. Measurements of national income are subject to this type of illusion and resulting abuse, especially since they deal with matters that are the centre of conflict of opposing social groups where the effectiveness of an argument is often contingent upon oversimplification" (Kuznets, 1934: pp. 5-6).

GDP is based on an imperfect image of the structure through which the economy works since it only calculates monetary transactions related to the output of goods and services (Dynan *et al.*, 2018). However, GDP fails to regard shifts in the environmental, social, and human components of community wealth, which the society depends on for continuous life and welfare, by evaluating only the economic activities of what is produced. However, this has led to its failure to assess essential parts of the quality of life and it further promotes actions that are detrimental to lasting societal welfare in many respects.

The "threshold effect" is another question posed regarding the successful use of GDP to calculate economic progress. With GDP rising, overall life quality also grows to a degree. After this point, the GDP growth is crowded out by the cost of increasing income inequality and depleting natural resources (Max-Neef, 1995; Talberth *et al.*, 2007). A wide-ranging and strong field of research validates that more improvements in material well-being over and beyond a certain level have negative side-effects that lead to decreasing group cohesion, healthy interactions, knowledge, the sense of meaning, connections with the environment and other aspects of human happiness (Costanza *et al.*, 2009). With all these limitations of GDP, a body of research has contributed to the concept of human development which is discussed in the next section. The concept of human development is used vis-à-vis human welfare.

2.4 The concept of human development

Several studies analysed where the crossroads between economic wellbeing in different countries and various economic and social indicators meet. These studies include Easterlin (2013) who reports that there is no associated relationship between long-term patterns in welfare and income. However, in the short term, He concludes that the variations between

welfare and income are well linked. In contrast to this claim, some other researchers say that welfare and economic growth in middle-income countries are to a certain degree linked to a zero correlation, but time-series information does not support this claim. Results from China present a more remarkable exception. Despite the increase of GDP per capita fourfold, the Chinese citizen's welfare has not been increasing (Stundziene, 2019).

In contradiction of Easterlin (2013), Stevenson and Wolfers (2008) provide strong proof of people's human welfare being higher in high-income economies. The authors found a strong positive relationship between average subjective well-being and GDP per capita, but do not find any proof of a satiation point above which high-income economies cannot anticipate more growth to the subjective wellness of individuals. Similarly, there was also no proof of a satiation point in (Deaton, 2008). His study of 2006 Gallup World Poll data showed that log GDP is strongly linked to welfare, which in high-income economies was even greater. Moreover, Stevenson and Wolfers (2008) find that over time the overall increases in wellbeing are inconsistent. When the unemployment and inflation variables rise, the rate of overall welfare was found to decrease; in more, the overall happiness rate was found to shift in a direction predicted in a trade cycle.

According to Deaton (2008), the words life satisfaction and welfare are not synonymous. The well-being questions compel respondents to evaluate their lives generally. The findings of surveys are also considered for welfare measures. However, the measurement of welfare also takes place with the use of experiential questions, such as a smile, happiness, or depression the day before the interview. Similar questions are addressed by the polls conducted by Gallup

Welt Poll and findings indicate that experiential welfare levels are not always consistent with well-being measures.

Ng (2008) also notes some inconsistencies between the concepts of welfare and satisfaction. However, according to the researcher, because personal welfare is the main goal in the life of an individual, satisfaction with life is very closely linked with happiness. The fact that surveys produce very similar results is rational, regardless of which conditions (i.e., happiness or satisfaction in living conditions) are used. In addition, the research conducted by Gamble and Garling (2012) and Joshanloo *et al.* (2016) indicate that human welfare corresponds significantly to satisfaction in life. Though economic growth has been considered majorly as an important policy target, some researchers have been talking in recent years against trying to increase the living standards, arguing that such efforts do not lead to the rise of well-being (Stevenson & Wolfers, 2008; Van der Ploeg & Venables, 2009). Revenue-based welfare programmes are rather critical, given that they provide an insufficiently broad image of social development and human welfare.

However, there have been a variety of alternative methods which therefore have been established to measure human welfare and this has led scholars in agreeing that changing the economic focus from economic production measured by GDP into the well-being of people is necessary to achieve greater economic progress (Michalos, 2011; Stiglitz *et al*., 2010). This progress has led to different indicators for improved human development measurement to been created. Bleys (2012) and Miklos and Van den Bergh (2014), introduced comparatively detailed explanations of different human well-being measures. The classification of Bleys (2012) welfare interventions is based on concepts of well-being, economic well-being, and

sustainability. The other alternative metrics available for the human welfare calculation according to Miklos and Van den Bergh (2014) include:

- Genuine Progress Indicator (GPI)
- Sustainable Net Benefit Index (SNBI)
- Index of Sustainable Economic Welfare (ISEW)
- The sustainable or green(ed) GDP. This measure includes GDP changes with a total emphasis on environmental externalities and the loss of natural resources; the notion of sustainable income which refers to the income levels which should be maintained.
- Genuine Savings Indicator. This indicator refers to the differences between existing wellbeing and welfare measures across the years.
- Better life index.
- Human Development Index (HDI), which is a composite index that captures important human welfare aspects.

To quantify the well-being of populations, Stiglitz *et al*. (2010) provided a comprehensive evaluation of the limits of GDP. The writers, for example, looked at how GDP overlooks economic inequality (that means most people will get worse despite an increase in their average income), and how environmental factors affect their economies. After analysing how people differ and what they know about their welfare, the researchers suggest a new range of ideologies, from environmental steps to economic welfare, investments, wealth, and other welfare measures to replace GDP as a measure of economic wellbeing. If an increasing GDP does not significantly increase human welfare, it should not be regarded as the core policy goal for any country (Stevenson & Wolfers, 2008). However, it should be noted that many other variables, which are not directly related to GDP, may affect people's well-being i.e., welfare (Sarracino, 2013). One of such is the Human Development Index (HDI) and for this thesis, its

was adopted as the measure of human welfare following (Lashitew *et al*., 2020). The conception of HDI is explained in the next section.

2.5 Human development index (HDI)

The acknowledgement that there is much more to well-being than what is produced in an economy is a big strength of social measures like the HDI from the UNDP. The HDI was originally presented in the United Nations Human Development Report (HDR) of 1990 (UNDP, 1990). The HDR 1990 introduced the term "Human Development" as a measure of economic wellbeing and sets out a wide variety of national indicators for evaluating the status of welfare worldwide. To provide the basic needs of man, in general, is the important economic goal in any society, so defining what constitutes the basic needs becomes pertinent. According to Raheem *et al.* (2016), the basic needs of man from a macroeconomic view are access to education, healthcare and income which results in higher life expectancy, an effective education system and more income for members of the society is the debate on addressing HDI for countries. It recognises that access to resources for economic activity is a key component of overall well-being (Osberg & Sharpe, 2005).

Since 1990, the UNDP has been providing the well-known global indicator of well-being, i.e., HDI. From its beginnings, the HDI has attracted the attention of academic and political circles and has been able to move from economic growth policies to policies centred on citizens (Haq, 1995). The HDI combines three aspects of growth, i.e., a healthy life, education, and a decent standard of living measured by income in its total index. The HDI index intends to emphasise the relevance of education and health in the evaluation of well-being in addition to per capita income and to understand that improved health and educational capacity are essential. The

assessment of HDI uses standardised life expectancy as a proxy for health, school enrolment as a proxy for educational levels and a proxy for purchasing power for per capita earnings. HDI data was available across all the countries hence its adoption rather than the earlier specified metrics that measure human welfare

According to the previous HDI model, the expectancy at birth was the measure for health; training or awareness by combined adult literacy and education rates (elementary and college) was the measure for education; GDP per capita income in US dollars adjusted for purchasing power parity (PPP) was the measure for income. The dimensional indices derived from the indicators were standardised by using a fixed minimum and maximum. For three-dimensional indices, the final HDI was derived as an arithmetic median using identical weights of the third according to the methodology preceding it.

The 2010 UNDP report made some improvements to HDI in terms of the metrics, database, and the maximum value changed to standardisation and method of aggregation. The HDI for each three-dimension is now the geometric mean of normalised indexes. The health factor is still evaluated by life expectancy when they are born, but the HDI educational aspect is now calculated in terms of schooling years for adults aged 25 and anticipated years of learning for school children. The per capita GNI indicates the standard of living. The index uses life expectancy, education, and per capita income to put countries into a rank between 0 and 1 and a country would score a higher HDI if the expected lifespan is higher, the level of education is higher, and the per capita income is higher than the other countries. It is simply a tool to measure both social and economic development in any country. The HDI dimensional and detailed well-being indicator has been implemented with the focus that the study of how

economic growth either translates or does not translate into a change in different countries and how significant that change is. The HDI, like all other indicators, has not remained free of conceptual and methodological scrutiny as a progress indicator (Noorbakhsh, 1998; Ravallion, 2012; Srinivasan, 1994). A large part of the criticism of the HDI approach concerned the selection of dimensions and the aggregation process in a multilateral indicator.

A report by Sen focused on the need to improve the quality of the aggregate social progress index such as HDI (Stiglitz *et al.,* 2009). Identifying a minimum of eight aspects of well-being, namely the material living standards (income, consumption, and wealth), health, education, personal activity, political voices and governance, social relations and relationships, environment (Stiglitz, 2008). This critiqued by several researchers was the same as its predecessors. However, the simplicity of HDI nonetheless makes this considerably more relevant in comparison with the analysis of dozens of policy indicators (Streeten, 1994). In addition, as a straightforward indicator, HDI is much more attractive to the public than any other measure since it enables a common person, without having to comprehend complex analytical methods, to compare the country's relative wellbeing.

For this thesis and inconsistency with (Asongu & Nwachukwu, 2017; Dipietro & Anoruo, 2006; Jeremic *et al*., 2011; Natoli & Zuhair, 2010), the term human welfare would be used vis-à-vis human development. HDI data among all other identified welfare measures was more available for the sample set of middle-income countries rather than other more recent welfare measures as further explained in the methodology section.

2.6 The concept of economic diversification

Reliance on a few natural resources is harmful to every economy and eventually subject to weak economic performance and thus the resource curse. Furthermore, the limited sources of revenue cause disruptions, impacts the country's budget, financial stability, and economic development. Thus, few sources cannot be sufficient to enhance a process of multidimensional sustainability in the economy. The IMF issued cautions to the fact that countries need to diversify to eliminate the effects of low oil prices. Economic diversification is defined by Samuelson (1967) as an act of investing in a range of assets, with the benefit of reducing risk, particularly during times of recession, inflation, deflation, and so on (Chris *et al.*, 2015). While the availability of established economic production and source of revenue is expressed in economic diversification, they are often the adjustment of national income sources to decrease dependency on a specific resource (Horshig, 2016).

Thus, economic diversification can be defined as diversifying domestic sources of income by restructuring the economy and increasing the contribution of the different economic sectors, by creating a wide base of domestic and export products that do not depend on a resource that could be economically disrupted. For such variety to occur, the economic structures need to be radically changed to build them on a broad base of manufacturing facilities for high-precision and competitive industry chains. Economic diversification involves horizontal diversification, which means creating opportunities for the manufacture of new commodities linked or not associated with a primary industry such as crude oil, mining and farming, and vertical diversification, which implies the development, by using local or imported inputs, of a product which will further increase its value-added.

The IMF says that although the existing growth model has produced tangible socio-economic outcomes, it has weaknesses and allows diversification to be excluded from the rentier economy and petroleum products alone (IMF, 2014). Real diversification, therefore, calls for greater horizontal integration in diversification through manufacturing which replacing imports such as food, construction materials, information and communication technologies, tourism, etc. This will mean greater diversification.

The indicators for measuring diversification are numerous. These indications may differ depending on the efficiency of the measurement and the goal of the measurement. Some indicators track dispersion, whereas others track concentration or diversification. One technique of measuring economic diversification is Herfindahl-Hirschman. This statistic relies on the measurement of companies' market shares in the sector and ranges from zero (complete diversification) to 1 (no diversification). However, this method is not adopted as this thesis focuses on the overall production output of sectors and hence disaggregates the non-oil sectors into agriculture, manufacturing, and services to represent economic diversification (Abogan *et al*., 2014).

2.7 The impact of dependence on oil in oil-producing countries

The economic effect of dependency on oil production can be classified into two categories: volatility and crowding. Either will influence economic development and thereby trigger a curse on economic resources (see e.g., Auty, 2001; Lederman & Maloney, 2006; Ross, 2019; Sachs, 2007; Van der Ploeg & Venables, 2011). Macroeconomic volatility is the most extensively researched consequence of oil dependency. Oil and minerals appear to have volatile values because both supply and demand have short-term inelasticities (Hamilton,

2009). Therefore, a specialisation in these products continues to yield macroeconomic turbulence if left unchecked by policies or institutions (Van der Ploeg & Poelhekke, 2009).

Several studies suggest that the volatility which is resource-based continues to deteriorate investment, which in turn can limit the economic growth (Aghion *et al*., 2009; Blattman *et al.*, 2007; Ramey & Ramey, 1995). Van der Ploeg and Poelhekke broke down the reliance on natural resources into a favourable direct economic impact that they conclude was positive and has an indirect economic effect through the effects of volatility which they found to be negative and was much larger. Furthermore, Cavalcanti *et al*. (2015) also reported similar findings in their study which analyses the relationship between growth and commodity terms of trade volatility. However, few studies present less conclusive results. For example, Lederman and Maloney (2006), found a strongly correlated result between the exports from the extractive sectors and volatility in terms of trade, but not a strong connection to the volatility of growth.

The effect of these shocks on government services is based in part on the capacity of the government to stabilise its incomes from other sectors such as the use of stability funds or hedging mechanisms. The volatility in the revenue received leads to a greater demand on government fiscal policies at a minimum. In general, the volatility of income may elucidate why several studies link the oil-rich countries with higher corruption (Arezki & Bruckner, 2011; Caselli & Michaels, 2013; Sala-i-Martin & Subramanian, 2013). Bhattacharyya and Hodler (2010) also found this to be true in autocracies. A second result of the oil exports specialization is the crowding out of other non-oil sectors through the 'Dutch disease'. Manufacturing can be crowded out in an undesirable way if it produces more beneficial externalities from learning-by-doing than other industries, and these externalities add to human

capital accumulation (Krugman, 1987; Ross, 2019). Moreover, Rodrik (2012) found out that the manufacturing firms seem to converge in labour efficiency in manufacturing sectors across countries. This means that having a big manufacturing sector would lead to more growth in low-income countries.

2.8 The need for diversification among oil-producing countries

There has been a lot of research which have explored the link between economic development and diversification in the literature. The results differ depending on the statistical methodology, the data sets adopted, and the phases of diversification (Benedictis *et al.*, 2009). Such studies have a monotonous link between economic development and diversification, where countries appear to diversify along the way to economic development Stokey (1988), while research by studies have shown that countries become highly specialised as they develop (Krugman, 1987). Recently, there has been an increasing number of analytical studies that have examined the connection between diversification and development.

In the research by Imbs and Wacziarg (2003), which is a widely cited work, there is a non-monotonic connection where diversification takes a trend of U-shape, which has been shown in other studies such as (Cadot *et al.*, 2011; Miklos Koren & Tenreyro, 2007). Cadot *et al.* (2011) argue that diversification should not be seen as a policy goal for two reasons: first, the role of specialisation should be stressed, not diversifications. Secondly, he argues that export trends are primarily dictated by resource endowments. Policymakers in less developed and resource-rich nations, however, are still worried about diversification, since according to Papageorgiou and Spatafora (2012) it is the road to higher growth.

Alsharif *et al.* (2017) analyses the resource-rich literature and highlights developments in non-oil exports and non-oil employment. Gylfason (2011) argued that economic diversification could stimulate growth by attracting new economic activity to avoid over-reliance on primary production in some natural-resource industries, thus enabling labour-paying jobs in low-skill, intensive farming, and agriculture to be transferred to more lucrative high-skill jobs in the manufacturing sector. The author also maintains that, if well-handled and used to diversify the economy, relying on natural resources may be good for economic development. Exports will help countries upgrade their resource-based sectors to allow more sophisticated goods & services, shifting away from unprocessed primary exports (Gelb & Grasmann, 2010).

Higher reliance on resources makes diversification more difficult, but for many reasons, resource-rich countries do want to diversify (Gelb & Grasmann, 2010). In the first place, the diversification of exports is linked to longer-term growth, which allows for dynamic, productive learning that increases competitive products and services. Secondly, diversification opens a wider range of global business awareness to give vendors the opportunity for other markets. Thirdly, the effect of diversification on volatile resource markets declines. Van Der Ploeg and Venables (2012) suggest that public and private investment is required to work together to achieve diversification in resource-rich economies through human and private resource investment. From these advantages, resource-rich countries are then advised to diversify their economy for better economic growth.

2.9 Impact of economic diversification on economic and human development in oil-producing middle-income countries.

The profits from natural resources were above $4 trillion every year which approximately amounts to 7 per cent of global GDP (World Bank, 2011). In 24 countries, resources constitute about 75 per cent of their total exports. Among these countries, 13 of them have natural resources making up a minimum of 40% of their total GDP, and then 18 of them have resources providing above half of the entire fiscal revenue (IMF, 2007; Van der Ploeg & Venables, 2012). In many resource-rich nations, they have through history been more reliant on a limited scope of natural resources locally produced, mostly for their exports.

This narrow diversification most times leads to unsustainable economic growth, brought about by a greater concentration in low productivity sectors. This concentration in these sectors could result in higher vulnerability to external shocks, an unstable macroeconomic environment and price volatility. Several of these resource-rich countries continually aspire to create a more diversified economy. However, for many of these countries, especially the low and middle-income countries, there is little successful experience regarding what sectors the diversification is crucial. Imbs and Wacziarg (2003) discovered that countries begin to diversify at earlier phases of their development but when they achieve a higher phase of income, they often tend to specialise in some sectors, paying less attention to others.

The existing literature which exists between non-resource and resource rents economic activities has the focal point on the concept of the 'Dutch Disease,' which has been widely used in the development literature. In 1977, the economist magazine invented the term to explain the sudden gas boom and its implication on the Dutch economy. Corden and Neary (1982) have

through literature led extensive research on the 'Dutch Disease' (Alsharif, 2017). In their work, they found out the poor performance of manufacturing exports was obtained from the resource boom. Three factors may lead to this boom: a surge in the price of the world commodity price, a discovery of a new resource or an induced increase in productivity because of technology. They identified two major impacts of the boom of the natural resource on the manufacturing sector.

The first impact was that there was the spending effect, which occurred when there was a surge in the value for the export of the natural resources that led to an increase in the real income, resulting in more spending on the services sector, which in turn raised prices resulting in the adjustments to the real exchange rate. This resulted in making the export of non-resource commodities to become more challenging and unprofitable and thus made the competition with other imports from the broader array of commodities to become harder. The revenues which were gained from the sale of these resources are then used to buy internationally produced commodities, at the expense of ignoring the local manufactures of these commodities.

The second impact they discovered was the domestic resources including labour and material, began to shift towards the booming resource sector. This was where the resource movement took place. The result of this shift led to prices of these resources going up in the domestic market, consequently leading to an increase in the costs to local producers in other sectors. Ultimately, the result of the continuous extraction of these natural resources starts a dynamic that gives way to the dominance of two sectors i.e., the resource sector and then the non-resource sectors (Humphreys *et al*., 2007; Van der Ploeg & Venables, 2012). In another study, Arezki and Ismail (2010) researched the Dutch Disease using a sample of thirty-two countries

from 1992 to 2009 and they found out that when there was an oil boom, fiscal policies aided the reduction of capital expenditure.

Harding and Venables (2016) found out from their results that the export of natural resources was more than the export of non-resource exports. They further discovered that in countries where there is good governance as well as high-income levels, the contribution from the non-resource sectors is greater because these countries have higher activity in the manufacturing of the non-resource exports. The "resource curse" was first accredited to Sachs and Warner (1995, 2007) and they showed a relationship that was significantly negative between dependence on natural resources and the growth of GDP per capita. Just like the Dutch Disease, they agree that the abundance of resources tends to lead to a squeezing of the manufacturing sector and other non-oil sectors.

2.10 Review of relevant theories

This section reviews the relevant theory to aid the understanding of the impact of economic diversification on economic and human development in oil-dependent middle-income countries.

2.10.1 Resource curse

The theory that natural resource wealth is a burden rather than a gift has gotten a lot of coverage in recent decades, cited in the works of Auty (1993), Gelb (1988), Leite and Weidmann (1999) and Sachs and Warner (1995, 1999), who find that resource-rich countries not only do not benefit from a desirable natural resource endowment but also perform poorer than less well-endowed countries. The resource curse's paradox is built on this concept Humphreys *et al.* (2007) state why natural resources vary from other kinds of wealth from two main distinctions.

Firstly, it is not necessary to generate natural resource but merely extract it. Consequently, natural resources wealth can be produced by fuels and minerals without strong links with other industries and without much domestic labour force involvement.

Secondly, when many natural resources are particularly non-renewable for example, crude oil, they are not seen in economic terms as a source of revenue but as wealth that is consumed over time and eventually gets depleted (Lebdioui, 2019). There were considerable discussions on the relationship between natural resources and economic growth. These debates were distinguished by the optimism of resources and pessimism, one or the other at any given moment dominating (Hobfoll *et al*., 2015; Lahn & Stevens, 2018).

These discussions centred on the impact of mineral wealth on the development of industries because of the increased recognition by academia on the importance of industrialization in sustaining economic growth (see Andreoni & Chang, 2016; Chang, 2005; Hauge *et al*., 2017; Kaldor, 1967; Myrdal, 1956; Palma *et al*., 2014; Rowthorn & Ramaswamy, 1999).

Further debates on the natural resource optimism or pessimism give rise to define two concepts which measure natural resources; resource dependence and resource abundance. Resource dependence, measured in output, often refers to the amount to which a country relies on the revenues from the sale of natural resources on the other hand, natural resource abundance, measured in stock, refers to the estimated amount of a country's wealth under the soil or the estimated amounts of minerals, oil and gas (Badeeb *et al*., 2017; Brunnschweiler & Bulte, 2008).

However, the difference between resource abundance and resource dependence is in the measurements of each these concepts for economic progress. Resouce abundance is measured

by the estimation of the natural resource per capita while resource dependence is often measured by the gross domestic product (GDP). This study takes on the resource dependence concept as it is measured by growth of the economy.

The next section begins with the review of the information gained about the negative effect of natural resources on economic growth and then further literature discusses the favourable link between the development of economies and natural resources.

2.10.2 Literature on the resource curse

Important research, such as Auty (1994) and Sachs and Warner (1997), have shown that the connection between economic growth and dependency on the resource is negative, and have concluded that, because of what has been identified in the literature as 'resource curse,' countries with major natural resources, such as crude oil are more likely to do worse than other countries in economic development. This negative connection observed produced a broad literature to describe it. The sale accrued from natural resources has been argued to contribute to the marketplace and government let-downs marked by corrupt institutions in the long run that obstruct economic development and industrialisation (Beblawi & Luciani, 2015; Bhattacharyya & Hodler, 2010). Furthermore, a growing number of studies have doubted the resource curse hypothesis's theoretical and methodological credibility (Echavarria & Vazquez Moreno, 2016; James, 2015; Lederman & Maloney, 2007). A few explanations of the resource curse are explored in the next sub-section.

2.10.3 An economic reasons for the resource curse

The resource curse has three major economic reasons: Dutch disease, market fluctuations and the enclosure principle (Ross, 1999). The word 'Dutch disease' was originally used in explaining the observable deterioration, when natural gas was discovered in 1959, in the

manufacturing sector in the Netherlands. The study by Corden (1984) modelled this phenomenon to demonstrate how the money flows out of the non-oil sectors as oil booms and how a capital inflow into the booming resource market triggers currency appreciation. This idea was popularised by Sachs and Warner (1997, 2001), who affirmed that it was the biggest growth impediment for resource-rich countries.

Several explanations are given of the phenomenon of the Dutch disease, but formally they lead to two collective effects which are:

- The currency appreciation because of a significant increase in exports.
- The extractions of capital and labour from both the manufacturing and agriculture sectors because of the booming resource market.

Together, these two effects increase production prices and contribute to a lack of productivity in the production and agriculture industries (Neary & Van Wijnbergen, 1986). The Dutch disease model still has theoretical flaws, which are more significant. According to Ross (1999), this model is based on assuming that both the supply of capital and labour are stable and completely employed before the start of a boom. The booming resource sector, in turn, extracts capital and labour from agricultural and manufacturing under certain circumstances, but developed countries often have work surpluses, and, most of all, resource sectors often draw international capital and labour to mitigate local shortages (Wai, 1988). In addition to full jobs, John (2009) assumes statistical technology in the Dutch disease model.

This has important consequences because, as a nation experiences a technical deficit, increased foreign exchange will help narrow the gap by rising imports of advanced technology. It can therefore be avoided if proceeds from resource booms are used to encourage an industry's competition by protection, concessions, or financial incentives, which can help to modernise the industrial capital stock, which can increase efficiency. Governments may also fight the impact of Dutch disease by investing their capital in physical infrastructure that boosts growth or by putting windfall in external monetary markets that aid currency appreciation. Cashin and McDermott (2002) in their research found that uncertainty leads to more harm than a predictable and constant drop in commodity prices to commodities producers.

However, policymakers may use some tools to mitigate commodity revenue fluctuations. They include stabilisation funds and stringent budgetary guidelines to smooth government spending and offset commodity revenue boom-and-bust cycles. Another reason is the lack of economic links between resources and non-resource sectors, especially as international companies lead mineral extraction operations and repatriate their earnings rather than spend them locally (Hirschman, 1958). The study of the "enclave theory" suggests that mining resources are important as they are capital-intensive, concentrate ownership, resulting in less efficient consumption and production linkage than the circulation of resources in developing countries (Auty, 2001; Auty & Gelb, 2000; Hirschman, 1981; Singer, 1950).

However, there is no evidence to fully support the enclave proposition. In a study conducted in 76 developing countries by Fosu (1996) between 1967 and 1986, there was a minimal impact from the output of the non-export industries. This possibly was due to government actions, for example, nationalisation, to capture the economic rents once taken out by international

multinationals in the 1970s (Ross, 1999). Governments tend to have the potential to facilitate linkages, but they often refuse to do so. All these things being said, the problem of weak economic links is more complicated and requires special consideration rather than merely appropriating rents from the sale of natural resources.

2.10.4 Other reasons for the resource curse

Although economic conditions may pose certain challenges for resource exporters, it seems that the influence of resource riches is not predetermined and is contingent on policy responses (Gelb, 1988; Neary & Van Wijnbergen, 1986). Consequently, the true issue that is behind the resource curse is why governments sometimes refuse to take corrective measures (Saad-Filho & Weeks, 2013). There are three explanations for this: Cognitive, rentier state and societal explanations (Ross, 1999).

2.10.4.1 Cognitive reasons

In the 50s and 60s, the dominating argument was that booms in capital or ease of affluence caused paralysing or euphoria among policymakers, but also reflected previous claims made in the 14th century by Ibn Khaldun and in the 16th century by Jean Bodin (Watkins, 1963). There are some flaws in the cognitive approach, as state actors also recognise the risks of resources booms. John (2009) criticises the cognitive reasons for Venezuela's weak economic results in the period 1973-1998, and that the government's failure to predict oil income would not be continuous until investment in large scale industrial projects contributed to macroeconomic uncertainty.

Though it takes up some of the issues, it does not clarify, why short-term economic crises inevitably prevented a long-term economic transition and why other resource-rich countries

(like Malaysia) with the significant macroeconomic crisis have transformed the framework of their economies to lead to fast, long-term development (John, 2009). Malaysian leaders strongly exaggerated resources available to pursue large-scale, heavy industrial investments, according to Nellis and Kikeri (1989), but this did not deter them from making disruptive and growth-led investments.

2.10.4.2 Rentier State explanation

Ascher (1999) maintains that the factors behind bad use of resource rents are more nuanced than ignoring effective management of resources or greed. As resource rents offer a simple and low-visibility funding mechanism, policymakers may endanger effective control of natural resources to accomplish other goals, such as financing unpopular growth projects, restructuring and the capturing of the wealthy or more 'political' targets as bribery or the preservation of the status quo (Mahdavy, 1970; Tornell & Lane, 1999). Anderson (1987) adds that rentier states prefer equitable consumption to growth policies. Karl (1997) discovers startling correlations between states such as Algeria, Venezuela, Nigeria, Saudi Arabia, and even 16th century Spain. In nearly all situations, the state is the direct beneficiary of the rent wealth, which decreases the need for taxes, eroding the essence of the mutual agreement between the government and people. Other research also discovered the natural resource endowment has had a detrimental effect on government and institutions (Jensen & Wantchekon, 2004; Sala-i-Martin & Subramanian, 2013).

While rentier state theories provide valuable knowledge, they are based on untrustworthy assumptions. To begin with, 'unearned' wages hinder the creation of a social structure by taxes and responsible states, which have fewer incentives to devise growth-enhancing policies as a

result. However, if rich resource states have less transparency, then do they still believe that collective approval must be bought through unnecessary redistribution? Countries like the United Arab Emirates have shown that the lack of revenue tax does not hinder the government's formulation of policies to boost growth. Secondly, the belief that politicians are necessarily greedy is reductive and cannot consider that many regimes in resource-rich countries (e.g., Algeria and Venezuela in the seventies) have sought to establish developmental states and have succeeded not just because of 'selfish intentions' but also partly because their industrial policy has not been developed. Even if leaders have egoistic ambitions, why they do not optimise development is not clear. This is expressed in Olson's (1993) notion of the stationary bandit, which says that a leader with a long-term vision has the encouragement to stimulate development as this maximises revenues accrued to the state in the long term.

2.10.4.3 Societal explanations

Finally, "societal explanations," which stress how the influence of non-state players in resource-rich countries support unsustainable industrial policies, have also demonstrated this resource curse (Ross, 1999). Sachs and Warner (1997, 2001) maintain that resource-rich countries appear to be the victims of protectionist policies leading to a stagnant economy because the companies impacted by the slow-moving manufacturing sector which has been impacted by the Dutch disease ask for compensation under the guise of trade barriers. The theory that natural resource abundance contributes to the continuation of counterproductive ISI (Import-Substitution Industrialisation) policies has been used to justify why resource-rich Latin American countries are behind resource-poor East Asian countries in the 1970s and 1980s (Ross, 1999). This point, however, can fall short of explaining why East Asian countries retained protectionist policies for decades before infant companies became globally competitive.

2.10.5 Resource optimism

Scholars such as Innis (1956) and Mackintosh (1923, 1939) established the staple theory in the 1920s and 1930s, emphasising the importance of commodities as a driver of economic growth. It noted that exports of primary products stimulate growth by employing capital and labour in less developed areas and that exports of raw materials will lead to growth if an investment is continuously made for the reduction of cost of production and transport of commodities to export. A few decades later, many development economists, including Spengler (1960), Viner (1952) and Lewis (1955), proposed that resource abundance would benefit developed countries, which were perceived to be suffering from labour surpluses and capital shortages.

Over the last two decades, a slew of experiments have discovered a beneficial association between natural resource availability and economic and human growth indices, clearly contradicting the resource curse study (see Bravo-Ortega & De Gregorio, 2007; Brunnschweiler & Bulte, 2008; Davis, 1995; Findlay & Lundahl, 1999; James, 2015; Pineda & Rodriguez, 2010). The observational research discussed so far is mostly based on a cross-sectional analysis and therefore does not take the time component of the results into account and is affected by possible excluded variable bias. Van Der Ploeg (2011) emphasises the importance of the panel data estimate to solve this challenge.

Manzano and Rigobon (2001) estimate the impact of abundance of natural resources on panel growth and find the inverse relationship only in cross-sectional statistics, not panel data. The observational findings for a cross-sectional method are thus attributable to omitted, variable predictions and the influence disappears until fixed results have been added. In a separate panel data study by Carmignani and Chowdhury (2007), the authors find out that natural resources

are weakening economic growth in Sub-Saharan Africa, even though there is no proof of a general resource curse at global levels. Both static and dynamic models of development prove that their effects are beneficial to the growth of natural resources.

2.11 Research gap

Although the multidimensional relationship between natural resources and economic development has been studied extensively in the "resource curse" literature Ross (2012), Van Der Ploeg (2011) and Venables (2016), the concept of economic diversification has gotten far less discussion. The low level of economic diversification is one of the most prominent expressions of resources, given that natural resources dominate revenue accrued among the oil-producing countries (Bahar & Santos, 2018; Ross, 2015). This low level of economic diversification can be detrimental since the focus on natural resources can make resource-rich countries subject to direct economic shocks linked to the unpredictable price of these resources in the global market and the depletion of resource stocks (Devlin & Titman, 2004; Van der Ploeg & Poelhekke, 2009; Venables, 2016).

Reliance on extractive sectors with high regulatory rents can also stifle the creation of other industries that support broad-based economic growth (Pritchett *et al.*, 2017). The main difficulty among resource-rich countries for policymakers is how to transform the resources in the ground which can help their people succeed and live better lives (Morrison, 2010). The greatest way of achieving economic diversification is to increase the non-resource side of the economy. Take Canada and the Republic of Congo as examples. The World Bank's figures indicate that the natural resource endowments of the two nations were the same, whereas resource rents per capita were roughly USD 1.200 in 2014.

In Canada, however, the GDP per capita when compared to the Republic of Congo is approximately eight times larger. The key policy consideration is how Canada successfully succeeded to diversify their economy away from natural resources and establish a highly productive non-resource sector, while the Republic of Congo failed to do so. Both nations initially started as extremely resource-dependent countries but the difference in performance perhaps draws our attention that there are some mechanisms responsible for this result. Current research however mostly focuses on documenting the influence of natural resources on overall results such as the GDP per capita growth (Van Der Ploeg, 2011).

This is unexpected, given theoretical research on the Dutch disease found that resource booms crowded commercial non-resource industries (Corden & Neary, 1982). The failure to differentiate between resource and non-resource areas might also empirically lead to a misleading result since the negative correlation between resources and GDP might represent the lack of performance of the oil sector itself (James, 2015). The lack of comprehensive studies on why diversification in resource-rich nations has not been achieved has reduced the pertinence of academic results to contribute to policymaking in reality (Lashitew *et al*., 2020). Whereas dependency must be reduced, the mechanisms of doing this are less evident (Gelb, 2010; IMF, 2016).

According to Ross (2015), the countries that have achieved more economic diversification fall in the World Banks category of High-Income countries. This creates a gap for research into economic diversification in oil-producing middle-income countries which this study intends to fill as no known study to the researcher has filled this gap. This thesis does not intend to solve the resource debate, nor does it try to understand if the presence of natural resources raises or

lowers GDP. However, this thesis deviates from other studies by examining the effect of economic diversification on economic and human development in middle-income oil-producing countries.

By disaggregating the non-oil sectors, the study uses agricultural sector production, manufacturing sector production, and service sector production, specifically their shares of GDP, as a proxy for economic diversification to test how these variables have impacted both economic growth and human development of middle-income oil-producing countries. Aside from the choice of these variables, the study extends the period from 2000 to 2017 and makes use of a comparative panel data analysis to analyse the data from multiple middle-income countries. As at the time of submission, it has also been identified as a contemporary issue at the World Bank and is now receiving some attention among economists. Table ***2.1*** below summarizes recent empirical literature which reveals the gap found:

Table 2.1: Summary of recent literature

Name and year of Author	Country/ Period of study	Methodology	Findings
(Matallah, 2020)	MENA 1999-2017	GMM, Pooled OLS, fixed effects, random effects	MENA oil exporter's economic growth has a positive and significant impact on oil rents.
(Dwumfour & Ntow-Gyamfi, 2018)	38 African countries 2000-2012	Generalised Method of Moments (GMM)	Resource rents showed a positive influence on financial development was stronger when there was more accountability in the country.
(Kinuthia & Mabaya, 2017)	Uganda and Tanzania/ 2005 to 2015	Probit and linear probability model	The results show the improved agriculture helps households in especially in rural areas increasing their welfare.
(Alsharif *et al*., 2017)	35 Oil-dependent countries 1962-2012	Panel OLS Method	There was a negative correlation between economic diversification and oil dependency.
(Tiba, 2019)	Sub-Saharan countries 1990-2015	PSTR (Panel Smooth transition Regression model)	Natural resources increase resulted in poorly managed natural resources revenues.
(Ali *et al.*, 2014)	Pakistan	Ordinary Least Squares (OLS) regression analysis models	The study confirms the poverty alleviating impact of the manufacturing sector and human capital (healthcare and education).
(Asongu & Le Roux, 2017)	Sub-Saharan African countries/2000 to 2012	Tobit regressions analysis	The findings of the study show that policies designed to boost ICT penetration will increase inclusive development in the post-2015 sustainable development agenda
(Alexeev & Conrad, 2011)	CIS Countries 1996 - 2005	Ordinary least squares (OLS)regression	When corruption is controlled, there is a positive and significant influence on economic growth
(Loayza & Rigolini, 2016)	Peru/1990 and 2000	Ordinary Least Squares (OLS) regression analysis models	The authors find that mining districts have larger average consumption per capita and lower poverty rates than otherwise similar districts
(Aljebrin, 2017)	Saudi Arabia/ 1988-2014	Ordinary least squares and error correction model	The empirical results obtained show that, in both short-run and long-run, a positive and significant relationship exist between the non-oil economic growth and non-oil exports

No known work to the best of the researcher's knowledge has examined the effect of non-oil production on economic growth and human development for middle-income oil-producing countries in a single study. This study combines both economic growth and human development and contributes to the literature by examining the impact of economic diversification on economic development in oil-producing middle-income countries.

2.12 Contributions of the study

After identification of research gap in the empirical literature, this thesis has contributed to the body of knowledge and is significantly different in the following ways:

1. The use of oil-producing middle-income countries to understand the impact of economic diversification on economic and human development. No known work to the best of the researcher's knowledge has used this sample set for analysis on economic diversification.

2. In addition to adopting the generalised method of moments (GMM) which is commonly used across the literature to estimate the impact of economic diversification on economic growth, this research makes use of the generalized linear model (GLM) when HDI, which is measured from 0-1, was adopted as a proxy for human development adding to the literature on economic diversification and its impact on economic development.

3. The use of a case study chapter on Nigeria to understand the impact of economic diversification on both economic and human development. Previous studies focus more on economic growth, but this thesis combines both economic growth and human development for Nigeria. No known work to the best of the researcher's knowledge has used both for their analysis on economic diversification.

4. No known work to the best of the researcher's knowledge has examined the effect of non-oil production by using these variables (agricultural sector production, manufacturing sector production, and service sector production) on economic growth and human development for middle-income oil-producing countries in a single study. Hence this study combines both economic growth and human development and contributes to the literature by studying the impact of economic diversification on economic development in oil-producing middle-income countries.

5. The calculation of nHDI (Nigerian human development index) variable where HDI was not available before 2005. This may allow further research to estimate their variables and calculate HDI to help move the discussion forward on how countries can achieve economic diversification.

6. The use of a recent panel dataset to understand the impact of economic diversification on both economic and human development.

Chapter 3

DATA AND METHODOLOGY

3 Data and Methodology

3.1 Introduction

As already stated in chapter one, the main objective of this thesis is to explore the impact of economic diversification on economic and human development in oil-dependent middle-income countries from 2000 – 2017. Economic diversification represents production in non-oil sectors such as agriculture, manufacturing, and services.

The methods that are adopted are descriptive statistics, correlation analysis, pooled OLS, fixed and random effects, Hausman tests to determine what best describes the model. Furthermore, the generalised method of methods (GMM) is used in the first model and the generalised linear model (GLM) is used in the second model as HDI which ranges between 0-1 replaces GDP per capita growth. Thus, this chapter is subdivided into five main sections: data sources, sample and collection, model specification, data type, variables description and the econometric techniques that are applied.

3.2 Data Sources, sample, and collection

The data was collected from various sources covering a period of eighteen years, from 2000 to 2017. According to World Bank (2020), as of 1 June 2020, countries have been classified into high-income, middle-income and low-income countries as follows: the high-income countries are countries that have a GNI per capita of about $12,055 and more, the middle-income countries are countries that have GNI per capita between $996 and $12,055 while low-income countries are countries that have GNI per capita about $996 or less World Bank (2020).

The analysis was restricted to middle-income countries as identified in the research gap and as well as the fact that more developed countries, that is countries that fall into the high-income by the World Bank classification, who are oil-producing, have generally attained higher stable

developments and have seen more diversified economies (Bergougui & Murshed, 2020; Lashitew *et al.*, 2020; Ross, 2015). Among the middle-income countries, a sample of 30 countries that were also oil producers according to the International Energy Agency (IEA) and fall into the middle-income criteria specified by the World Bank was adopted for this thesis (IEA, 2020). The study uses a threshold of those countries which produce oil but not in insignificant quantities. The impact of the resource curse is generally not expected to be found among high-income countries. For this study, the panel data sample of oil-producing middle-income countries was adopted because they are more likely to be subject to the resource course than oil-producing high-income countries (Alodadi, 2016). The sample countries that were adopted for this study are shown in Table ***3.1*** below:

Table 3.1: Oil-producing middle-income countries

Source: World Bank, International Energy Agency

Furthermore, all data for this study were obtained from various sources for the period mentioned above and a summary of the variables used in the study and their sources are given in Table ***3.2*** below:

Table 3.2: Variables and sources of data

Variable	Explanation	Source	Code
GDPCG	GDP Per capita growth (annual %)	World Bank	NY.GDP.PCAP.KD.ZG
HDI	Human Development Index	United Nations Development Programme	
AGR	Agricultural Sector Production proxied by Agriculture; forestry, and fishing, value added (% of GDP)	World Bank	NV.AGR.TOTL.ZS
MAN	Manufacturing Sector Production proxied by Manufacturing; value added (% of GDP)	World Bank	NV.IND.MANF.ZS
SER	Service Sector Production proxied by Services; value added (% of GDP)	World Bank	NV.SRV.TOTL.ZS
OPR	Oil production proxied by oil rents (% of GDP)	World Bank	NY.GDP.PETR.RT.ZS
EXCR	Official Exchange Rate (US Dollars)	World Bank	PA.NUS.FCRF
CPI	Corruption Perception Index	Transparency International	
CAP	Gross capital formation (% of GDP)	World Bank	NE.GDI.TOTL.ZS
LFP	Labour force participation rate, total (% of total population ages 15+ (modelled ILO estimate)	World Bank	SL.TLF.CACT.ZS

3.3 Panel data

The analytical research for this thesis employs panel data to investigate the association between economic diversification and economic and human development in oil-producing middle-income countries. Panel data is often referred to as longitudinal time-series data. This longitudinal dataset contains measurements on the same units over several time intervals (Kennedy, 2008). A panel data collection consists of several individuals, each with replicated measurements at various time intervals. It has greater variability, and it presents more conclusions than cross-sectional or time-series data (Hsiao, 2007). Panel data also produces more insightful data, more certainty, less collinearity among variables, more degrees of freedom, and higher efficiency (Baltagi & Kao, 2001). Panel data may be fixed or rotating, long or short, balanced, or unbalanced. A short panel data has a lot of individual observations (N) but few time periods (T), while a long panel data has a lot of time periods (T) but few individual observations (N).

Individual observations were assessed in all time intervals in a balanced panel. Accordingly, the total number for the individual observations is N multiplied by T. When any cross-section or entity has a different number of observations than others, the panel data is unbalanced. N x T is not the absolute number of observations (Park, 2011). Furthermore, a panel data set is considered a fixed panel if the same individuals (or groups) are observed for each cycle. When a group of individuals varies from one time to the next, the data collection is called a rotating panel (Greene, 2008). This study contains a balanced and fixed panel data set.

Park (2011) provides a short and straightforward explanation of the panel data models. Panel data models analyse the impact of the countries, the periods, or both to resolve the

heterogeneity and individual effects which may or may not be identified. These are either random or fixed. A model of fixed effect investigates whether intercepts vary throughout sample countries or time, while a random effect model studies whether variation over country or time is randomly determined.

Some methods can be used to investigate economic growth and pooled OLS, one-way (country dummies) fixed and random effects, and two-way (country and time dummies) fixed and random effects are the most widely used techniques in earlier studies. The GMM estimator developed by Arellano and Bond (1991), Manuel Arellano and Bover (1995) and Blundell and Bond (1998) has recently been used in scientific studies to further solve the issue of potentially endogenous variables. Section 3.6 elucidates more of the methods discussed in this analysis.

3.4 Model specification

In chapter two, the resource curse theory was identified to be the main theory that influences this thesis. However, to specify the model, which was adopted from Alodadi (2016), the Solow model was adopted. The Solow model remains the most common method to examine economic development variables for countries (Anaman, 2004). Theoretical and empirical studies have also identified different factors that influence a nation's economic growth. These factors include natural resources (oil, gas), non-oil sectors (agriculture, services, and manufacturing), volatility of exchange rates, economic policies, institutions, and others. This research takes into consideration most of these factors to investigate evidence of the impact of economic diversification on economic development in oil-producing middle-income countries.

However, the oil sector presence among these rich oil nations, as well as its dominance in the economy (which is vastly different from the non-oil sector), necessitated its inclusion in this

study. Solow's model has been utilised in most of the research done in less developed nations to explore the drivers of economic growth according to Anaman (2004) and Asseery and Al-Sheikh (2004). Thus, this thesis uses the Solow model which explains economic development. Furthermore, this study employed the standard baseline economic growth model, or a simple version of the Solow model often illustrated by using a Cobb-Douglas production function as follows:

$$Y = \mathrm{AL}^{\alpha} K^{\beta} \tag{3.1}$$

Where Y is the level of output, A is the level of technology, L is the amount of labour input, K is the stock of capital, β is the share of capital in output and α is the share of labour in output. Shares α and β are positive and below 1; i.e., $0 < \alpha < 1$, $0 < \beta < 1$ and sum to 1, $\alpha + \beta = 1$ (constant returns to scale).

The typical Solow growth model was modified from equation 3.1 to 3.2 to test the impact of economic diversification and other control variables impacting economic development. Thus:

$$GDPCG_{i,t} = \beta_0 + \beta_1 \mathrm{LAB}_{i,t} + \beta_2 CAP_{i,t} + \beta_3 AGR_{i,t} + \beta_4 MAN_{i,t} + \beta_5 SER_{i,t} + \beta_6 OPR_{i,t} + \beta_7 EXCR_{i,t} + \beta_8 CPI_{i,t} + \mu_{i,t} \tag{3.2}$$

Where GDPCG is the GDP per capita growth, LAB is the labour force participation, CAP is the gross capital formation, AGR is the agricultural sector production (% of GDP), MAN is the manufacturing sector production (% of GDP), SER is the services sector production (% of GDP), OPR is oil production (% of GDP), EXCR is the official exchange rate (US Dollars), CPI is the corruption perception index, and $\mu_{i,t}$ is the error term.

However, scholars such as Kakwani and Pernia (2000), Amartya Sen (1999), Thirlwall (2006) and UNDP (2013) have concluded that using GDP per capita growth to calculate living conditions is an insufficient measure of overall human wellbeing. This is because economic growth can occur without improving the poor's condition, especially if the income distribution between the rich and the poor remains unchanged.

It is also likely to identify conditions where living standards rise at a faster pace than the rate of real GDP growth rate. Carvalho *et al.* (2009), for example, discovered that taming hyperinflation in 1994 and significantly improving social security and social aid payments resulted in an improvement in total social welfare in Brazil from 1985 to 2004, despite the country's slow growth. However, as Kakwani and Pernia (2000) have indicated, development may be considered an acceptable indicator of improvements in overall social wellbeing if it is equitable, that is, followed by an appropriate redistribution of income.

As a result of the above, some scholars propose that a multidimensional indicator of social wellbeing, such as the human development index (HDI), which is a combination of income, education, and life expectancy, is a stronger measure of overall living conditions (Alkire & Foster, 2011). This is because, in addition to income, it considers improvements in health and education, all of which are important factors in potential wealth formation. Hence, the study replaces HDI for GDP per capita growth to measure human welfare in the model.

$$HDI = f(L, K, AGR, MAN, SER, OPR, EXCR, CPI) \quad (3.3)$$

Where HDI is the human development index as a proxy for human welfare. All the other variables as earlier defined.

From equation (3.3) above the researcher adopts the following econometric form:

$$HDI_{i,t} = \beta_0 + \beta_1 \mathrm{LAB}_{i,t} + \beta_2 CAP_{i,t} + \beta_3 AGR_{i,t} + \beta_4 MAN_{i,t} + \beta_5 SER_{i,t} + \beta_6 OPR_{i,t} + \beta_7 EXCR_{i,t} + \beta_8 CPI_{i,t} + \mu_{i,t} \quad (3.4)$$

Where β_0 is the intercept and $\mu_{i,t}$ is the error term

3.5 Variables

3.5.1 Dependent variables

3.5.1.1 Gross domestic product per capita growth rate (GDPCG)

GDP per capita growth is one of the ways to measure economic growth. It is an increase in per capita national output or net national product over a long time. It implies that the rate of increase in total output must be greater than the rate of population growth. To measure economic growth using GDP per capita growth, economists generally examine the rate of change in GDP per capita from one year to the next. GDP per capita is the GDP of the country divided by the total population of the country. GDP per capita growth is GDP per capita for the previous year minus GDP per capita for the present year divided by GDP per capita growth for the previous year, multiplied by 100. GDP per capita growth is the dependent variable in the model which explains economic growth. This variable was adopted from (Alodadi, 2016) as it shows economic growth in a country within a given time frame and as shown through literature to be a measure of economic growth.

3.5.1.2 Human welfare (HDI)

UNDP sees human welfare as defined earlier as primarily to do with education, health, and income, reflected in the HDI calculation, which is a composite of three social welfare variables to represent long and healthy life, acquisition of knowledge, i.e., education and a decent standard of living. In this thesis, the dependent variable in the first model for Economic growth

is replaced with the proxy for human development HDI i.e., that Human welfare. This was done to ascertain whether the impact of measuring human development would show different conclusions than the impact of economic growth when used in the same model. This was adopted from (Lashitew *et al*., 2020). The replacement of the dependent variable would show the impact of economic diversification on people's welfare and not just what is produced in a country each year as measured by GDP.

3.5.2 Independent variables

This thesis adopts the independent variables in the related literature but modifies some of them for the context of economic diversification. To avoid any omitted variable bias, independent variables were used in the regression as shown in the literature. The independent variables used in this thesis are shown below:

3.5.2.1 Proportion of manufacturing sector production as a percentage of GDP (MAN)

The MAN is defined as the proportion of manufacturing production in GDP. The manufacturing sector production or output is one way of assessing the performance of the manufacturing sector in a country. Others are the proportion of manufacturing sub-sector production in GDP and capacity utilization level. In this study, the researcher used the proportion of manufacturing sub-sector to GDP to proxy manufacturing sub-sector production. Thus, the researcher employed it as an independent variable in this study as adopted from (Rodrik, 2013). It is expected that an increase in manufacturing sub-sector production will through transmission mechanisms increase economic growth and human welfare of middle-income oil-producing countries. Therefore, the following hypothesis is then proposed:

$$H_1 - Manufacturing\ sector\ output\ has\ a\ positive\ impact\ on\ economic\ growth$$

$$H_2 - Manufacturing\ sector\ output\ has\ a\ positive\ impact\ on\ human\ development$$

3.5.2.2 Proportion of agricultural sector production as a percentage of GDP (AGR)

The AGR is defined as the proportion of agricultural production in GDP. The agricultural sector production or output is one way of measuring performance in the agricultural sub-sector of a country. In this thesis, the researcher used the ratio of agriculture production to GDP to proxy agricultural sector production. Thus, it is employed as one of the independent variables in this study as adopted from (Abogan *et al.*, 2014; Lashitew *et al.*, 2020). It is expected that an increase in agricultural production will promote and increase economic growth observed in the study by Matthew and Mordecai (2016) and human welfare observed in the study by Self and Grabowski (2007) of middle-income oil-producing countries. Therefore, the following hypothesis is then proposed:

$$H_3 - Agricultural\ sector\ output\ has\ a\ positive\ impact\ on\ economic\ growth$$

$$H_4 - Agricultural\ sector\ output\ has\ a\ positive\ impact\ on\ human\ development$$

3.5.2.3 Proportion of services sector production as a percentage of GDP (SER)

The SER is defined as the proportion of services production in GDP. The services sector production or output is one way of assessing the performance of the services sector among countries (Eichengreen & Gupta, 2011). The other is the proportion of the services sector to GDP. In this study, the researcher used the proportion of services sector to GDP to proxy services sector production. Thus, the researcher employed it as the third independent variable in this study. It is expected that an increase in services sector production will through transmission mechanisms increase economic growth and human welfare of middle-income oil-producing countries. Therefore, the following hypothesis is then proposed:

$$H_5 - Services\ sector\ output\ has\ a\ positive\ impact\ on\ economic\ growth$$

$$H_6 - Services\ sector\ output\ has\ a\ positive\ impact\ on\ human\ development$$

3.5.2.4 Crude oil production (OPR)

Crude oil production is used as one of the explanatory variables to compare its effect and that of economic diversification on economic growth and human development. The OPR used in this thesis represents oil production as a percentage of GDP. It was obtained from the oil rents data provided by the World Bank. It is defined as the difference between the total value of what is produced from crude oil at regional prices and the overall cost for producing the crude oil (Ravallion, 2012). Accounting for the contribution of natural resources to economic development is important for the development of a sustainable development analytical framework according to the World Bank (2020). Over the last five decades, oil revenue has been critical to the economic development of many oil-rich countries (Mehrara, 2008; Snudden, 2016). The countries which were used ranked among the middle-income oil-producing nations according to the IEA's ranking the highest in terms of crude oil production (Adeola & Evans, 2020). It is expected that an increase in crude oil production will increase economic growth and human welfare in oil-producing middle-income countries. Therefore, the following hypothesis is then proposed:

$$H_7 - Crude\ oil\ production\ has\ a\ positive\ impact\ on\ economic\ growth$$

$$H_8 - Crude\ oil\ production\ has\ a\ positive\ impact\ on\ human\ development$$

3.5.2.5 Exchange rate (EXCR)

The exchange rate is defined as the quantity of one currency exchangeable in respect of another or the price of one currency in terms of another (Grauwe, 2016; Vogler *et al*., 2019). In terms of another currency, this is considered the worth of one country's currency. The exchange rate adopted is the official exchange rate in US dollars. Exchange rates on the foreign currency

market are established, which is suitable for various sorts of buyers and sellers where currency trade is constant (Abogan *et al.*, 2014). As a result, the rate, like all prices, is controlled by the relative demand and supply of each currency.

Volatility is one source of the negative relationship between resource dependency and economic development. Oil prices are extremely volatile, with a coefficient of variation of 0.7 (Gelb, 2010). Prices are likewise extremely difficult to forecast. None of the key turning points in the oil market has been generally forecasted since the early 1970s. Predictions for persistent price hikes in the early 1980s were way off the mark. The oil boom merely followed the spot price at future prices; they were flat and extended the present price to 10 years. Because of some lower and higher bounds, actual prices cannot exactly correspond to such a non-stationary process, but estimated prediction models perform little or no better than a random walk.

Hamilton (2008) offered a thorough analysis of the statistical characteristics of the oil price series. He concludes that we should not be shocked to see a price of oil that is as high as 391 dollars or as low as 34 dollars from the price of $115 per barrel, four years in the future. The latter price was unthinkable at the time of the research and considerably beyond the range of reported futures prices; nonetheless, prices reached $34 per barrel late in 2008 when the market crashed and have crashed beneath $5 per barrel in recent times. For the oil producers, the ensuing uncertainty is huge. Take an oil producer like Nigeria, for example. The difference between a $50 and $150 price is comparable to a 50 per cent change in GDP at the base price of oil, estimated at 100 dollars a barrel (Desai *et al.*, 2017). These severe pricing oscillations have not usually been smoothed by oil exporters. They tend to alternate shorter boom times typified by high, real exchange rates, rising prices in non-traded sectors (especially immovable)

and high but not dramatic GDP growth rates, with lengthy slums. This study examines economic diversification and economic development; it is important to analyse the exchange rate as it has been identified to be a key driver in the resource curse (Ezike & Ogege, 2012), therefore, the following hypothesis is then tested:

$$H_9 - Exchange\ rate\ has\ a\ negative\ impact\ on\ economic\ growth$$

$$H_{10} - Exchange\ rate\ has\ a\ negative\ impact\ on\ human\ development$$

3.5.2.6 Corruption perception index (CPI)

The CPI generally defines corruption as the misuse of public power for private benefit (Clark, 2017). It is expected that lower scores in the corruption perception index will reduce economic growth and human welfare. As earlier discussed, and through literature, Corruption Perception Index (CPI) was adopted as our proxy for institutional quality based on the research by Lebdioui (2019) and Sachs and Warner (1995) as revenues from resource rents has been demonstrated in the literature to lead to corruption. The introduction of the institutional quality variable helps solve the problem of endogeneity in the data. In countries where the CPI scores are higher, it implies that there is a lesser perception of corruption while countries with lower CPI scores imply there is the presence of more corruption according to Zouaoui *et al.* (2017), therefore, the following hypothesis is then proposed:

$$H_{11} - Corruption\ has\ a\ negative\ impact\ on\ economic\ growth$$

$$H_{12} - Corruption\ has\ a\ negative\ impact\ on\ human\ development$$

3.5.2.7 Gross capital formation (CAP)

Capital in economics is tangible assets including machinery and equipment used to produce goods. It is also defined as the wealth or financial strength of an individual or company or country. However, when referring to capital in economics, the term refers to factors of production used to create goods that are not themselves part of the production process. In this study, the researcher used gross capital formation to proxy capital. Gross capital formation includes spending on land improvements; plant, machinery, and equipment purchases; the construction of roads, railways, private residential dwellings, and commercial and industrial buildings. According to Barro (2000), Bulte *et al.* (2005), Lashitew *et al*. (2020) and Stijn (2006), capital serves as a key driver for both economic growth as well as Economic Diversification hence the adoption of gross capital formation as a proxy for capital**.** It is expected that a capital increase will increase economic growth and human welfare. This was adopted because of the Solow model and to revisit the evidence in the literature. Therefore, the following hypothesis is then proposed:

$$H_{13} - Capital\ formation\ has\ a\ positive\ impact\ on\ economic\ growth$$

$$H_{14} - Capital\ formation\ \ has\ a\ positive\ impact\ on\ human\ development$$

3.5.2.8 Labour force participation (LAB)

Most economic growth theories including Lucas (1988), Romer (1986) and Smith (1776), and empirical research in both developed and developing nations have shown the labour force to be one of the major drivers of growth. Asseery and Al-Sheikh (2004), Barro (1996), Chow (1987), Hamdan (2016), Harvie and Pahlavani (2007), Mansur *et al*. (2010), Tiwari (2011) and Tyler (1981) all stress the favourable influence of labour on economic growth. According to

Piazolo (1995), having a positive influence of the labour force on an economy occurs over time rather than in the short term. Labour is the amount of physical, mental, and social effort used to produce goods and services in an economy. It supplies the expertise, manpower, and service needed to turn raw materials into finished products and services.

In this study, the researcher used labour force participation to proxy labour. It is expected that an increase in labour will increase economic growth. This was adopted because of the Solow model and to revisit the evidence in the literature. According to the Solow growth hypothesis, this variable should be included in every economic growth model. However, in oil-rich nations, the bulk of the labour force is employed in non-oil industries rather than the oil industry. Most of the research on oil-rich nations such as Anaman (2004), Asseery and Al-Sheikh (2004) and Dizaji (2012) support a positive link between economic development and the labour force in the economy for both oil and non-oil sectors. Furthermore, the adoption of labour force participation as a proxy for labour has been demonstrated in the literature to be a key driver when measuring resource curse (Rahman *et al.*, 2020; World Bank, (2020).

Therefore, the following hypothesis is then proposed:

$$H_{15} - Labour\ has\ a\ positive\ impact\ on\ economic\ growth$$

$$H_{16} - Labour\ \ has\ a\ positive\ impact\ on\ human\ development$$

The variables chosen all have strong associations with economic diversification i.e., non-oil production proxied by Agricultural Sector production (AGR) demonstrated in the literature review Abogan *et al.* (2014) and Lashitew *et al.* (2020), Manufacturing Sector Production (MAN) Rodrik (2013), Service Sector Production (SER) Eichengreen and Gupta (2011) and the of measure Crude Oil Production (OPR) (Alodadi, 2016). Corruption Perception Index (CPI) was adopted as a proxy for institutional quality based on the research by Lebdioui (2019)

and Sachs and Warner (1995) as revenues from resource rents has been demonstrated in the literature to lead to corruption. According to Barro (2000), Bulte *et al*. (2005), Lashitew *et al*. (2020) and Stijn (2006), capital serves as a key driver for both economic growth as well as economic diversification hence the adoption of gross capital formation as a proxy for capital as well as the adoption of labour force participation as a proxy for labour which has also been demonstrated in the literature to be a key driver when measuring resource curse *(Rahman et al*., 2020).

3.6 Methods of data analysis

This study adopts the following methods to estimate the effect of economic diversification on the economic and human development of oil-producing middle-income countries:

3.6.1 Descriptive statistics

One of the methods economists normally use to investigate the cause-effect relationship between variables is through descriptive statistics. Thus, in this research simple numerical descriptive statistics (i.e., mean, standard deviation, minimum and maximum value) shall be employed to variables used in this thesis between 2000 and 2017.

3.6.2 Pooled ordinary least squares (OLS) estimator

The study employed the pooled Ordinary Least Squares (OLS) to examine the impact of economic diversification on the economic growth of oil-producing middle-income countries. According to Gujarati (2011), the pooled Ordinary Least Squares (OLS) model simply pools all the observations and estimates a grand regression, neglecting the cross-section and time-series nature of the data. That is the pooled OLS model, rather than testing a cross-sectional model for all countries at one point in time or testing a time series model for one country using

time series data, pools and tests all countries through time (Adeleye, 2018; Pennings *et al*., 2006).

The general equation of the pooled OLS model is stated as:

$$y_{i,t} = \alpha_i + X'_{i,t}\beta \ + \mu_{i,t} \quad (3.5)$$

Where $y_{i,t}$ is the dependent variable (which is GDP per capita growth i.e., GDPCG and HDI in both models), i is the entity (countries), t is the time, α_i $(i = 1 \dots \dots n)$ is the common y-intercept, $X_{i,t}$ is the matrix of the explanatory variables (which is LAB, CAP, AGR, MAN, SER, OPR and CPI), β is the coefficient vector of the explanatory variables and $\mu_{i,t}$ is the error term

OLS is based on five fundamental assumptions according to Kennedy (2008):

1. The first assumption states linearity, that is, the dependent variable is expressed in the equation as a linear function of a set of independent variables and includes an error term.
2. The next assumption states that exogeneity refers to the fact that the predicted value of the error term is zero and that the error term is unrelated to any independent variables.
3. Error terms have the same variance i.e., homoscedastic, and are unrelated to one another over time, which implies non-autocorrelation.
4. The independent variable's observations are not stochastic with no measurement errors.
5. According to the full rank assumption, independent variables do not have an exact linear relationship. This means there is no multi-collinearity.

If the individual impact in longitudinal data is not zero, heterogeneity (individual unique characteristics that are not captured in regressors) may affect assumptions 2 and 3. This can be linked to one another which means autocorrelation, violating assumption 3 as well. Therefore, the OLS estimator isn't the best linear estimator anymore. Panel data models offer a means to

address these issues already addressed in section 4.3. For example, random and fixed effects panel data models which observe both random and/or fixed effects within a country or time is discussed in the next section.

3.6.3 Random effect estimator

The researcher employed the random effect to estimate the impact of economic diversification on the economic and human development of middle-income oil-producing countries. A random model assumes the country influence (heterogeneity) is not associated with a regressor; therefore, it calculates country-specific error variance (or times). This $\mu_{i,t}$ is a particular random heterogeneity or part of the composite error term. As a result, a random effect model is also known as an error component model. Regressor intercepts and slopes are the same throughout the country. The difference between countries (or time periods), not their intercepts, depends on their individual specific errors. The rationale behind the random effects model is that, unlike the fixed effects model, the variation across entities is assumed to be random and uncorrelated with the predictor or independent variables included in the model. Thus, the equation for the random-effects model is stated as:

$$y_{i,t} = \alpha_i + X_{i,t}\beta + \mu_i + \varepsilon_{i,t} \quad (3.6)$$

Where y_{it} is the dependent variable (which is GDP per capita growth i.e GDPCG and HDI) where i are the entity (countries), t is the time, α_i $(i = 1 \dots \dots n)$ is the unknown intercept for each entity, $X_{i,t}$ are the explanatory variables (which are LAB, CAP, AGR, MAN, SER, OPR and CPI), β is the coefficient of the explanatory variables, μ_i is the cross-sectional or individual error component term or between-entity error term, $\varepsilon_{i,t}$ is the combined time-series and cross-sectional error term or within-entity error term. The error terms μ_i and $\varepsilon_{i,t}$ both capture every other possible omitted factors and which are grouped at the country level and hence can be randomly serially correlated within the countries.

3.6.4 Fixed effect estimator

The researcher also adopts the fixed effect model to estimate the effect of economic diversification on the economic and human development of middle-income oil-producing countries. Fixed effect model is a feasible generalised least squares technique that is asymptotically more efficient than Pooled OLS when time constant attributes are present. According to Gujarati (2011), the fixed-effect model pools all the observation, but allows each cross-section unit (i.e., each country) to have its intercept. The equation for the fixed effects model is stated as:

$$y_{it} = \alpha_i + X_{i.t}\beta + \mu_{i.t} \quad (3.7)$$

Where α_i $(i = 1 \dots \dots n)$ is the unknown intercept for each entity, y_{it} is the dependent variable (which is GDP per capita growth i.e., GDPCG and HDI) where i are the entity (countries), t is the time, X_{it} are the explanatory variables (which is LAB, CAP, AGR, MAN, SER, OPR and CPI), β is the coefficients for the explanatory variables and μ is the error term.

A paradigm for a fixed group effect explores intercepts in-country differences with the same slopes and continuous country-wide variations. Because the time-invariant for a particular effect is considered part of an intercept, μ_{it} might be associated with other regressors, so that OLS assumption 2 is not violated.

3.6.5 Hausman test

The researcher used the Hausman test for fixed effect and random effect to determine which of the models to employ to examine the effect of economic diversification on the economic growth of oil-producing middle-income countries. The rationale behind the Hausman test is to decide whether to use the fixed or random effects for the analysis. It tests whether the unique errors ($\mu_{i,t}$) are correlated with the regressors, the null hypothesis is they are not. The Hausman null hypothesis states that the null hypothesis should be rejected if the p-value is statistically

significant at a 5 per cent level and therefore adopt the fixed effect estimator to run the analysis otherwise, use the random effect estimator (Greene, 2005). The Hausman test provides the basis for discerning between these two models (i.e., fixed, and random effects). The null and alternative hypotheses are expressed as:

H_0: Random effects are independent of the explanatory variables

H_1: Random effects are not independent of the explanatory variables.

3.6.6 Generalized method of moments (GMM)

The Generalised Method of Moment (GMM) is a method for estimating parameters in statistical models. It uses moment conditions that are functions of the model parameters and the data, such that their expectation is zero at the parameters' true value. It is a dynamic panel data estimator, and it controls for the endogeneity of the lagged dependent variable in dynamic panel data when there is a correlation between the explanatory variables and the error term in that model. The GMM approach is used to approximate this dynamic panel data model. This decision was made for a variety of reasons. First and foremost, the GMM framework is adaptable enough to fit our balanced panel. Second, it enables the researcher to work with country-specific fixed effects. Third, it allows the researcher to deal with the possible endogeneity among both explanatory factors through using internal tools (i.e., instruments based on lagged values of those variables). This is significant because endogeneity problems tend to be non-trivial considerations in this context.

Furthermore, omitted variable issues are expected to exist. For dynamic panel data, there are two different GMM estimator approaches, difference GMM proposed by Arellano and Bond (1991) and system GMM proposed by Arellano and Bover (1995) and Blundell and Bond

(1998). Difference GMM is a subsequent estimation that occurs after the data has been first differentiated to exclude fixed results. System GMM, on the other hand, improves difference GMM by calculating concurrently in disparities and thresholds where the two equations are instrumented (Roodman, 2009). One benefit of GMM is the collection of internal instruments that are used and designed based on previous measurements of the instrumented variables

The basic equation in general, the GMM panel estimator defines a dynamic panel model in first differences and takes advantage of the moment conditions described above. As a result, the model's lagged (three-time intervals or more) levels of endogenous and weakly endogenous variables become useful tools for tackling endogeneity. Consistent coefficient estimates are given by the difference GMM panel estimator. By changing from difference to system GMM, where the total count is normally quadratic in T, the story looks the same from the perspective of instrument count. However, as compared to the first difference GMM, the system GMM, an expanded from difference GMM estimator, has lower finite sample bias and higher accuracy (Blundell *et al.*, 2001).

The existence of endogeneity and reverse causality is a popular concern in previous literature on economic diversification and economic and human development (Afonso & Alegre, 2011; Ghosh & Gregoriou, 2007). Recent analytical research has used the GMM methodology to address the potential endogeneity of the explanatory variables in the panel data (Afonso & Alegre, 2011; Christie, 2014; Ormaechea & Morozumi, 2013). Although the GMM method produces reliable estimators, there can be finite sampling biases on the original difference GMM estimators developed by (Arellano & Bond, 1991; Holtz-Eakin *et al.*, 1988). The single equation estimator suffers from the problem of weak instruments when the panel's time-series dimension is relatively limited. To put it another way, there is a poor link between the

regressors and the instruments. Because of this problem, the approximate coefficients have a low degree of precision (Staiger *et al*., 1997). The panel GMM method estimator proposed by (Arellano and Bover (1995) and Blundell and Bond (1998), which drastically reduces the imprecision associated with the single equation estimator, should solve this problem.

For the levels equation, the normal instruments, and all others unique to the differenced equation are given zero values, whereas additional instruments are introduced for the levels equation and are set to zero for the differenced results. The underlying premise behind these modern level instruments is that historical adjustments are unrelated to current level failures, which include fixed consequences. Since the results from the pooled ordinary least squares (OLS) within a dynamic panel data model is inconsistent and biased, some problems which may arise include unobserved heterogeneity, endogeneity problems, problems from autocorrelation as well as persistence from dependent variable by adopting the GMM estimator (Bergougui & Murshed, 2020).

This study adopts the system GMM which was proposed by Arellano and Bover (1995) and Blundell and Bond (1998) to catch the endogeneity involved in the simultaneous determination of the explanatory variables in the literature. Moreover, the two-step system GMM was adopted and in its estimations, the Windmeijer correction was applied to reduce any bias from the data and potential standard errors (Windmeijer, 2005). The two-step system GMM is more effective than using the one-step as it shows more robust conclusions to problems of weak instruments in the model. This is because the system GMM has some advantages over the difference GMM. The system GMM controls endogeneity by introducing more instruments to dramatically improve efficiency of the estimator, it transforms the instrument to make them uncorrelated (i.e., endogenous) with the fixed effects. It builds a system of two equations:

- the first equation is the original equation, and

- the second is the transformed equation.

It uses orthogonal deviations. That is instead of subtracting the previous observation from the contemporaneous one, it subtracts the average of all future available observations of the variable. Meaning that no matter how many gaps you have in your data, such is computable for all observations except the last for each individual observation, so it minimizes data loss. Roodman advises that when using GMM dynamic panel methods the number of instruments should be reported and it should be remembered that including too many instruments can cause the endogenous variables to be overfitted and, therefore, fail to remove their endogenous components (Roodman, 2006; 2009). Too many instruments also weaken the power of the Hansen test for instrument validity.

The general or simple equation of the dynamic panel data model of the GMM type of model is stated as:

$$y_{(i,t)} = \beta_0 + \beta_1 y_{(i,t-1)} + \beta_2 X_{(i,t)} + \epsilon_{(i,t)} \quad (3.8)$$

Where y is the dependent variable, the subscript "t" represents the year periods, whereas i represents the country, y is the dependent variable, that is, GDP per capita growth (GDPCG), $y_{(i,t-1)}$ is the lag of the dependent variable, while X represents the set of the explanatory variables (LAB, CAP, AGR, MAN, SER, OPR, EXCR and CPI), ϵ represents the error term. Thus:

$$GDPCG_{i,t} = \beta_0 GDPCG_{i,t-1} + \beta_1 \mathrm{LAB}_{i,t} + \beta_2 CAP_{i,t} + \beta_3 AGR_{i,t} + \beta_4 MAN_{i,t} + \beta_5 SER_{i,t} + \beta_6 OPR_{i,t} + \beta_7 EXCR_{i,t} + \beta_8 CPI_{i,t} + \mu_{i,t} \quad (3.9)$$

Where GDPCG is the GDP per capita growth, $GDPCG_{i,t-1}$ is the lag of GDP per capita growth, LAB is the labour force participation, CAP is the gross capital formation, AGR is the agricultural sector production (% of GDP), MAN is the manufacturing sector production (%

of GDP), SER is the services sector production (% of GDP), OPR is oil production (% of GDP), EXCR is the official exchange rate (US Dollars), CPI is the corruption perception index, and $\mu_{i,t}$ is the Error Term.

This study performs a series of specification checks to ensure the feasibility of this system GMM method in the sense of the thesis. The Arellano-Bond test is the first. The Arellano and Bond estimator's accuracy is predicated on the fact that the errors are not serially associated. As a result, it is important to monitor for the existence of serial correlation. As a result, first-order correlation but not second-order correlation should exist (Roodman, 2009). The second is the Hansen over-identification measure, which measures the general validity of instruments in the use of the GMM technique. The null hypothesis is that the instruments are valid and in this first differentiated equal, they are not associated with errors (Roodman, 2009).

3.6.7 Generalized linear model (GLM)

The choice of estimation strategy is critical to extract economically useful estimates from our defined models. The replaced dependent variable, i.e., HDI is a factional response variable (or a narrow range variable) since it is bounded between zero and one. The variable's bounded existence, as well as the probability of observing values at the limits, raises important functional structure and inference questions. The initial variable, which was bounded by 0 and 1, has now been translated to the real line. While OLS can now be used to match this model, this does not guarantee that the expected values will fall within the unit interval. For instance, the transition cannot be applied to experiments with a dependent variable of 0 or 1; the consequence will be missed values, and those observations will be removed from the estimation sample.

We will sacrifice degrees of freedom if we use this method since our sample includes values of 1 for the dependent variable. Also, when we use OLS, we make the mistake of assuming the dependent variable is normal, which can lead to inaccurate calculation results and assumptions. Some OLS assumptions can also be broken. For instance, we may be dealing with non-constant volatility for the dependent variable's values, and the error terms aren't always usually distributed (Hazel, 2013; Papke & Wooldridge, 1996; Ramalho *et al*., 2011).

Another choice is to use the Tobit model. However, Ramalho *et al.* (2011) argue that while a Tobit model is suitable for describing censored data in the interval (0,1), applying it to data described only in that interval is difficult to explain. They suggest that findings at the fractional variable's limits are a natural outcome, not a result of censoring. Furthermore, they contend that the Tobit model has very strict assumptions, requiring normality and homoskedasticity of the dependent variable before censoring.

Given the above reasons, Papke and Wooldridge (1996) propose that using GLM is a better option for estimating bounded variables between 0 and 1. The Generalized Least Squares regression is a versatile generalisation of the Ordinary Least Squares regression. It extends linear regressions by allowing the linear model to be linked to the response variable with a relation function and the magnitude of the variance of each calculation to be a function of its expected value. These versions are made up of three fundamental components. The first is an exponentially distributed probability distribution. The second is a linear indicator with the formula $\eta = X\beta$. The third is a connecting function g with the property $E(Y) = g - 1(\eta)$. Since the dependent variable HDI has values between 0 and 1, GLM is preferred over other scales, including GMM, which was used in the chapter. The GLM with the ‘binomial' family and the ‘logit' relation function is used to perform logistic regression, which is intended to

describe the dependent variable that is limited between 0 and 1 (Hilbe, 2011). Considering the above, we approximate our models using GLM, as recommended by Papke and Wooldridge (1996) and perform robustness tests using OLS. We use strongly correlated variables in alternative specifications to resolve the problem of high collinearity among some of our explanatory variables, thereby mitigating concerns about multi-collinearity.

In summary, the main model used for this thesis is the GMM for economic growth and the GLM for Human development i.e., HDI. This is a methodological contribution to the economic diversification debate as no known work has used these methods i.e., GLM to measure HDI to find out what the impact of economic diversification is on economic and human development.

Chapter 4

RESULTS AND DISCUSSION FOR ECONOMIC GROWTH

4 Results and discussion for economic growth

4.1 Introduction

This chapter focuses on the results and discussion which have been obtained for the oil-producing middle-income. It begins with pooled OLS, fixed and random effects. The Hausman test is then carried out to determine what type of effects does the data exhibit. The generalised method of moments (GMM) is then used to assess the impact of economic diversification on economic growth in oil-producing middle-income countries. Thus, this chapter is subdivided into three main sections: data analysis, discussion of results and then the summary of the results.

4.2 Data analysis

4.2.1 Descriptive statistics

The descriptive statistics show and explain the characteristics of each variable in the dataset. The result of the descriptive statistics for economic diversification on economic growth in oil-producing countries with all the variables is presented in Table ***4.1*** below:

Table 4.1: Descriptive statistics for economic growth

Variable	Mean	Std. Dev.	Min	Max
GDPCG	3.59	7.89	-62.38	121.78
LAB	63.27	10.87	43.64	82.76
CAP	25.72	8.56	9.34	58.15
AGR	10.46	6.46	1.85	36.97
MAN	15.62	8.18	0.91	50.04
SER	47.50	8.62	10.57	65.08
OPR	10.77	13.91	0.01	66.71
EXCR	2.18	2.87	1.2E-05	21.61
CPI	12.87	14.58	1.00	52.00

4.2.2 Correlation matrix

The result of the correlation matrix for all the variables is presented in Table ***4.2*** below. The correlation matrix between economic growth (i.e., GDPCG) and the other variables for oil-producing countries middle-income countries shows the correlation coefficient between every two variables in the model. As shown in the matrix below, the correlation coefficient between a variable and itself is one. The correlation matrix is used to test the data for multicollinearity (i.e., variation in one explanatory variable can be completely explained by movements in another explanatory variable) which could give rise to biased estimates. This is ruled out if the coefficient of correlation between any two explanatory variables is not equal to one or very close to one, that is, 0.9 and above.

Table 4.2: Correlation matrix for economic growth

Variable	GDPCG	LAB	CAP	AGR	MAN	SER	OPR	EXCR	CPI
GDPCG	1.00								
LAB	0.10	1.00							
CAP	0.25*	0.00	1.00						
AGR	0.10	-0.24*	0.09	1.00					
MAN	-0.02	-0.00	0.21*	0.04	1.00				
SER	-0.39*	0.01	-0.31*	-0.29*	0.02	1.00			
OPR	0.22	-0.12	0.11	-0.21*	-0.32	-0.57	1.00		
EXCR	-0.13	-0.03	0.10*	-0.06*	-0.22	-0.00*	0.15	1.00	
CPI	-0.18	0.02	0.03	-0.08	-0.04	0.27*	-0.24	0.14	1.00

Note: *GDPCG = GDP per capita growth; LAB = Labour; CAP = Capital; AGR = Agricultural sector production; MAN = Manufacturing sector production; SER = Service sector production; OPR = Crude oil production; EXCR= Official exchange rate; CPI = Corruption perception index.*

As shown in Table ***4.2*** above, none of the variables was perfectly correlated with each other, that is, equal to one or very close to one, suggesting that there is no multi-collinearity in the model. The table shows that there is a negative correlation between two of the three variables adopted to measure economic diversification, i.e., the manufacturing sector and the services sector. The negative correlation between service sector production and economic growth in

middle-income oil-producing countries indicates possible neglect of the development of the non-oil sectors for crude oil production lee (Dutt & Lee, 1993).

The negative correlation between manufacturing and economic growth further agrees with the finding from Afolabi and Laseinde (2019) yet they conclude that it is a key driver for economic growth in middle-income countries. However, we find that the agricultural sector is positively correlated with economic growth similar correlation in the study by Matsuyama (1992).

It is also observed as expected the impact of rent-seeking, corruption to have an inverse relationship with economic growth. As shown through the literature, corruption impedes economic growth and this finding also support Amin *et al.* (2013) who find that corruption impedes economic development in their research. Furthermore, the negative correlation between exchange rate and economic growth, which meets a priori expectation suggesting that the volatility negatively brings about macroeconomic stability, which in turn affects crude oil prices for these oil-producing countries like findings from (Ahmad *et al.*, 2013). This was also identified as a key component that results in resource curse hence negatively impacting economic diversification.

However, the positive correlation between crude oil production and economic growth in middle-income oil-producing countries met a priori expectations. However, labour and capital all have a positive correlation with economic growth in middle-income oil-producing countries in line with the a priori expectations that more investments into other sectors would lead to greater economic growth among oil-producing middle-income countries.

4.2.3 Pooled OLS, fixed and random effects models

Table ***4.3*** presents the results of the pooled OLS, fixed effect model and random effect model. This will enable the researcher to find out the effect of economic diversification on economic growth in oil-producing middle-income countries.

Table 4.3: Panel regression, fixed and random effect results for GDPCG model

Variable	Pooled OLS Result	Fixed Effect	Random Effect
Constant	8.0822**	3.7613***	3.7431***
	(3.4203)	(0.2068)	(0.2788)
LAB	0.0471**	-0.3487	-0.5470**
	(0.0207)	(0.2665)	(0.2672)
CAP	0.1123***	0.2416***	0.2343***
	(0.0270)	(0.0539)	(0.0554)
AGR	0.0141	-0.4224**	-0.5889***
	(0.0447)	(0.1880)	(0.1909)
MAN	-0.0549*	-0.2876*	0.2296
	(0.0303)	(0.1483)	(0.1514)
SER	-0.1817***	-0.4840***	-0.5092***
	(0.0409)	(0.1115)	(0.1141)
OPR	0.0093	0.0354	-0.0023
	(0.0275)	(0.0800)	(0.0818)
EXCR	-0.2727***	-1.7237***	-1.4417***
	(0.0756)	(0.3110)	(0.2815)
CPI	-0.0281*	0.0025	0.0038
	(0.0147)	(0.0247)	(0.0254)
F-Cal	15.58	12.07	
	(0.00)	(0.00)	
R^2	0.21	0.17	0.18
Hausman Test		3782.54	
		(0.00)	

Note: The dependent variable is gross domestic product per capita income growth; LAB is the labour force participation; CAP is the gross capital formation; AGR represents agricultural sector production; MAN is the manufacturing sector production and SER is the services sector production. OPR represents crude oil production, EXCR represents the official exchange rate while CPI is the corruption perception index. The figures in parenthesis are the standard errors. ***** *= 0.01; ** = 0.05; * = 0.1.*

4.2.4 Pooled OLS

The pooled OLS results examining the effect of economic diversification on economic growth for the sample of 30 middle-income oil-producing countries presented in Table ***4.3*** show that the coefficient of agriculture is a positive and significant predictor of economic growth in middle-income oil-producing countries at the 1% level. This agrees with the findings of Khan *et al*. (2020) who also found a positive and significant relationship between agriculture and economic growth but contradict the findings of (Verter, 2016). However, the coefficient of

manufacturing production is negative and insignificant and agrees with the finding of Su and Yao (2017) who found a negative impact of the contribution of manufacturing to economic growth. It is also observed that the coefficients for the service sector, exchange rate and corruption are all insignificant predictors of economic growth while oil production is a positive and significant predictor of economic growth. In the next section, the fixed effects results are explained.

4.2.5 Fixed effects model

The fixed effect (FE) estimator increases the explanatory power of the model. While examining the effect of economic diversification on economic growth in middle-income oil-producing countries presented in Table ***4.3***, it shows that manufacturing production is a negative significant predictor of economic growth in middle-income oil-producing countries. This indicator shows that the neglect of this sector by oil-producing countries who in most cases are dependent on oil tends to have the Dutch disease and supports evidence from Corden and Neary (1982) who found out that the manufacturing sector had a negative impact on economic growth. There is also a negative and insignificant impact of other sectors to proxy economic diversification i.e., agriculture and services sector. Also, interesting to note is that when looked across oil-producing middle-income countries, there is an insignificant effect of oil production on economic growth which goes against the findings of (Abogan *et al*., 2014). Perhaps the focus on the oil sector which leads to the Dutch disease points to the attention of stakeholders that more growth can be achieved in other non-oil sectors as identified by (Ross, 2019; Ude *et al.*, 2012).

4.2.6 Hausman test

The result of the Hausman test as presented in Table ***4.3*** and based on Greene (2003), since the p-value is 0.00, the null hypothesis is rejected, and the fixed effects estimator is adopted to analyse the model in middle-income oil-producing countries.

4.2.7 Generalized method of moment (GMM)

The GMM regression results examining the effect of non-oil production on economic growth in middle-income oil-producing countries in a dynamic model setting are presented in below**:**

Table 4.4 below:

Table 4.4: Two-Step System GMM results for GDPCG model

Variables	Coefficients
GDPCG L1	0.7872***
	(0.0960)
LAB	0.1174
	(0.2091)
CAP	0.2592*
	(0.1279)
AGR	-0.3524
	(0.2876)
MAN	-0.1502
	(0.1452)
SER	-0.6065***
	(0.1043)
OPR	0.0232
	(0.0828)
EXCR	-0.7260*
	(0.3646)
CPI	-0.0116
	(0.0221)
CONS	0.8300**
	(0.4040)
F-Cal	57.78
No. of Observations	432
No. of Groups	30
No. of Instruments	12
AR (1)	0.002
AR (2)	0.246
Sargan Test	0.105
Hansen Test	0.576

Note: The dependent variable is the lagged value gross domestic product per capita income growth levels; LAB is the labour force participation; CAP is the gross capital formation; AGR represents agricultural Sector production; MAN is the manufacturing sector production and SER is the services sector production; OPR represents crude oil production; EXCR represents the official exchange rate while CPI is the corruption

perception index. AR 1 & 2 represents the p values for the Arellano-Bond test for first and second-order serial correlation. The figures in parenthesis are the standard errors. ***** *= 0.01; ** = 0.05; * = 0.1.*

The effect of economic diversification on economic growth is evaluated within the framework of a two-step GMM estimator above. From below:

Table 4.4, it was observed that the model has a good fit as the F-statistic is statistically significant across all specifications demonstrating the joint significance of the explanatory variables. To interpret the GMM regression coefficients, it is important to verify the behaviour of the residual terms as well as the instruments used (Roodman, 2009). For the statistical inference of the estimated coefficients to be valid, the following must be satisfied:

- Rejection of the null hypothesis of non-autocorrelation for the AR (1) test.
- Non-rejection of the null hypothesis of non-autocorrelation for the AR (2) test.
- Non-rejection of the null hypothesis of valid instruments for the Sargan's/Hansen's test.

A violation of these assumptions may suggest evidence of specification bias. Based on the results, the model passes these entire tests. Also, the study found that the coefficients of agricultural service production (AGR), manufacturing service production (MAN) and service sector production (SER) have negative signs but only service sector production is statistically significant at 1% in middle-income oil-producing countries also supporting the Dutch disease phenomena and suggesting neglect of economic diversification in oil-producing middle-income countries. Similar to the fixed effects model results presented in Table ***4.3***, the impact of oil production on economic growth is statistically insignificant. This implies that oil production does not create economic growth for these countries which does not meet the a priori expectation. The results also reveal an insignificant contribution of other non-oil sectors

like the agricultural and manufacturing sectors to economic growth in oil-producing middle-income countries.

4.3 Discussion of findings from two-step GMM

4.3.1 Agricultural sector production and economic growth

The study reveals that the effect of agricultural sector production (AGR) on economic growth in middle-income countries is negative (-0.3524) and is not statistically significant as shown in below:

Table **4.4**. This suggests that an increase in the share of agricultural production in GDP does not appear to create economic growth. The statistically insignificance of the agricultural sector production (AGR) on the economic growth of this study does not meet a priori expectation and supports previous works such as with Safdar *et al.* (2012) who have found that agricultural sector production (AGR) does not positively affect the economic growth but seems to agree with Ekine and Onu (2018), Ellah and Emeh (2017) and Matthew and Mordecai (2016), who found agricultural sector production (AGR) to have a positive impact on economic growth.

From this finding, the resource curse theory seems to be supported in the case of economic diversification which indicates that mineral and fuel abundance in middle-income oil-producing countries tends to generate negative developmental outcomes, including the poor economic performance of non-oil sectors (Humphreys *et al*., 2007). They also concluded that it leads to slower economic growth and high levels of corruption discussed further in this section. However, this implication of the insignificant effect of agricultural sector production (AGR) on economic growth in middle-income oil-producing countries suggests that this may have occurred because of the neglect of the non-oil sectors including the agricultural sector for the oil sector, leading to decreased economic diversification which could contribute positively to economic development in most of the oil-producing middle-income countries.

4.3.2 Manufacturing sector production and economic growth

below:

Table 4.4 reveals that the effect of manufacturing sector production (MAN) on economic growth in middle-income countries is negative (-0.1502) and is not statistically significant. This suggests that an increase in the share of manufacturing production in GDP does not appear to create economic growth. From this finding, the a priori expectation which states that the manufacturing sector positively impacts economic growth is not met. The statistically insignificant relationship between manufacturing sector production (MAN) and economic growth of this study seems to corroborate with Su and Yao (2017) who concluded that although manufacturing plays a major role as a key engine for the economic growth for middle-income economies, it has a negative relationship with economic growth.

In contrast to this finding, previous works such as Attiah (2019), Rodrik (2013) and Szirmai and Verspagen (2015) found manufacturing sector production (MAN) to have a positive contribution on economic growth. Moving on from the results of the agricultural sector production, it is observed that a similar phenomenon through the same transmission mechanism of the resource curse is found for these oil-producing nations. This implication of the insignificant effect of manufacturing sector production on economic growth in middle-income oil-producing countries suggests the neglect of the full potential of this sector to focus on oil production for these countries. In the literature review, Alsharif (2017) found out the poor performance of manufacturing exports was obtained from the resource boom. This further indicates the presence of the Dutch disease effect which says a boom in the oil sector leads to neglect of other sectors, thus the resource curse in oil-producing middle-income countries (Corden & Neary, 1982).

4.3.3 Service sector production and economic growth

The study reveals that the effect of service sector production (SER) on economic growth in middle-income countries is negative (-0.6065) and is statistically significant at a 5 per cent level as shown in below:

Table 4.4. This suggests that an increase in the share of services production in GDP does not also appear to create economic growth just like the agriculture and manufacturing sectors. The statistical insignificant impact of service sector production (SER) on the economic growth of this study also for economic diversification did not meet the a priori expectation. This finding seems to support the research by Dutt and Lee (1993) who found that the services sector majorly has a negative impact on economic growth. Just like the other non-oil sectors, this finding indicates the presence of the resource curse. However, it does not seem to support previous work such as Attiah (2019), who found service sector production (SER) to be positively related to economic growth. As demonstrated for other non-oil sectors the neglect of this sector impacts these countries and through the transmission mechanism of the Dutch disease, it supports the resource curse theory. Furthermore, the negative relationship between service sector and economic growth can be explained by reallocation of labour from non-oil sectors to the oil sector.

4.3.4 Crude oil production and economic growth

below:

Table 4.4 reveals that the effect of crude oil production on economic growth in middle-income countries is positive (0.0232) but statistically insignificant. This suggests that an increase in the share of oil production in GDP does not appear to create economic growth in middle-income countries. This positive effect of crude oil production (OPR) on the economic growth of this study supports previous works such as Adesola and Dada (2014) and Nwoba and Abah

(2017), who found crude oil production (OPR) to be positively related to economic growth. This finding supports the resource curse theory and agrees with Sachs and Warner (1997, 2001) who found a relationship that was significantly negative between dependence on natural resources and the growth of GDP per capita. However, if we look at economic diversification, this finding which indicates an insignificant positive impact, suggests that the neglected non-oil sectors present a great opportunity for more economic growth and thus economic development. An investment into other non-oil sectors for economic diversification would lead to more economic growth and this is urgently needed for oil-producing middle-income countries (Lashitew *et al.,* 2020). The implication of the insignificant effect of crude oil production (OPR) on economic growth in middle-income oil-producing countries could be that income from oil goes into the hands of the governments but is not being used effectively to achieve better economic growth which could also suggest either poor governance or rent-seeking behaviour or corruption which is presented in further in this research.

4.3.5 Exchange rate and economic growth

The findings from below:

Table 4.4 reveal that the effect of the exchange rate (EXCR) on economic growth for oil-producing middle-income countries is negative (-0.7260) and is statistically significant. This finding supports the a priori expectation that the exchange rate on economic growth is negative. This was earlier expressed by (Gelb & Grasmann, 2010) that volatility is one source of the negative relationship between resource dependency and economic development. This finding also seems to support that finding by Alagidede and Ibrahim, (2016) that exchange rate does not contribute to economic growth. Furthermore, (Van der Ploeg & Poelhekke, 2009) broke down the reliance on natural resources into a favourable direct economic impact that they conclude was positive and has an indirect economic effect through the effects of volatility which they concluded was negative and much larger. However, findings from research such as

Musa *et al*. (2019) seems to be the opposite, and the author suggests that crude oil price and the exchange rate positively impacts economic growth. Moreover, a positive impact was also found where the exchange rate significantly impacted GDP in the study by (Habib *et al*., 2017). Likewise, Lee and Yue (2017), also researched this and found that exchange rates using USD directly affected GDP.

The influential research by Corden and Neary (1982) shows that the exchange rate volatility impacts economic growth and Cavalcanti *et al*. (2015) also found in their study which analyses the relationship between growth and commodity terms of trade volatility to be negative. The Dutch disease phenomenon has been shown to lead to neglect of other sectors that are not the natural resource sector and a major reason for this is the appreciation in the exchange rate which then turns around and impacts economic growth in an unbalanced way. We can conclude, although oil production could be a blessing for these middle-income oil-producing nations, it impacts through the revenues gotten from its, if not managed effectively by governments can be felt for decades. Hence the impact of corruption is discussed in the next section.

4.3.6 Corruption and economic growth

The study reveals that the effect of corruption (CPI) on economic growth in middle-income oil-producing countries is negative (-0.0116) and is statistically insignificant as shown in below:

Table 4.4. It was expected that lower scores in the corruption perception index will reduce economic growth. This finding agrees with the a priori expectation that higher corruption has a negative impact on economic growth. In countries where the CPI scores are higher, it implies that there is less corruption while countries with lower CPI scores imply there is a presence of more corruption according to (Zouaoui *et al.*, 2017). With the negative impact of the corruption

variable, which is our institutional quality variable, we can imply that for oil-producing middle-income, the score of the perceived corruption was significantly lower indicating the presence of more corruption also supporting the rent-seeking behaviour which suggests the presence of the resource curse theory among these countries (Corden & Neary, 1982). Furthermore, some studies have found out that corruption i.e. institutional variable has a negative impact on economic growth Cieslik & Goczek, (2018); D'Agostino *et al.*, (2016); Grundler and Potrafke, (2019); Swaleheen, (2011). Other similar studies such as Amin *et al*. (2013) and Boussalham (2018), also found corruption (CPI) to be negatively related to economic growth.

4.3.7 Labour and economic growth

Based on the system GMM result shown in below:

Table 4.4, the study reveals that the effect of labour (LAB) on economic growth in middle-income countries is positive (0.1174) but is not statistically significant. This suggests that an increase in labour force participation does not create economic growth in oil-producing middle-income countries. This finding does not support the a priori expectation that labour force participation positively impacts economic growth. The positive coefficient is supportive of the previous works such as Kenny (2019), Oburota and Ifere (2017), Tkachenko and Mosiychuk (2014) and Zulu and Banda (2015), who find that labour force participation (LAB) positively impacted economic growth of countries, however, it does not support the findings of Yakubu *et al.* (2020) who also discovered a negative impact of labour force participation on economic growth. Consequently, natural resource resources wealth can be produced by fuels and minerals without strong links with other industries and without much domestic labour force involvement (Humphreys *et al*., 2007).

According to Gylfason (2011), labour force participation in middle-income countries is in large part concentrated on low skilled labour force (mainly expatriate labour force). However, this

suggests that the implication of the positive relationship between labour force participation (LAB) and economic growth in middle-income countries presents middle-income countries the opportunity to investigate sectors that could lead to a more significant contribution of the labour force to economic development. The oil industry is capital-intensive and has more potential for economic growth, relative to low-skill labour-intensive industries which have lower potential. This means as more population joins economic activities, they are likely to join low-skilled labour-intensive industries which may not significantly improve or be linked to higher economic growth. (Chigbu *et al*., 2015; Kenny, 2019; Nikoloski *et al*., 2015; Nweke *et al*., 2017; Oburota & Ifere, 2017).

4.3.8 Capital and economic growth

below:

Table 4.4 reveals that the effect of capital (CAP) on economic growth in middle-income countries is positive (0.2592) and is statistically significant at a 10 per cent level. This suggests that an increase in the gross capital formation appears to create economic growth in oil-producing middle-income countries. The finding of this study supports previous works such as Chigbu *et al.,* (2015), Kenny (2019), Nikoloski *et al.* (2015), Nweke *et al.* (2017) and Oburota and Ifere (2017) who found capital (CAP) to be positively related to economic growth. In contrast to these findings, this study seems not to agree with Ahmad *et al*. (2013) and Amin *et al.* (2013) who have found that capital negatively affected the economic growth of countries. This finding agrees with the a priori expectation and suggests that gross capital formation leads to economic growth in oil-producing countries and hence supports the economic theory.

4.4 Summary of the findings

This chapter has focused on investigating the impact of economic diversification on economic growth in oil-dependent middle-income countries from 2000 - 2017. The analysis assessed how

economic diversification, i.e., the non-oil sectors affect economic growth in oil-producing middle-income countries. Further analysis in this chapter examined the impact of oil production on economic growth for the oil-producing middle-income countries.

The analysis used pooled OLS, fixed and random effects and used the Hausman test to determine whether the model showed fixed or random effects. It was observed that fixed effects explain the model for economic growth. Furthermore, the two-system generalised method of moments (GMM) with Windmeijer finite sample corrections was adopted to estimate the model in the dynamic form to check the impact of economic diversification on economic growth in oil-producing middle-income countries.

The chapter found that the effect of economic diversification on economic growth measured by GDP per capita growth rate in oil-producing middle-income countries was negative and insignificant except for the services sector which was negative but significant and thus shows that economic diversification does not appear to lead to economic growth.

The results which were obtained in this chapter indicated that the services sector production had a negative but significant impact on economic growth and hence agreed with the resource curse theory which shows that mineral and fuel abundance in middle-income oil-producing countries tends to generate negative developmental outcomes, including the poor economic performance of non-oil sectors. A similar pattern of results was obtained for both the manufacturing and agriculture sectors although insignificant thus suggesting that for all three sectors representing economic diversification, the impact was negative and hence does not contribute to economic growth. This shows that these sectors among these oil-producing middle-income countries have not received great attention to ensure more sustainable economic growth.

The results from this chapter also reflected that oil production has a statistically insignificant impact on economic growth and met the a priori expectation. However, if we look at oil production, this finding showed an insignificant positive impact and thus presents the neglected non-oil sectors as a great opportunity for more economic growth and thus economic development in oil-producing middle-income countries. The results from the exchange rate volatility which was identified to be a contributing fact to the Dutch disease was negative on economic growth. This result further validated the Dutch disease phenomenon and hence the resource curse. However, it was observed that the variable for institutional quality, i.e., corruption perception index, was negative and indicated the presence of corruption which suggest rent-seeking. This result also upholds the resource curse theory.

The results which were obtained for the capital, i.e., the gross capital formation was positive in both the static and dynamic models and thus have a positive and significant impact on economic growth. This result is consistent with economic theory i.e., Solow's growth model. From the results obtained, the oil-producing middle-income countries should put more focus on achieving economic diversification and relying less on oil production. Sectors such as the agricultural, services and manufacturing sectors should particularly be focused on as the prices of oil do not have much bearing on them. The enhancement of economic diversification should become a pressing focus for these oil-producing middle-income countries.

The conclusions from this research may therefore be of considerable value to the policymakers of these countries while they develop their longer-term economic strategies. Furthermore, since these countries fall in the middle-income group as classified by the World Bank and with rising inequality, the governments of these countries, policymakers and other stakeholders should ensure more economic diversification which would achieve a more sustainable economic growth long-term should be the key policy initiative as they plan the future for their countries.

Chapter 5

RESULTS AND DISCUSSION FOR HUMAN DEVELOPMENT

5 Results and discussion for human development

5.1 Introduction

This chapter covers the analysis of the empirical result on the impact of economic diversification on human development in oil-producing middle-income countries and its interpretation. As shown through literature, the use of GDP to measure economic progress has come under criticism Lashitew *et al*. (2020), Sarracino 2013 and Stiglitz *et al*. (2010), and the use of a more welfare approach rather than what is produced in a country in each country was necessary. This chapter adopts the approach of replacing HDI as the dependent variable in the model for economic growth to measure human development making use of the generalised linear method (GLM). This chapter compares results to the previous chapter to find out if there are different conclusions from replacing the dependent variable.

It begins with pooled OLS, fixed and random effects. The Hausman is then carried out to determine what type of effects does the data exhibit. The generalised linear model is then analysed to assess the impact of economic diversification on human development in oil-producing middle-income countries. Thus, this chapter is subdivided into three main sections: data analysis, discussion of results and then the summary of the results.

5.2 Data analysis

5.2.1 Descriptive statistics

The result of the descriptive statistics for economic diversification on human development in oil-producing countries with all the variables for model 3.4 in the methodology section is presented in Table ***5.1*** below:

Table 5.1: Descriptive statistics for human development

Variable	Mean	Std. Dev.	Min	Max
HDI	0.68	0.08	0.39	0.83
LAB	63.27	10.87	43.64	82.76
CAP	10.46	8.56	9.34	58.15
AGR	15.62	6.46	1.85	36.97
MAN	15.62	15.62	0.91	50.04
SER	47.50	8.62	10.57	65.08
OPR	10.77	13.91	0.01	66.71
EXCR	2.18	2.87	1.2E-05	21.61
CPI	12.87	14.58	1.00	52.00

5.2.2 Correlation matrix

The result of the correlation matrix for all the variables is presented in Table ***5.2*** below. The correlation matrix between the human development index (i.e., HDI) and the other variables for oil-producing countries middle-income countries shows the correlation coefficient between every two variables in the model. As shown in the matrix below, the correlation coefficient between a variable and itself is one. The correlation matrix is used to test the data for multicollinearity (i.e., variation in one explanatory variable can be completely explained by movements in another explanatory variable) which could give rise to biased estimates. This is

ruled out if the coefficient of correlation between any two explanatory variables is not equal to one or very close to one, that is, 0.9 and above.

Table 5.2: Correlation matrix results for human development

Variable	HDI	LAB	CAP	AGR	MAN	SER	OPR	EXCR	CPI
HDI	1.00								
LAB	0.18*	1.00							
CAP	0.07	0.01	1.00						
AGR	-0.61*	-0.23*	0.08	1.00					
MAN	0.19*	-0.00	0.21*	0.02	1.00				
SER	0.28*	0.00	-0.31*	-0.29*	0.01	1.00			
OPR	-0.16*	-0.11	0.11	-0.22*	-0.32	-0.57	1.00		
EXCR	0.03	-0.03	0.10*	-0.05*	-0.23	-0.01*	0.15	1.00	
CPI	0.32*	0.02	0.03	-0.07	-0.04	0.26*	-0.24	0.14	1.00

Note: *HDI = Human development index; LAB = Labour; CAP = Capital; AGR = Agricultural sector production; MAN = Manufacturing sector production; SER = Service sector production; OPR = Crude oil production; EXCR= Official exchange rate; CPI = Corruption perception index.*

As shown in Table ***5.2*** above, none of the variables was perfectly correlated with each other, that is, equal to one or very close to one, suggesting that there is no multi-collinearity in the model. The table, for now, shows that there is a negative correlation for one of the three variables adopted to measure economic diversification, i.e., the agricultural sector whereas manufacturing and services were positively correlated with human development. The negative correlation between the agricultural sector and human development in middle-income oil-producing countries indicates possible neglect of the development of the non-oil sectors for crude oil production (Qasim *et al.*, 2020; Verter & Becvarova, 2016). The impact of the

resource curse is seen from the inverse relationship between agricultural sector output and human development.

In contrast to the agricultural sector, the positive correlation between manufacturing and HDI as well as services and HDI indicate there are some prospects to solve the resource curse through these sectors and achieve greater economic development as identified also in Lashitew *et al*. (2020) that they are key variables to achieve sustainable economic development. However, oil production now has a negative correlation with human development going against the a priori expectation which is different from the correlation results from economic growth perhaps suggesting it may not be the best sector to invest in when human development is the policy focus. The negative correlation between crude oil production and human development in oil-producing middle-income countries could be as a result of corruption where funds from the sale of crude oil production have resulted in income inequality Mallaye *et al*. (2015), and we explore this further with the use of the generalised linear model.

5.2.3 Pooled OLS, Fixed and Random Effects Models

Table *5.3* below presents the results of the pooled OLS, fixed effect model and random effect model. This will enable the researcher to find out the effect of economic diversification on human development in oil-producing middle-income countries.

Table 5.3: Panel Regression Results for HDI Model

Variable	Pooled OLS Result	Fixed Effect	Random Effect
Constant	0.8529***	0.7860***	0.7695***
	(0.0447)	(0.0417)	(0.0408)
LAB	-0.0002	-0.0006	-0.0003
	(0.0003)	(0.0006)	(0.0005)
CAP	0.0076**	0.0005**	0.0005**
	(0.0004)	(0.0005)	(0.0002)
AGR	-0.0107***	-0.0058***	-0.0016***
	(0.0006)	(0.0006)	(0.0004)
MAN	0.0013***	-0.0019***	-0.0017***
	(0.0004)	(0.0004)	(0.0004)

SER	-0.0017***	-0.0000	-0.0001
	(0.0005)	(0.0003)	(0.0004)
OPR	0.0023***	-0.0008***	-0.0010***
	(0.0004)	(0.0002)	(0.0003)
EXCR	0.0006	0.0046***	0.0045***
	(0.0010)	(0.0006)	(0.0006)
CPI	0.0013***	0.0011***	0.0011***
	(0.0002)	(0.0001)	(0.0001)
F-Cal	67.77	123.09	
	(0.00)	(0.00)	
R^2	0.55	0.30	0.34
Hausman Test		18.72	
		(0.02)	

Note**: The dependent variable is the human development index; LAB is the labour force participation; CAP is the gross capital formation; AGR represents agricultural Sector production; MAN is the manufacturing sector production and SER is the services sector production. OPR represents Crude oil production, EXCR represents the official exchange rate while CPI is the corruption perception index. The figures in parenthesis are the standard errors. **** = 0.01; ** = 0.05; * = 0.1.*

5.2.4 Pooled OLS

The pooled OLS results evaluating the effect of economic diversification on human development for the sample of 30 middle-income oil-producing countries presented in

Table *5.3* shows that the manufacturing sector now has a positive and significant impact on human development agreeing with Gylfason (2011). However, this result differs from the results obtained for economic growth in section 4.2.4 where it was negative and significant. This significant relationship suggests that this sector may be a great start to solving the resource curse and ensuring more economic diversification. The other sectors for economic diversification have negative and significant relationships with human development. The coefficient for oil production is a positive but insignificant relationship with human development for oil-producing middle-income countries. This variable becomes statistically significant in the fixed effects estimation, which further controls for the unobserved time-invariant country-specific effects. In the next section, the fixed effects results are explained.

5.2.5 Fixed effects Model

The fixed effect (FE) estimator results examining the effect of economic diversification on human development in middle-income oil-producing countries presented in

Table *5.3* shows that across all specifications, the variables for economic diversification, i.e., agriculture, services and manufacturing all have negative signs but are statistically insignificant. However, this result differs for the same sectors when analysed in the economic growth model. This further validates the resource curse theory and shows that the neglect of these sectors by oil-producing middle-income countries is harming the welfare of people and thus economic development.

5.2.6 Hausman Test

The result of the Hausman test is presented in

Table *5.3* and based on Green, 2003 since the p-value is 0.02, hence the null hypothesis is rejected, and the fixed effects estimator is adopted to analyse the human development model in middle-income oil-producing countries.

5.2.7 Generalized Linear Model (GLM) Regression Model

The GLM regression results examining the impact of economic diversification on human development in middle-income oil-producing countries is presented in Table ***5.4*** based on the model specification from equation 3.4. Since the dependent variable is changed to HDI, which is bounded by 0 and 1, the GLM estimations take this into account as explained in section 3.6.7.

Table 5.4: GLM results for human development model

Variables	Coefficients
CONS	1.4786***
	(0.1869)
LAB	-0.0010
	(0.0014)
CAP	0.0034**
	(0.0014)
AGR	-0.0473***
	(0.0023)
MAN	0.0057***
	(0.0014)
SER	-0.0069***
	(0.0021)
OPR	-0.0100***
	(0.0018)
EXCR	0.0020
	(0.0067)
CPI	0.0065***
	(0.0008)

Note: *The human development index was the dependent variable in this table. The figures in parenthesis are the probability values.* ******* *= 0.01; ** = 0.05; * = 0.1. GLM was executed using the family (binomial) link (logit) with robust standard errors.*

As shown from Table ***5.4*** above, it is observed that labour has a negative and significant impact on human development in middle-income oil-producing countries and agriculture, service and oil production has a negative and significant impact on human development in middle-income oil-producing countries while the impact of capital formation, manufacturing, exchange rate

and corruption perception index has a positive and significant impact on human development in middle-income oil-producing countries. These results are further discussed in the next section.

5.3 Discussion of findings

5.3.1 Agricultural Sector production and Human Development in Middle-income Oil-producing Countries

From Table ***5.4*** above, the study reveals that the effect of agricultural sector production (AGR) on human development in middle-income countries is negative (-0.0473) and is statistically significant. This suggests that an increase in the share of agriculture production does not appear to create human development. The a priori expectations for the impact of agricultural sector contribution on human development are not met. We can find a similar conclusion from the agricultural sector output as shown in below:
Table 4.4 and section 4.3.1 when compared with the coefficients found for economic growth suggesting a negative impact of the sector on both economic growth and human development in oil-producing middle-income countries, thus negatively impacting economic development. This finding seems to agree with Sachs and Warner (1997, 2001) who found out that the abundance of resources tends to lead to a squeezing of the manufacturing sector and other non-oil sectors suggesting the presence of the resource curse. Furthermore, the results corroborate the results from Neary and Wijnbergen (1986) who found out that an increase in production prices contributes to a lack of productivity in the production and agriculture industries. However, the findings differ from the findings of Self and Grabowski (2007) who found out that agricultural modernization has a positive on human development. The implication of the significant negative effect of agricultural sector production (AGR) on human development in middle-income oil-producing countries indicates neglect of the non-oil sectors including the agricultural sector for the oil sector among the oil-producing middle-income countries which further shows the Dutch disease phenomenon. This then leads to slowing down both the process of economic diversification and consequently economic development.

5.3.2 Manufacturing Sector Production and Human Development in Middle-income Oil-producing Countries

The study reveals from Table ***5.4*** above that the effect of manufacturing sector production (MAN) on human welfare in middle-income countries is now positive (0.0057) and is statistically significant. This suggests that an increase in the share of manufacturing production appears to create human development. The a priori expectations for the impact of the manufacturing sector contribution on human development are now met. Furthermore, this conclusion from the manufacturing sector output as shown in below:

Table 4.4 and section 4.3.2, when compared with the coefficients found for economic growth indicating a negative impact of the sector on only economic growth but differs from the positive impact found when compared with human development in oil-producing middle-income countries, thus suggesting and thus impacting economic development inconclusively.

This finding agrees with the results of Gylfason (2011) who found out that economic diversification could stimulate growth by attracting new economic activity to avoid over-reliance on primary production in some natural-resource industries, thus enabling labour-paying jobs in low-skill, intensive farming, and agriculture to be transferred to more lucrative high-skill jobs in the manufacturing sector. In addition, these results further agree with Rodrik (2012) who found that having a big manufacturing sector would lead to more growth in low-income countries. However, this result differs from Corden and Neary (1982) who found out the poor performance of manufacturing exports was obtained from the resource boom. This sector possibly presents a fresh way to tackle the resource curse and hence economic diversification for oil-producing middle countries.

5.3.3 Service Sector Production and Human Development in Middle-income Oil-producing Countries

The study reveals that the effect of service sector production (SER) on human development in middle-income countries is negative (-0.0069) and is statistically significant from Table ***5.4*** above. This suggests that an increase in the share of service sector production does not appear to create human development. The a priori expectations for the impact of service sector contribution on human development are not met. We can find a similar conclusion from the services sector output as shown in below:

Table 4.4 and section 4.3.3 when compared with the coefficients found for economic growth suggesting a negative impact of the sector on both economic growth and human development in oil-producing middle-income countries, thus negatively impacting economic development. This result seems to differ from Daud (2017) who found out that the service sector directly affects the welfare of people in communities and indirectly affects the human welfare of people via the channel of absorbing more labour into the economy thus increasing human development index. However, as demonstrated for other non-oil sectors the neglect of this sector impacts these countries and through the transmission mechanism of the Dutch disease, it supports the resource curse theory. We can conclude that for all three non-oil sectors, there is no evidence to suggest that economic diversification positively impacts economic development also validating the resource curse theory. The negative relationship between service sector and human development similar to the results of economic growth exists caused by labour reallocation could lead to unproductive service sector in oil producing middle income countries (Kuralbayeva & Stefanski, 2013).

5.3.4 Crude Oil Production and Human Development in Middle-income Oil-producing Countries

The study reveals from Table ***5.4*** above, that the effect of crude oil production (OPR) on human development in middle-income countries is now negative (-0.0100) and is statistically significant. This surprisingly suggests that an increase in the share of oil production does not appear to create human development. The a priori expectations for the impact of oil sector contribution on human development was not met. These results seem to agree with Auty (1993), Gelb (1988), Leite and Weidmann (1999) and Sachs and Warner (1995, 1999), who find that resource-rich countries do not benefit from natural resource endowment such as oil, but also perform poorer than less well-endowed countries.

It is observed that a different conclusion now exists from the oil sector production. The output as shown in below:

Table 4.4 and section 4.3.4, when compared with the coefficients found for economic growth showed a positive impact of the oil sector on economic growth. However, there is a negative impact of oil production on human development in oil-producing middle-income countries, thus suggesting an inconclusive impact on economic development. This shows that crude oil production does not necessarily impact the human development or human welfare of people in oil-producing middle-income countries and focusing on other sectors would prove beneficial to the oil-producing middle-income countries. The implication of the negative effect of crude oil production (OPR) on human development in middle-income oil-producing countries could be that as income from oil revenue goes into the hands of the politicians, they could mismanage them thus resulting in rent-seeking behaviour or corruption which is presented in the next section. This inadvertently would slowdown economic development for these middle-income oil-producing countries hence indicating the presence of the resource curse in these countries.

5.3.5 Corruption Perception Index and Human Welfare in Middle-income Oil-producing Countries

The study reveals that the effect of corruption (CPI) on human welfare in middle-income oil-producing countries is positive (0.0065) and is statistically significant from Table ***5.4*** above. The a priori expectations for the coefficient of corruption on human development are not met differing from the coefficient of corruption for economic growth as shown in below:

Table 4.4 and section 4.3.6. However, the same conclusion is found for both economic and human development. This implies that for oil-producing middle-income the score of the perceived corruption was also significantly lower and indicates the presence of more corruption supporting the rent-seeking behaviour theory among these countries just like the case for economic growth (Corden & Neary, 1982).

Furthermore, it also supports that the findings that there is a statistically negative relationship between human development and corruption perception index (Pradhan, 2012). It also agrees with the study by Amrane and Mourad (2017) who found that corruption leads to political instability. This goes to show that rent-seeking which is a result of dependence on oil production improves neither economic growth nor human development and would slow economic diversification down across these countries. This negative contribution to economic development indicates the presence of the resource curse for middle-income oil-producing countries.

5.3.6 Exchange rate and human development in oil-producing middle-income countries

The study reveals that the effect of the exchange rate on human welfare in middle-income countries is positive (0.0020) and is not statistically significant from Table ***5.4*** above. The a priori expectations for the impact of the exchange rate on human development was not met. Furthermore, this conclusion from the exchange rate as shown in below:

Table 4.4 and section 4.3.5, when compared with the coefficients found for economic growth indicating a negative impact of the sector on only economic growth but differs from the positive impact found when compared with human development in oil-producing middle-income countries, thus suggesting and thus impacting economic development inconclusively.

This result seems plausible and agrees with the results of Ogege (2019) who found out that there is a positive effect of the exchange rate on HDI. Their result implied that the exchange rate will have a direct effect on one of the variables used to calculate the HDI. The volatility of income i.e., exchange rates was explained as the reason why studies such as Arezki and Bruckner (2011), Caselli and Michaels, (2013) and Sala-i-Martin and Subramanian (2013) linked oil-rich countries to rent-seeking behaviour. This volatility results in the resource curse which negatively impacts human development.

5.3.7 Labour and Human development in Middle-income Oil-producing Countries

From Table ***5.4*** above, based on the GLM results, the study reveals that the effect of labour force participation (LAB) on human development in middle-income countries is negative (-0.0010) and is not statistically significant. This suggests that an increase in the labour force participation and does not appear to create human development in oil-producing middle-income countries. These findings seem plausible as Humphreys *et al.* (2007) found out that natural resource resources wealth can be produced by fuels and minerals without strong links with other industries and without much domestic labour force involvement. However, as identified by Gylfason (2011), the oil industry is capital-intensive and has more potential for economic growth, relative to low-skill labour-intensive industries which have lower potential. That is, as more population joins economic activities, they are likely to join low-skilled labour-intensive industries which may not improve or be linked to economic growth. The negative

impact of labour force participation on human welfare leads to more income inequality as the better-paying jobs would naturally be found in these countries in the oil sector.

The a priori expectations for the impact of labour force participation on human development are not met. Furthermore, this conclusion from the labour force participation output as shown in below:

Table 4.4 and section 4.3.2, when compared with the coefficients found for economic growth which indicates a positive impact of the sector on only economic growth but differs from the negative impact found when compared with human development in oil-producing middle-income countries, and thus an inconclusive impact on economic development. It can be further implied that the insignificant relationship between labour (LAB) and human development in middle-income countries could be that labour in middle-income countries is in large part concentrated on low skilled labour force (mainly expatriate labour force).

5.3.8 Capital and human development in Middle-income Oil-producing Countries

The study reveals that the effect of capital (CAP) on human development in middle-income countries is positive (0.0034) and is statistically significant. This suggests that an increase in the gross capital formation appears to create human development in oil-producing middle-income countries. The a priori expectations for the impact of gross capital formation on human development are met. We can find a similar conclusion from the gross capital formation output as shown in below:

Table 4.4 and explained section 4.3.7, when compared with the coefficients found for economic growth indicating a positive impact of capital on both economic growth and human development in oil-producing middle-income countries, thus positively impacting economic development. This result differs from Arezki and Ismail (2010) who researched the Dutch disease using a sample of thirty-two countries from 1992 to 2009 and found out that when there

was an oil boom, fiscal policies aided the reduction of capital expenditure. Furthermore, this result also contradicts the results from Hirschman (1958) that the lack of economic links between resources and non-resource sectors, especially as international companies lead mineral extraction operations and repatriate their earnings rather than spend them locally.

5.4 Summary of the findings

The chapter studied examined the effect of economic diversification on human development in 30 middle-income oil-producing countries from 2000 to 2017. Furthermore, the analysis assessed the contribution of oil production to human development for the oil-producing middle-income countries. The main economic approach that was used was the GLM as the dependent variable, HDI is measured from 0 to 1. Furthermore, the OLS regression, fixed and random effects models, as well as the Hausman tests, were all used to assess the impact of economic diversification on human development in middle-income oil-producing countries.

The results which were obtained from this study, the impact of economic diversification does not entirely contribute to human development measured by HDI in oil-producing middle-income countries, as only one sector, i.e., the manufacturing sector had a positive impact and the other two sectors, i.e., agriculture and service sectors had a negative impact on human development.

The results which were obtained in this chapter indicated that the manufacturing sector production had a positive impact on human development. When this sector was compared with economic growth negative but for human development, there is a positive contribution. This means that the sector potentially presents a way to tackle the resource curse and hence enhance human development and economic diversification for oil-producing middle countries.

However, results obtained for both the agricultural and services sector, there was a negative impact suggesting they do not contribute to human development and hence agreed with the

resource curse theory in oil-producing middle-income countries. Interestingly, the results were the same for economic growth further validating the resource curse theory. This indicates that these sectors among these oil-producing middle-income countries have not received great attention to ensure more sustainable economic development yet.

The results from this chapter also reflected that oil production has now a negative impact on human development and did not meet the a priori expectation. It was surprising to see that oil production led to a negative contribution on human development thus reducing economic development for the oil-producing middle-income countries which further suggests the need for more economic diversification away from oil for more sustainable economic development among these countries for more human development.

The results from the exchange rate volatility which has been identified to be a contributing fact to the Dutch disease now had a positive impact on human development. The positive impact was not statistically significant, and the coefficient was close to zero so we may not completely suggest that it impacts human development as this finding was against the a priori expectation.

However, it was observed that the variable for institutional quality, i.e., corruption perception index, was now positive and still indicates the presence of corruption which suggest rent-seeking. This result also upholds the resource curse theory. The same conclusion is found for both economic and human development. Thus, the conclusion can be made that the impact of corruption on economic development is negative.

From the results from the impact of economic diversification on economic development, i.e., both economic growth and human development, we conclude that there is a pressing need for economic diversification based on the evidence provided from this research. Focusing on HDI, i.e., human development presents a better way to plan for sustainable economic development

as the impact on the welfare of citizens rather than what is just produced in the economy through the GDP.

From the results obtained, the oil-producing middle-income countries should put more focus on achieving economic diversification and relying less on oil production. As both scenarios indicate sustainable economic development by better-targeted policies on economic diversification. The manufacturing sector presents a starting sector in which more attention should be given to achieve economic diversification. However, as the governments of these countries, policymakers and other stakeholders plan to ensure more economic diversification to achieve more sustainable economic development, an in-depth country study is done to capture what this economic plan could look like both in the short run and long run which presents a different methodology. This study adopts the major oil-producing country from sub-Saharan Africa i.e., Nigeria.

The choice of Nigeria in this case study is informed by the fact that they are the leading producers of oil in Africa according to OPEC (2017). Nigeria is ranked the first in Africa and 13th in the world, producing about 1,900,000 barrels per day. Another characteristic observed by Nigeria is that its economy is heavily dependent on oil for revenues. When compared with Algeria (the third-largest oil producer in Africa) and Egypt (the fourth-largest oil producer in Africa), Nigeria falls short as Algeria and Egypt have more diversified economies with a lesser HDI score. The country is seeking means of diversifying its economy following the fall in the prices of crude oil in the international market that started in 2014 to have a competitive economy and meet the needs of the citizens. These reasons guide the choice of Nigeria as the oil-dependent middle-income country to be studied in this work.

Chapter 6

NIGERIAN CASE STUDY

6 Nigerian Case Study

6.1 Introduction

The focus of this case study chapter is to explore the impact of economic diversification on both economic and human development on a country-level analysis using time series data. The description of the Nigerian economy is given in the background and the evidence from past literature is presented in section 6.2. A different set of methodology was adopted for this study to assess the impact of economic diversification on both economic and human development in Nigeria. They include the ADF and PP unit root tests, Johansen co-integration test for long-run impact and the vector error correction model (VECM) for the short-run impact of economic diversification on both economic and human development is for country-level analysis.

6.2 Background

The Nigerian economy has been impacted by the reduction in the prices of crude oil between 2012- 2018, declining income from crude oil and significant economic shocks as a result of declining turnover from global oil production (Oriakhi & Osaze, 2013; Oyelami & Alege, 2018). Nigeria is primarily dependent on its oil industry to boost the growth and development of the economy (Esu & Udonwa, 2015; IMF, 2017). According to the Organisation of Petroleum Exporting Countries (OPEC) report, Nigeria is leading other African countries in terms of oil production, with the production of about 1.9 million barrels of crude oil daily (OPEC, 2017).

However, this oil-rich nation has overtaken India to become the country with the highest poverty rate globally with about 87 million Nigerians now living in extreme poverty and about

80% of the population in Nigeria living on less than $2 per day which means the oil wealth has not necessarily been a blessing to Nigerians (Beaumont & Abrak, 2018; Oyelami & Alege, 2018).The collapse in the world market's oil prices has led to serious economic shocks which have hurt Nigeria's economy substantially (Wit & Crookes, 2013). The first pressure from declining oil prices have seen a severe drop in oil income, government incapacity to pay workers at federal and government levels, job losses in the private sector resulting from a lack of consumer and investor confidence, and subsequently declining economic growth (CBN, 2017; Ehinomen & Daniel, 2012). This drop in oil prices has brought the interest among oil-producing countries like Nigeria into economic diversification to achieve higher economic growth (Esu & Udonwa, 2015; Nwanne, 2014; Olaleye *et al.*, 2014).

Economic diversification is considered a safeguard against the resource curse and the symptoms of the Dutch disease in the Nigerian economy and is viewed as a strategy of ending external shocks caused by declining global oil prices (Karahan, 2017; Olaleye *et al.*, 2014). Furthermore, economic diversification is an instrument for mitigating economic problems, such as improving the production structure of the economy and improving consumer and investor spending (Al-Marhubi, 2000; Koren & Tenreyro, 2007). The Nigerian government's quest for economic diversification to help stabilise its economy in cases where global oil prices are falling has been continuously encouraged (Esu & Udonwa, 2015; Oyelami & Alege, 2018). However, in the past, the Nigerian government have made several attempts to actively develop and execute policies aimed at broadening the base of the economy or achieving economic diversification.

Some export, trade and economic diversification policies were adopted by the government of Nigeria (Asiedu, 2006; Olaleye *et al*., 2014). The government invested substantial sums of money on the following in the early 1980s, 1990s, and 2000s: export diversification programme, trade diversification programme, the Nigerian economic industrialisation imports

substitution programme, and privatisation of state enterprise (Akinlo & Egbetunde, 2010; Ikhide & Alawode, 2001; Ogun & Akinlo, 2011). These audacious measures and structural changes achieved mixed results since certain components of economic diversification and privatisation provided positive benefits (Ikhide & Alwode, 2002). But the reversal of the policies, regular changing government policies, and the inability of future administrations to maintain some of past administrations policies have caused the reforms to fail. Thus, studies by Bleaney and Greenaway (2001) and Ghosh and Ostry (1994) imply that the impact of export instability must be mitigated by economic diversification. It is against this backdrop that this case study assesses the subject of economic diversification in Nigeria in considerable depth, to obtain insights into how economic diversification impacts both economic and human development.

6.3 Aims and objectives

This case study chapter aims to explore the impact of economic diversification on economic development in Nigeria from 1980 – 2017 making use of time series analysis for the in-depth country study. The specific objectives to ensure this is achieved are enlisted below:

1. To examine how economic diversification impacts economic development in the short run and long run in Nigeria.
2. To critically evaluate the impact of oil production on economic development in the short run and long run in Nigeria.
3. To propose a policy guideline on how Nigeria could avoid the resource curse.

6.4 Literature review

6.4.1 Overview of the contribution of crude oil to the Nigerian economy

Before crude oil was discovered in 1956, the Nigerian economy was well-known for its agrarian economy, which relied on cash crops like such as palm oil and kernel, cocoa, rubber, wood, and groundnuts amongst others (Ikenwa *et al*., 2017; Ndimele, 2017). In the 1960s, agriculture, which was a major sector among the non-oil sectors, accounted for about 70 per cent of exports and employed more than 70 per cent of the Nigerian workforce. Furthermore, the sector produced 95 per cent of the essential food necessities for the nation for more than one hundred and thirty million individuals and additionally giving raw materials to local producers (World Bank, 2013). Consequently, the agricultural sector exports aided Nigeria in taking steps towards achieving greater economic growth which led to the building up of infrastructure especially in the areas of health and education such as the development of universities that were built before the emergence of oil (Igwe *et al.*, 2017). After the discovery of oil by Shell-BP, Nigeria became an oil-producing country in 1958 when it went on stream and produced 5, 100 barrels every day (Akinyetun, 2016).

After the discoveries and boom of crude oil between 1956 and 1970, Alimi and Muse (2013), reported that oil exports contributed about 96 per cent of total exports from 1970 to 1984, 91 per cent from 1985 to 1996, and 98 per cent from 1997 to 2009 and that only slightly dropped to 96.3 per cent between 2010 and 2013. Nonetheless, the proportion of Nigeria's non-oil exports has continued to decline from more than 48 per cent in 1970 to approximately 4 per cent in 2009 and then slightly rose to 4.8 per cent in 2013 (Ogunjimi *et al*., 2015). Since the 1970s oil boom, a single product economy, with crude oil as the main source of revenue, has emerged in Nigeria. (Folawewo & Olakojo, 2010).

Furthermore, Ezeibe (2017) also confirms that Nigeria's major source of revenue is oil, and it accounts for about 80 per cent of Nigeria's national income. In the same way as other oil-

producing nations, the country has not been spared from the volatility from crude oil prices related to the natural resource that it has been blessed with, i.e., oil (Kalu, 2018). The discovery of oil, to some degree has helped the nation's financial success, however, it has now turned into a negative aspect of Nigeria's economic growth (Ovadia, 2014). The revenues which were earned from the sale of crude oil led to the neglect of the non-oil sectors of the economy. Like the saying, "Nigerian government murdered the goose that was laying the brilliant eggs". The agricultural sector that was neglected had less support at the subsistence level, because of immense income created from the exportation of crude oil (Igberaese, 2013).

However, since the 1990s, a growing amount of research works have built up a link between resource abundance and various fiscal issues (Igwe *et al.*, 2017; Ihua, 2010; Ikenwa *et al.*, 2017; Ndimele, 2017; Obasi, 2015). The abundance of natural resources has been linked to moderate economic growth in the research by (Doraisami, 2015). Similar observations have been made about Nigeria by several researchers and have generated debates in research. A few investigations have reported a significant negative relationship between economic growth and the abundance of natural resources, for example, crude oil (Ayodele *et al.*, 2013; Maku & Adetowubo-King, 2018). This negative relationship is referred to as the resource curse explained extensively in the first literature review.

Nigeria, which is the largest oil producer in Africa is regularly observed as an infamous illustration of this negative link between economic growth and resource abundance. According to Weinthal and Luong (2006), the Nigerian government has accumulated $350 billion in oil income since 1960, but its economy has contracted; in purchasing power parity (PPP) terms, Nigeria's GDP per capita was $1,113 in 1970, however just $1,084 in 2000, and amid this same period, its poverty rate estimated as the number of the populace surviving on under US$1 every day expanded from near 36 per cent to just below 70 per cent.

In line with this, Osundina (2014) observed that Nigeria has moved from an oil boom that metamorphosed into a full-blown Structural Adjustment Programme (SAP) into perhaps an oil doom. He also said that the country has slid from an oil-rich country in the 1970s to one of the poorest countries in the world and went further to state that more than 60 per cent of its labour force is still in small-scale peasant agriculture, which he said is an indication of underdevelopment.

6.4.2 Impact of economic diversification on economic growth in Nigeria

Many researchers see economic diversification as a means to accelerate economic growth and development, especially in single product economies, such as the economies that depend largely on the export of crude oil (Akpan, 2009; Anyaehie & Areji, 2015; Hyden, 2007). Akpan (2009) emphasised that achieving economic diversification is crucial for the healthy growth of the Nigerian economy. Noko (2016) stated that, in the light of the current economic slump, economic diversification is the key remedy that will set Nigeria's economy on a route to growth. He also advocated that agriculture and industrial development should be promoted by the government to ensure sustainable growth and development of the economy.

The Organisation for economic cooperation and development (OECD) suggests that economic diversification may not always indicate an increase in a country's aggregate production over time, but it means broadening the country's economic base to absorb any unexpected economic shocks (OECD, 2015). In most African and Arab nations with enormous natural resources and limited economic growth and development, the pattern of resource or dominating mono-products is rising (Olomola, 2006). The problem of mono products which continues to stymie Nigeria's long-term economic development can be remedied by shifting the economy's productive base away from crude oil and towards agriculture, services, manufacturing sectors as well as other sectors that lead to industrialization growth.

Economic diversification, according to Anyaehie and Areji (2015), should be considered as a growth strategy for the long term for any country. Therefore, diversification, when viewed from this perspective, can grow, and reinforce a nation's economic foundation while also ensuring its development in the long-term despite significant drops in the prices of commodities in global markets. According to Suberu *et al*. (2015), the Nigerian budget is reliant on external influences such as income from oil prices rather than internal factors in Nigeria's control. The manufacturing sector has performed poorly in the country, contributing less than 8% of the country's GDP, compared to the United States, where the industry contributes over 50% of the nation's GDP and over 40% of the GDP of Asian countries (World Bank, 2015). Anyaehie and Areji (2015) found out that economic diversification can achieve for a country that has basic sustainable development, such as safe and good health care, more income for the citizens and enhanced education by opening a nation's economic base.

Noko (2016) suggested that diversifying the national productive base will lead to effective use of natural resources, social administration and finally to the development of an economic system based on which is responsive and sustainable to citizens. Although Nigeria and most other African nations can diversify their economy, there have been no significant accomplishments in Nigeria diversifying its economy. Gangas (2017) argues, however, that government expenditure and infrastructure in the agricultural and other non-oil sectors in the nation are part of ensuring economic diversification in the nation.

6.4.3 Empirical studies on economic diversification in Nigeria

This section examines the importance of economic diversification and its effects on economic growth in Nigeria and assesses empirical research that has examined economic diversification as the instrument for sustainable economic development. In the context of diminishing oil revenues, for example, Uzonwanne (2015) explored the effects on Nigeria's economic development of economic diversification. The results show that economic diversification has

over time showed a strong favourable impact on the growth of economies. He advocated that accountability from the government to the demands of the population by fostering a system in which success and competitiveness amongst different industries are encouraged.

Suberu *et al*. (2015), holds the same opinion on the role of diversification in Nigeria in achieving sustainable economic growth and development, arguing that diversification of the economy into mechanized agriculture production is a perfect answer to its mono-product economy dilemma. Using a descriptive survey, they conclude that Nigeria's economic diversification can boost the growth of the economy. The problems of this study are the technique of generalisation, as the results were not submitted to more advanced statistical tests in any way as it depends on plain descriptive statistics such as the medium and standard deviation. In their study paper, Eko *et al*. (2013) suggested that the economy of Nigeria was steady in the production of agricultural commodities before oil was discovered, while agriculture mostly contributed to national income and hence the growth of the economy but was overlooked after oil was discovered. They stated that by economic diversification in agriculture and other non-oil sectors. i.e., economic diversification, the problem of mono-products reliance on oil production which is prone to depletion may be remedied.

More recent research on diversification sees it as a strategy for addressing the country's inequality problem rather than increasing economic growth. Tonuchi and Onyebuchi (2019) looked at economic diversification and infrastructure development as viable measures for inequality reduction in Africa: using the Nigerian viewpoint. According to the report, Nigeria and other African nations should concentrate on the production and industrialisation of products in which they have comparative advantages over other countries across the world. For example, Akpan (2009), who carried out a panel analysis from the West African nations examined the link between private sector development and economic diversification. The author found out that diversification measures sustainable economic growth and progress, but

that a variety of problems, including restricted market access, insecurity and political instability, seeking rents have hindered this diversification.

In their paper, Ahungwa *et al.* (2014) found out using quantitative and qualitative methods that the solid minerals that have been overlooked have the potential over the decades to significantly contribute to Nigeria's economic growth. They are consequently advocating economic diversification by increasing investment in other non-oil sectors to ensure economic diversification. They also argue that solid minerals may reduce inequality in the country. The empirical studies evaluated found that the literature on diversification is still limited, and the few studies that have been conducted have not thoroughly examined the influence of economic diversification on economic growth and human development i.e., economic development in Nigeria. This study will build on the previous ones by applying robust econometric estimating approaches and taking into consideration the impact of economic diversification on both economic growth and human development which no known work to the researcher has been carried out on Nigeria.

6.5 Data and methods

This section presents the methods that were adopted in this case study to examine the relationship between economic diversification and economic development in Nigeria (1980 – 2017). It discusses the sources of data, description of variables, model specification, and method of data analysis as well as the techniques used to compute missing data. In summary, this thesis adopts econometric techniques to discover which variables impact economic diversification in both the long and short-term data were obtained

6.6 Sources of data

Time-series data were obtained from various sources as illustrated in Table ***6.1*** for the sample period 1980-2017. HDI data was not consistent before 2005 for Nigeria. To solve this, this

research applied the model for computing HDI as defined by the UNDP to calculate nHDI data for Nigeria from 1980 – 2005. Furthermore, all data for this study were obtained from World Bank, IEA World Energy statistics and balances, Transparency International for the period as well as the human development index calculated from data from the Central Bank of Nigeria (CBN). A summary of the variables description and sources used in the research are presented in Table ***6.1*** below:

Table 6.1: Description of variables and sources

Source: *UNDP, CBN, World Bank, IEA, and Transparency International*

6.7 Variables

This section discusses all the dependent and independent variables used for analysis in this chapter. The discussion centres on the description of the variables, any transformation done to the variables, why the variables were selected and in some cases what the variables represent.

6.7.1 Dependent variables

Human development (HDI)

UNDP uses the HDI to measure the level of human development. The HDI is a multidimensional composite index that comprises three social welfare dimensions namely life expectancy, education, and income (UNDP, 2020). This research also adopts HDI as a proxy for human development. However, the HDI scores were not available for Nigeria from 1980 to 2005, therefore this research calculated nHDI to get the data from 1980 - 2017. The formula for calculating HDI adopted by UNDP (2020) is shown in equation 6.1 below:

$$HDI = (I_{Health} \times I_{Education} \times I_{Income}) \times \frac{1}{3} \quad (6.1)$$

Where:

Health= Life Expectancy (years)

Education= Expected years of schooling (years)/ Mean years of schooling (years)

Income= Gross national income per capita

From this original calculation of HDI, nHDI was calculated using the following formula below adopted from the UNDP's formula:

$$nHDI = (Health \times Education \times GNI) \times \frac{1}{3} \quad (6.2)$$

Where:

Health = Nigerian Government spending on health

Education= Nigerian Government spending on education

GNI= Gross National Income

The GDP per capita was similarly adopted to proxy economic growth in this case study chapter.

6.7.2 Independent variables

In this study, agricultural sector production (AGR), manufacturing sector production (MAN), service sector production (SER), crude oil production (OPR), exchange rate (EXCR), corruption perception index (CPI), capital (CAP), and labour (LAB) served as the explanatory variables in the model as was same when compared for the 30 oil-producing middle-income countries.

6.8 Model specification

This chapter is an in-depth study into Nigeria using the models for study on economic growth below:

$$GDPCG_t = \beta_0 + \beta_1 \mathrm{LAB}_t + \beta_2 CAP_t + \beta_3 AGR_t + \beta_4 MAN_t + \beta_5 SER_t + \beta_6 OPR_t + \beta_7 EXCR_t + \beta_8 CPI_t + \mu_t \quad (6.3)$$

However, as stated in equation 3.4 below:

$$HDI_{i,t} = \beta_0 + \beta_1 \mathrm{LAB}_{i,t} + \beta_2 CAP_{i,t} + \beta_3 AGR_{i,t} + \beta_4 MAN_{i,t} + \beta_5 SER_{i,t} + \beta_6 OPR_{i,t} + \beta_7 EXCR_{i,t} + \beta_8 CPI_{i,t} + \mu_{i,t} \quad (3.4)$$

Similar to the analysis across countries, the dependent variable is replaced with nHDI to estimate the impact of economic diversification on human development in Nigeria and the model was rewritten for time series analysis.

Thus:

$$nHDI_t = \beta_0 + \beta_1 \mathrm{LAB}_t + \beta_2 CAP_t + \beta_3 AGR_t + \beta_4 MAN_t + \beta_5 SER_t + \beta_6 OPR_t + \beta_7 EXCR_t + \beta_8 CPI_t + \mu_t \quad (6.4)$$

6.9 Method of data analysis

This study would make use of time series analysis. The following econometric techniques were conducted using time series data: unit root test, Johansen co-integration, vector error correction model (VECM) to estimate the impact of economic diversification on economic and human development in Nigeria.

6.9.1 Econometric techniques

To assess the short and long-term link between economic diversification and economic and human development, a time-series econometric methodology was used. The data analysis methods utilised here are based on those employed by (Awokuse, 2007; Katircioglu, 2009; Piazolo, 1995). This research begins with the stationarity of the time series, which is followed by the primary stationary tests for unit roots, which was tested by the Augmented Dickey-Fuller (ADF), Dickey and Fuller (1981) and Phillips-Perron (PP) test (Phillips & Perron, 1988). Following this, co-integration tests based on the Johansen test Johansen and Juselius (1990) are used to determine the long-term relationship between the variables and economic growth, as well as the Error Correction Model (ECM) Engle and Granger (1987) to determine the short-term correction between selected variables and economic growth in Nigeria. The following sub-section goes into further depth about these tests.

6.9.2 Tests of stationarity

A unit root test is necessary to determine if there is stationarity in the time-series data or not. This approach is vital for avoiding the problem of spurious regression according to Brooks *et al*. (2008) and Gujarati (2011) and is required for converting the data into another form that

fulfils the stationary condition before beginning the study. There are several techniques for testing time-series stationarity, including Dickey-Fuller (DF), Augmented Dickey-Fuller (ADF), Philips-Perron (PP), Ng-Perron (NP), and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) (Kogid *et al.*, 2010). However, only the ADF and PP unit root tests will be presented. These tests are widely utilised across literature and in studies such as (Kogid *et al*., 2010; Piazolo, 1995). Furthermore, Piazolo (1995) also affirmed that there are three significant integration tests to use, the most essential of which are ADF and PP.

6.9.3 Augmented Dickey-Fuller (ADF) unit root test

This case study starts with the Augmented-Dickey-Fuller (ADF) test for the stationarity of the selected variables. The metric mentioned above is critical for avoiding false regression, which is a typical issue when estimating time-series data. This problem may be solved by utilising the initial difference of each variable, which typically results in variable stationarity (Gujarati, 2011; Koop, 2005; Piazolo, 1995). The null hypothesis, which claims that the variables being examined in the time series is not stationary and has a unit root, is used in the Dickey-Fuller simple test. The alternative hypothesis contends that the time variables being examined in the time series are stationary. After the tests are conducted, if the results are unable to reject the null hypothesis, then the series has a unit root but if the results can reject the null hypothesis, then the series does not have a unit root.

A straightforward Dickey-Fuller (DF) test may be performed making use of one of three regression formulas: a.) with an intercept, b.) with an intercept and trend, and c.) without an intercept and trend (Ravallion, 2012). The unit root test is used to determine whether these variables have a co-integration connection. Because it is straightforward and there is no superior option, the ADF test has received the most attention in research (Stinchcombe *et al*.,

2008). Furthermore, the ADF test works best with a small sample, like in this study (Davidson & MacKinnon, 2004).

6.9.4 Phillips-Perron Test (PP) test

The next key test for checking stationarity is the PP test that uses non-parametric correction for model variation to work on the residuals formula autocorrelation of the test for unit root (Phillips & Perron, 1988). It takes autocorrelation into account, reflecting the series dynamic character. The PP test employs a similar distribution as well as the same critical values just like the ADF test. However, because the PP test works better for bigger samples than those discovered for this study, the findings of the ADF test are used as a foundation for the co-integration test in this investigation (Davidson & MacKinnon, 2004). In terms of the lag length required for serial correlation removal in the residuals for both tests of stationarity, the Akaike Information Criterion (AIC) was used for the ADF test, while the Newey-West standard was used for the PP test (Andrada-Felix *et al*., 2003).

6.9.5 Co-integration tests

Following the tests for unit root and confirmation of co-integration association presence among the variables, the long-run equilibrium amongst variables would be assessed using the co-integration test. There is co-integration when at levels the time series is non-stationary but integrated into the same order, provided that there is a linear combination of integrated time series of order I (1) in the first or second difference. The most common methods for assessing co-integration are the Autoregressive Distributed Lag (ARDL), Engle-Granger, and Johansen techniques according to Mostafavi (2012) when just two variables are provided, the co-integration test that is conducted makes use of the Engle-two-step Granger's methodology. This test has the benefit of being simple to carry out. However, this test has significant limitations, such as not being able to ascertain the right number of links among the variables being tested (Koop, 2005; Mostafavi, 2012). Furthermore, Brooks *et al*. (2008) affirm in their book on

econometrics that the Johansen methodology is more suited especially when there is more than one variable for co-integration than the Engle-Granger technique.

Furthermore, other research, such as Dizaji (2012) and Rahman and Salahuddin (2010), adopted the ARDL technique for co-integration. Mostafavi (2012), on the other hand, did research in oil-rich nations and made a comparison between the two methodologies (both the ARDL and Johansen) and made the conclusion that the Johansen co-integration was more successful. It was discovered by the author that using the Johansen test was theoretically more meaningful than the ARDL. As a result, to analyse co-integration, this study used the Johansen technique. Furthermore, since the number of variables used in this study is greater than two, the test proposed by Johansen and Juselius is preferred to the Engel-Granger test.

According to various research such as Mostafavi (2012) and Stinchcombe *et al*. (2008), this is the most essential test. As a result, when the unit root tests for ADF and PP have been completed, it is important to guarantee that time-series variable of order one I are integrated (1). As a result, the Johansen approach's co-integration test will be performed between GDP and the independent variables to confirm the presence of a long-term link between GDP and the most relevant determinants. Johnson's methodology includes two criteria: λ trace and λ max. The Johansen test is based on the estimate of the Vector Autoregressive Model (VAR), which presupposes the existence (p) of economic variables in the vector of regression of the K-class. The VAR is turned into the VECM to carry out the Johansen test according to Alodadi and Benhin (2015) and Kogid *et al*. (2010):

$$\Delta X_t = \mu + \tau_1 \Delta X_{t-1} + \tau_{k+1} \Delta X_{t-p+1} + \pi X_{t-1} + \varepsilon_t \qquad (6.5)$$

Where X_t= (k x 1) stochastic variable vector, $\mu = (k$ x 1) constant vector, π and $\tau_1, \ldots \tau_{k+1}$ = k x k parametric matrix and ε_t = (k x 1) random vector.

According to the following results, Johansen's technique specifies the coefficient matrix: 1) π = 0 indicates that the initial difference should be employed, 2) π = k indicates the presence of stationary at the level (all variables have no unit root), and 3) $00 \leq \pi \leq$ k) indicates the existence of a stationary linear combination towards Xt (Kogid *et al.*, 2010). Concerning the short-term link, if the variables are co-integrated, the study applies the vector error correction model (VECM) developed from the VAR to analyse the short-term association between economic growth (GDP) and human development (nHDI) and the variables in the models. The nHDI equation in the VECM (6.5) becomes:

$$\Delta \mathrm{nHDI}_t = \alpha_0 + \sum_{i=1}^{n} b_i \Delta \mathrm{LAB}_{t-i} + \sum_{i=0}^{n} c_i \Delta \mathrm{CAP}_{t-i} + \sum_{i=0}^{n} d_i \Delta \mathrm{AGR}_{t-i} + \sum_{i=0}^{n} e_i \Delta \mathrm{MAN}_{t-i} + \sum_{i=0}^{n} f_i \Delta \mathrm{SER}_{t-i} + \sum_{i=0}^{n} g_i \Delta \mathrm{OPR}_{t-i} + \sum_{i=0}^{n} h_i \Delta \mathrm{EXCR}_{t-i} + \sum_{i=0}^{n} I_i \Delta \mathrm{CPI}_{t-i} + \mathrm{ECT}_{t-1} + \mu_t \quad (6.6)$$

Where:

ECT_{t-1}= Error term

Δ= First difference for variables

$b_i, c_i, d_i, e_i, f_i, g_i, h_i \; and \; I_i$ = Short term coefficients for the Johansen model

$\beta_2 - \beta_9$ = Short term coefficients for the Johansen co-integration

The empirical estimate that was utilised for the model was carried out using E-views software.

6.10 Missing data computation

The LAB variable had 10 observations that were missing. The researcher used the unconditional mean imputation method and interpolation method to replace observation with missing values. The unconditional mean imputation method estimates the overall mean of the variables and replaces the missing observations with the mean (Huisman, 2009). However, the weakness of this method is that it reduces the variability of the data because of replacing the missing values with the mean. Therefore, to overcome this weakness, this research also used

linear interpolation (Blu *et al.*, 2004). After the mean values for each variable were generated, it was placed in the first column of the LAB and CPI, then with EViews interpolation method, all the missing observation were imputed. Using both the unconditional mean imputation method and EViews interpolation method the research imputes the missing values while preserving the data variability.

6.11 Results

6.11.1 Test of stationarity

6.11.1.1 ADF and PP unit root test at level and first difference

Usually, time-series data are non-stationary and using such data for analysis leads to spurious regression (Granger & Newbold, 1974). Therefore, a unit root test needs to be carried out to transform variables that are non – stationary to stationary variables to begin the data analysis (Fernandez, 1981). This research tested for the presence of a unit root among the variables using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) test as illustrated in Table ***6.2*** and Table ***6.3*** below. The unit root test was performed using intercept and trend functional form based on the justification provided in section 6.9. According to Feng *et al*. (2014), there is common practice to use log transformation to reduce the data variability and allow the data to be closely conformed to normal distribution. However, this is not always the case as results from non-transformed and log- transformed data are not always relevant for the original non transformed data (Feng *et al.*, 2013). In the case of this study, all variables were not logged; the unit root test was performed on all variables in real terms. After the first difference, all variables in both ADF and PP test became stationary and therefore were integrated of order I (1). This resulted in carrying out the co-integration tests on the variables in the next section below:

Table 6.2: ADF unit root test at constant and trend

Variable	ADF Unit Root Test	
	Level	First Difference
LAB	-1.4473	-4.0016
CAP	-4.0725	-4.8870
AGR	-1.5271	-7.2706
MAN	-2.4181	-2.5945
SER	-1.4502	-5.0920
OPR	-3.7446	-7.3010
EXCR	-1.1162	-3.8519
CPI	-1.5572	-6.6167
GDPCG	-2.7656	-11.5818
nHDI	-2.2035	-4.6027

Table 6.3: Phillip-Perron unit root test at constant and trend

Variable	Phillips-Perron Unit Root Test	
	Level	First Difference
LAB	-0.3667	-3.4375
CAP	-2.4438	-5.4070
AGR	-1.6529	-8.8621
MAN	-2.4886	-7.8200
SER	-1.4584	-5.1665
OPR	-3.9076	-3.7446
EXCR	-0.1038	-3.8480
CPI	-1.5521	-6.6138
GDPCG	-4.1650	-0.5052

nHDI	-2.2412	-4.5885

6.11.2 Johansen co-integration test for economic growth

From the results from the test of stationarity that shows the unit root test, the time series analysis indicates the results were integrated of order I (1). This allowed for the Johansen co-integration test to be carried out and because we have more than one independent variable, the Johansen approach is adopted to test the impact of economic diversification and its impact on economic growth in Nigeria. In this section, the result of the co-integration test is presented in Table ***6.4*** based on equation 6.3 for economic growth stated below:

$$GDPCG_t = \beta_0 + \beta_1 \mathrm{LAB}_t + \beta_2 CAP_t + \beta_3 AGR_t + \beta_4 MAN_t + \beta_5 SER_t + \beta_6 OPR_t + \beta_7 EXCR_t + \beta_8 CPI_t + \mu_t \quad (6.3)$$

Table ***6.4*** presents the co-integration result to assess the long-term link between economic diversification and economic growth for Nigeria. Trace statistics result indicates that 4 co-integrating equations are significant at 0.05 level. The Trace statistics values of 293.7061, 203.1658, 149.0696 and 100.6623 are greater than the critical values at the 5% level. However, the Max - Eigen statistics indicate that 3 co-integrating equations are significant at 0.005 level. The Max-Eigen statistics values of 90.5403, 54.0962 and 48.40739 were also greater than the critical value at 0.05 level. This finding implies that there is a long-term relationship that exists between economic growth and all explanatory variables. Thus, this research proceeds to assess the long-term link between the variables and this is discussed in the next section.

Table 6.4: Johansen co-integration test result – GDPCG

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.
None*	0.9191	293.7061	197.3709	0.0000
At most 1*	0.7775	203.1658	159.5297	0.0000
At most 2*	0.7394	149.0696	125.6154	0.0008
At most 3*	0.6283	100.6623	95.7537	0.0220
At most 4	0.5770	65.0343	69.8189	0.1135
At most 5	0.3182	34.0648	47.8561	0.4983
At most 6	0.2848	20.2777	29.7971	0.4042
At most 7	0.1867	8.2127	15.4947	0.4429
At most 8	0.0212	0.7721	3.8415	0.3796
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.
None*	0.9191	90.5403	58.4335	0.0000
At most 1*	0.7775	54.0962	52.3626	0.0329
At most 2*	0.7394	48.4074	46.2314	0.0288
At most 3	0.6283	35.6280	40.0776	0.1458
At most 4	0.5770	30.9694	33.8769	0.1070
At most 5	0.3182	13.7871	27.5843	0.8370
At most 6	0.2848	12.0650	21.1316	0.5412
At most 7	0.1867	7.4406	14.2646	0.4384
At most 8	0.0212	0.7721	3.8415	0.3796

*Trace test indicates 4 co-integrating equations at the 0.05 level. The Max-eigenvalue test indicates 3 co-integrating equations at the 0.05 level. ** Denotes the rejection of the null hypothesis of no co-integration at 0.05 level*

6.11.2.1 Long term analysis for economic growth

Table 6.5: Long term results for economic growth

Variable Definition	Symbols	Coefficient	Standard Error	t - statistics
Gross Capital Formation	CAP	2.2181**	0.2302	9.6361
Labour Force Participation	LAB	-17.3934**	2.4702	-7.0414
Agriculture Sector Production	AGR	12.1469**	1.0353	11.7327
Manufacturing Sector Production	MAN	-3.9534**	1.8442	-2.1437
Service Sector Production	SER	4.6956**	1.0615	4.4237
Crude Oil Production	OPR	0.7654	0.4890	1.5653
Official Exchange Rate	EXCR	-0.6345**	0.1759	-3.6076
Corruption Perception Index	CPI	28.6629**	8.2911	3.4571

*** Denotes the level of significance at 0.05 level*

The long-run co-integration relationship between GDP per capita growth (GDPCG) i.e., economic growth in Nigeria and its explanatory variables is shown in Table ***6.5*** above. The result shows that both the agricultural sector production and service production which are two of the variables for economic diversification have positive impacts on economic growth in Nigeria and is statistically significant at a 5% level. However, the manufacturing sector has a negative impact on economic growth and is statistically significant at a 5% level. Furthermore, it is observed gross capital formation has a positive impact on economic growth in Nigeria. On the other hand, the results show that labour force participation and exchange rate have a negative impact on economic growth in Nigeria. In contrast, oil production had a positive and insignificant impact on economic growth in Nigeria as well as the coefficient for corruption had a positive effect on economic growth and this indicates that there is lesser corruption in Nigeria. All the coefficients were statistically significant at a 5% level except for oil production. The results are therefore interpreted as long-term multipliers according to Gujarati (2011).

According to Table ***6.5***, in Nigeria, a unit increase in the agricultural sector production and service production and will result in a long-term increase in economic growth by 12.15% and 4.70% respectively. However, a unit increase in the manufacturing sector production and will lead to a long-term decrease in economic growth by 3.95%. This sector further indicates the presence of the Dutch disease effect which says a boom in the oil sector leads to neglect of other sectors, thus the resource curse in the long run in Nigeria (Corden & Neary, 1982). This further suggests that if planning the long term economy in Nigeria is the policy focus, the agriculture and services sector presents the Nigerian government and policymakers a great option to avoid the resource curse and ensure a more diversified economy. However, the manufacturing sector, which could lead to an increase in economic growth and more economic diversification needs to be considered by the policymakers and Nigerian government.

Furthermore, the result in Table ***6.5*** shows that in the long-term, oil production in Nigeria has no significant impact on economic growth in Nigeria and this would not be a sustainable approach for this oil-dependent nation. The result indicates that in the long-term, oil production although having a positive coefficient does not contribute significantly to economic growth while the non-oil sector's production such as agriculture and services, i.e., economic diversification has a significant contribution to economic growth in Nigeria which makes a case for more focus into economic diversification.

The impact of the exchange rate is negative and further validates Kalu and Onyinye (2015) who found out that just as the same way as other oil-producing nations, Nigeria has not been saved from the volatility from crude oil prices related to the natural resource that it has been blessed with, i.e., oil. This means that better exchange rate regimes that would foster economic growth are necessary for Nigeria. Conversely, the positive coefficient of the corruption variable indicates a lesser presence of corruption in the long run. This validates the argument presented in the literature review (see section 2.3) explaining why measuring economic development with GDP per capita may not capture the impact on citizens in Nigeria. However, when the results are compared to the results obtained for long-term human development (see section 6.11.3.1) as well as economic growth in the short-term, an opposite result is observed and hence the presence of rent-seeking, which impacts the economy negatively. The next section presents the short-term analysis for economic growth in Nigeria.

6.11.2.2 Long-run analysis for human development

Table 6.6: Long term results for human development

Variable Definition	Symbols	Coefficient	Standard Error	t - statistics
Gross Capital Formation	CAP	0.0010**	9.8E-05	10.2681
Labour Force Participation	LAB	0.0129**	0.0012	10.8277
Agriculture Sector Production	AGR	0.0036**	0.0005	7.9405
Manufacturing Sector Production	MAN	0.0098**	0.0009	10.6051
Service Sector Production	SER	0.0058**	0.0005	12.6241
Crude Oil Production	OPR	-0.0007**	0.0002	-3.2069
Official Exchange Rate	EXCR	8.3E-05	8.6E-05	0.9710
Corruption Perception Index	CPI	-0.0174**	0.0041	-4.2527

*** Denotes the level of significance at 0.05 level*

The long-run co-integration relationship between human welfare (HDI) and its explanatory variables is shown in Table **6.6** above. The result shows that agricultural sector production, manufacturing, service production which are all the variables for economic diversification have a positive but insignificant impact on human development in Nigeria at a 5% level. Furthermore, capital and labour have a positive impact on human development in Nigeria. All the coefficients were not statistically significant at the 5% level except the exchange rate which was insignificant at a 5% level. In contrast, oil production had no effect on human development in Nigeria as well as the coefficient for corruption had no impact on human development in Nigeria. The results are therefore interpreted as long-term multipliers according to Gujarati (2011).

According to Table **6.6**, in Nigeria, a unit increase in the agricultural sector production and will lead to a long-term increase in human development by 0.0036%. Similarly, a unit increase in manufacturing sector production and service production will lead to long-term positive development in human development by 0.0098, and 0.0058 per cent, respectively. This implies that the impact of economic diversification, i.e., agriculture, manufacturing, and services on human development, in the long run, is positive and increases human development. This further

suggests that if planning the long-term human development in Nigeria is the policy focus, the manufacturing, agriculture, and services sector presents the Nigerian government and policymakers a great option to avoid the resource curse and ensure a more diversified economy.

Furthermore, the result in Table **6.6** shows that in the long-term, oil production in Nigeria has no significant impact on human development in Nigeria and this would not be a sustainable approach for this oil-dependent nation. The result in this section indicates that in the long-term oil production does not contribute significantly to human development while the non-oil sector's production, i.e., economic diversification has a positive contribution to human development in Nigeria. Similarly, the negative coefficient of the corruption variable, indicates the presence of corruption and this rent-seeking behaviour represented by corruption coefficients impacts the Nigerian economy negatively in the long run as the low value of the corruption coefficient indicates the presence of corruption as discussed in the methodology section in chapter 3 (see section 3.5.2). The next section presents the short-term analysis for human development in Nigeria.

6.11.2.3 Short-run analysis for economic growth

In the previous section, this research examined the long-term analysis for economic diversification on economic growth. The next step involves examining the short-term relationship. Therefore, Table ***6.7*** presents the estimated vector error correction model (VECM), which reflect the short-term relationship between economic and its explanatory variables. The result from Table ***6.7*** shows that, in the short-term, now, only the manufacturing sector production is significant and has a negative impact on economic growth in Nigeria indicating the presence of the resource curse in Nigeria whereas the results were different for the manufacturing sector in the long run. However, the coefficient of agriculture and services production was not significant and thus they have no impact on economic growth. These

sectors present the policymakers options to kick-start tackling the resource curse and thus, achieve better economic diversification hence economic development in Nigeria. Furthermore, the impact of corruption is negative differing from the results from the long-run results and indicates the presence of corruption in the short term in Nigeria. This indicates the presence of rent-seeking, a transmission mechanism for the resource curse resulting in slower economic growth in Nigeria in the short run.

The impact of the exchange rate is negative like the results from the long-run results and further validates Kalu and Onyinye (2015) Nigeria has had had a negative impact on economic growth from the volatility from crude oil prices related to the natural resource that it has been blessed with, i.e., oil. This further suggests that better exchange rate regimes that would foster economic growth are necessary for Nigeria. Additionally, Table ***6.7***, shows that in the short term, oil production was not significant and has no relationship with economic growth in Nigeria. It is observed that in both the long and short-run for economic growth, the impact of oil production was not significant. This can be explained as the impact of the exchange rate was negative in both the long and short-run and the country majorly earns from foreign currency which is open to oil price volatility. The coefficient of the error correction term ECT_{t-1} is negative and statistically significant. The error correction mechanism ECT_{t-1} of -0.97 which is consistent with method of implementing error correction. Furthermore, the F-statistics is 2.69 and is significant at a 5% level, while the R-square value is 0.52 and thus the ECM explains 52% of the systemic variation in the dependent variable.

Table 6.7: Vector error correction result for economic growth

Variable	Coefficients	Std. Error	t-Statistics
C	-0.6396	0.8712	-0.7341
D(CAP(-1))	-0.3038	0.1659	-1.8312
D(LAB(-1))	-0.8555	1.1766	-0.7272
D(AGR(-1))	0.4859	0.3655	1.3293
D(MAN(-1))	-1.2888**	0.5601	-2.3008
D(SER(-1))	0.0768	0.3462	0.2217
D(OPR(-1))	0.0569	0.1454	0.3915
D(EXCR(-1))	-0.0321	0.0444	-0.7219
D(CPI(-1))	-5.1764	4.0153	-1.2892
ECT_{t-1}	-0.0294	0.0302	-0.9742
R-squared	0.52		
F-statistic	2.69		

***Note**: D is the first difference, C is the constant and ECT is the error correction term*

6.11.3 Johansen co-integration test for human development

In this section, the result of the co-integration test is presented in

Table ***6.8*** based on equation 6.4 stated below:

$$nHDI_t = \beta_0 + \beta_1 \mathrm{LAB}_t + \beta_2 CAP_t + \beta_3 AGR_t + \beta_4 MAN_t + \beta_5 SER_t + \beta_6 OPR_t + \beta_7 EXCR_t + \beta_8 CPI_t + \mu_t \quad (6.4)$$

Where the dependent variable is the Human Welfare (nHDI), and the independent variables are labour force participation (LAB), gross capital formation (CAP), agricultural sector production (AGR), manufacturing sector production (MAN), service sector production (SER), crude oil production (OPR), exchange rate (EXCR) and corruption perception index (CPI). The result of the unit root test presented in section 6.12 showed that all the variables were stationary after the first difference thus integrated of order I (1). Therefore, this research conducted a Johansen co-integration test between HDI and other independent variables to verify if a long-run relationship exists between these variables shown in

Table ***6.8***. The Johansen co-integration approach uses the Trace and Max-Eigen statistics to test for the presence of a long-run relationship between all the variables under study (Alodadi, 2016).

In

Table ***6.8***, based on the Trace test statistics, the result indicates that are five co-integrating equation that was all significant at 0.05 level. The Trace statistics values of 321.5512, 236.1813, 169.3997, 125.2170 and 83.03088 are greater than the critical values at 0.05 level. However, the Max-Eigen test statistics indicated that there exist two co-integrating equation that was all significant at 0.05 level. The Max-Eigen statistic values of 85.46992 and 66.68152 were greater than the critical value of at the 0.05 level. This result indicates that there is at least more than one co-integration between human development and other explanatory variables. The long-term relationship among variables is discussed in the next section.

Table 6.8: Johansen co-integration test result – human development

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.
None*	0.9069	321.5512	197.3709	0.0000
At most 1*	0.8431	236.0813	159.5297	0.0000
At most 2*	0.7069	169.3997	125.6154	0.0000
At most 3*	0.6902	125.2170	95.7537	0.0001
At most 4*	0.6465	83.0309	69.8189	0.0031
At most 5	0.4733	45.5948	47.8561	0.0803
At most 6	0.3451	22.5128	29.7971	0.2708
At most 7	0.1765	7.2737	15.4947	0.5460
At most 8	0.0078	0.2821	3.8415	0.5953
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.
None*	0.9069	85.4699	58.4335	0.0000
At most 1*	0.8431	66.6815	52.3626	0.0010
At most 2	0.7069	44.1827	46.2314	0.0817
At most 3*	0.6902	42.1862	40.0776	0.0285
At most 4*	0.6465	37.4361	33.8769	0.0180
At most 5	0.4733	23.0820	27.5843	0.1700

At most 6	0.3451	15.2391	21.1316	0.2725
At most 7	0.1765	6.9916	14.2646	0.4902
At most 8	0.0078	0.2821	3.8415	0.5953

*Trace test indicates 5 co-integrating equations at the 0.05 level. The Max-eigenvalue test indicates 2 co-integrating equations at the 0.05 level. * Denotes the rejection of the null hypothesis of no co-integration at 0.05 level*

6.11.3.1 Short-run analysis for human development

In the previous section, this research examined the long-term analysis for economic diversification on human development. Consequently, the next step involves examining the short-term relationship. Therefore, Table ***6.9*** presents the estimated vector error correction model (VECM), which reflect the short-term relationship between human development and its explanatory variables.

The result from Table ***6.9*** shows that, in the short-term, manufacturing sector production, corruption and service sector production is insignificant and have no impact on human development in Nigeria indicating the presence of the resource curse in Nigeria. However, the coefficient of agricultural production is insignificant and has a positive impact on human development. Furthermore, the impact of corruption is negative and indicates the presence of corruption in the short term in Nigeria. This indicates the presence of the resource curse and would lead to slower human development in Nigeria.

However, Table ***6.9*** also shows that in the short term, oil production and agricultural sector production were the only explanatory variables that have a positive but insignificant relationship with human development. Furthermore, economic diversification does not have any significant effect on human development in Nigeria in the short term which further validates the resource curse theory in Nigeria. Compared to the long-term result in

Table ***6.8***, these variables had a positive relationship with human development indicating they are better strategic options for planning future economic development in Nigeria. The impact

of the exchange rate is negative and further suggest that better exchange rate regimes that would foster human development are necessary for Nigeria

The coefficient of the error correction term ECT_{t-1} is negative. The error term measures the speed of adjustment of human development to its equilibrium level and measures the tendency of each variable to return to equilibrium. The error correction mechanism ECT_{t-1} of -0.39 which is consistent with the method of implementing error correction. Since the error correction term is significant this implies that past equilibrium errors play a role in determining the current outcomes captures in the long run impact (Andrei & Andrei, 2015). Furthermore, the F-statistics is 0.5 and is significant at a 5% level, while the R-square value is 0.17 and thus the ECM explains 17% of the systemic variation in the dependent variable.

Table 6.9: Vector Error Correction for human development and other independent variables

Variable	Coefficients	Std. Error	t-Statistics
C	0.0037	0.0018	2.0898
D(CAP(-1))	4.4E-05	0.0002	0.2049
D(LAB(-1))	-0.0009	0.0022	-0.4217
D(AGR(-1))	0.0001	0.0005	0.2803
D(MAN(-1))	-0.0008	0.0009	-0.8939
D(SER(-1))	-0.0001	0.0005	-0.2412
D(OPR(-1))	2.1E-05	0.0002	0.1020
D(EXCR(-1))	-4.0E-06	7.1E-05	-0.0571
D(CPI(-1))	-0.0035	0.0056	-0.6268
ECT_{t-1}	-0.0413	0.1045	-0.3948
R-squared	0.17		
F-statistic	0.50		

***Note**: D is the first difference, C is the constant and ECT is the error correction term*

6.12 Discussion of results

In this section, the results presented in sections 6.11.1 to 6.11.3.2 are discussed. The discussion is segmented into sections 6.12.1 and section 6.12.2. In section 6.12.1, this research presents the discussion on the long-term analysis between human development and economic growth in

a comparative way and section 6.12.2, is the discussion on the short-term relationship between human development and economic growth.

6.12.1 Discussion of the long-run relationship between human development and economic growth

From equation 6.4 and the result presented in Table **6.6** and Table ***6.5***, in the long term, agricultural sector production, manufacturing sector production, and service sector production had an insignificant positive relationship with human development in Nigeria while crude oil production had a negative and insignificant relationship with human development in Nigeria. This further validates the findings of Eko *et al.* (2013) who suggested economic diversification in agriculture and other non-oil sectors. i.e., economic diversification, the problem of mono-products reliance on oil production which is prone to depletion may be remedied.

In contrast, when compared to economic growth, crude oil production had an insignificant and positive relationship with economic growth in the long term. The result indicates that in the long-term, oil production although having a positive coefficient, but does not contribute significantly to economic growth while the non-oil sector's production such as agriculture and services, i.e., economic diversification has a significant contribution to economic growth in Nigeria which makes a case for more focus into economic diversification. Furthermore, agricultural sector production and service sector production, i.e., economic diversification all had a significant relationship with economic growth in the long term. However, manufacturing sector production had an insignificant and negative impact on economic growth in the long term.

After the long-term analysis, these findings have two major implications. The first is that crude oil production does not contribute to human development in Nigeria while the economic

diversification sector contributes positively to human development in Nigeria. This finding reveals that looking into economic diversification for long term planning is a great opportunity for Nigerian economic development. Also, from the gap identified earlier in the study, this shift of attention from what is produced to what impacts people suggests that GDP may not give a holistic view of where the country is in terms of economic progress and development. This further validates the findings of Anyaehie and Areji (2015), who conclude that economic diversification should be considered as a long-term growth strategy for any country.

Secondly, for economic growth, crude oil production has a positive insignificant impact in Nigeria while the economic diversification, except the manufacturing sector, have a significant influence on the Nigerian economy. This further validates Esu and Udonwa (2015) and IMF (2017) finding that Nigeria is primarily dependent on the oil industry to boost economic growth and development and also validates Akpan (2009) who asserted that economic diversification is a must for healthy economic growth in Nigeria.

The study further reveals that if human development is the targeted policy issue, then a policy that targets to grow the economic diversification like agriculture, manufacturing, and services sector among others should be intensified to achieve more economic diversification and to improve the living standards of Nigerians. Moreover, the findings in this research had shown that crude oil production, in the long-term has no influence on human development in the Nigerian economy and would not be a great option for the future in Nigeria. This conclusion also agrees with the conclusion of Ologunde *et al*. (2020) who found that oil would negatively impact the human development index.

However, looking at economic diversification, the agricultural sector had a strong and positive relationship with human development and like earlier discovered by Ikenwa *et al.* (2017) and Ndimele (2017), going back to this sector also presents another opportunity for Nigeria to move

away from dependence on oil production. This result confirms the dominant role that the agricultural sector can play in the diversification of the economy from over-reliance on oil production as the main source of foreign revenue (Igwe *et al.*, 2017). Furthermore, the agricultural sector could contribute significantly to improving the living standard of millions of Nigeria compared to the oil sector. The result agrees with the findings of Olurankinse and Bayo (2012) that discovered that the non-oil trade sector like the agricultural sector has a strong effect on the growth of the Nigerian economy. The authors recommended the need for expansion of production in the agricultural industries to enhance local accessibility of agricultural product and further export for foreign revenue.

In the long term, the result showed that the gross capital formation has a significant positive influence on economic growth while labour force participation has a negative relationship which agrees with the findings of Shahid (2014) on economic growth. Conversely, the positive coefficient of the corruption variable indicates a lesser presence of corruption in the long run for the economy. This validates the argument presented in the literature review (see section 2.3) explaining why measuring economic development with GDP per capita may not capture the impact on citizens in Nigeria. However, when the results are compared to the results obtained for long-term human development (see section 6.11.3.1), an opposite result is observed and hence the presence of rent-seeking, which impacts the economy more via the slower economic growth achieved.

The implication of these findings shows that when economic growth is the targeted issue, crude oil production, as well as the economic diversification sector such as agriculture, and services sector, are important contributors to economic growth in Nigeria. However, in the Nigerian economy, an increase in economic growth from crude oil production does not always translate into a better standard of living. Therefore, when policymakers focus on improving living

standards for Nigerians, emphasis should be placed on human development as the focus tool for measuring economic progress.

6.12.2 Discussion on the short-term analysis for human development and economic growth

The result presented in section 6.11.2 showed that in the short term the manufacturing sector has a significant and negative relationship with human development. However, the service sector has an insignificant and negative relationship with human development while agriculture has a positive but insignificant impact on human development. Eko *et al.* (2013) found that the economy of Nigeria was steady in agricultural commodities before oil was discovered, while agriculture mostly contributed to national income and economic development but was overlooked after the discovery of oil. This finding presents evidence to policymakers and government that in the short-term, investments into the agriculture sector would contribute positively to economic development rather than continued neglect of the sector. Furthermore, this sector can help policymakers tackle the problem of the resource curse in Nigeria.

Oil production had a positive but insignificant influence on human development in the short term and would still be a great way to achieve economic development however, there is evidence to show it would not be a great sector for long-term planning in Nigeria. The perception of corruption has a negative relationship with economic growth and has a negative relationship with human development in Nigeria compared to the long-term result presented in section 6.12.1 indicating there is a presence of corruption in Nigeria which would result in slower economic development.

Oil production had no significant relationship with both economic growth and human development. This result agrees with the findings of (Berument, 2010; Esfahani, 2013;

Odularu, 2008; Spatafora, 1995; Yang, 2008). However, in the short term, economic diversification does not have any significant effect on human development in Nigeria except for the agricultural sector which had had a positive relationship with human development compared to the long-term results where these variables were significant. After the short-term analysis, these findings have two major implications. First, this result implies that in the short term, oil production is the better alternative for both economic growth and human development in Nigeria. This further shows that oil production can still contribute to the economic development in Nigeria as revenue from this sector can be used to improve the economy as well the individual lives of people in Nigeria. However, as concluded in the long run, it is not the best to focus on this sector for Nigeria to achieve economic development.

Secondly, in the context of this study, the implication that no explanatory variables were significant for economic growth whereas four variables were significant for human development shows the inadequacy of relying on economic growth to reflect welfare for a country. It does not imply that those variables do not affect economic growth rather when human development is the main policy focus, then economic growth would not be adequate. The negative relationship means that human development in Nigeria will be lower when economic diversification such as the manufacturing sector and service sector are not functioning optimally to their fullest capacity, and there is rent-seeking demonstrated by corruption in Nigeria. This indicates the potential for economic diversification to achieve more human welfare in Nigeria.

6.13 Summary of findings

This case study chapter has focused on examining the impact of economic diversification on economic and human development in Nigeria throughout 1980- 2017. This analysis used the time series approaches such as ADF and PP unit root test to determine the stationarity of the

data set. Johansen co-integration and VECM were also adopted to evaluate both short and long-term relationships between the variables.

From the analysis, in the long-term relationship, the findings showed two major implications. The first is that crude oil production does not influence human development while economic diversification significantly influences human development in Nigeria. Secondly, for economic growth, both crude oil production and economic diversification have a significant influence on Nigeria economy except the manufacturing sector. This shows that policymakers can focus more on policies to solve over-reliance on one natural resource and encourage diversification away from oil production as well as improve the welfare of citizens in Nigeria.

The study further reveals that in the long run, if human development is the targeted issue, then policy targets to grow the economic diversification like agriculture, manufacturing, and services sector among others should be intensified to achieve more economic diversification and to improve the living standards of Nigerians. However, this research showed that crude oil production, in the long-term has no influence on human development in the Nigerian economy and would not be a great option for the future in Nigeria.

When looking at the short run, oil production is the better alternative for both economic growth and human development in Nigeria. This further shows that oil production can still contribute to the economic development in Nigeria as revenue from this sector can be used to improve the economy as well the individual lives of people in Nigeria. However, as concluded in the long run, it is not the best focus for Nigeria to achieve economic development. Additionally, the implication that no explanatory variables were significant for economic growth in the short run whereas four variables were significant for human development shows the inadequacy of relying on economic growth to reflect welfare for a country. It does not imply that those

variables do not affect economic growth rather when human development is the main policy focus, then economic growth would not be adequate.

Chapter 7

CONCLUSIONS AND RECOMMENDATION

7 Conclusions and Recommendations

7.1 Introduction

The main contribution of this research is to ascertain the impact of economic diversification on economic development in oil-producing middle-income countries. Furthermore, it moves to an in-depth country study to assess the impact of economic diversification on economic development is in Nigeria.

The final chapter of this thesis brings every result together and summarizes the findings and then goes forth to provide policy recommendations to policymakers. The chapter is then organized into the following sections: key conclusions, policy guidelines and recommendations and limitations of the study and direction for further research, and a summary of the thesis.

7.2 Conclusions

Given fluctuations in oil prices and the poor employment potential of extractive industries, the demand for economic diversification in resource-rich nations remains strong. The International Monetary Fund recommends more economic diversification as this would enhance resilience to the volatility of oil prices (IMF, 2016). However, achieving diversification remains a major problem Marotta and Melo (2012), with little advice from academic literature (Ross, 2017).

This thesis fills this gap by investigating the impact of economic diversification on economic development in oil-dependent middle-income countries. This was accomplished by breaking down economic development into two, economic growth measured by gross domestic product (GDP) per capita growth and human development measured by the human development index

(HDI) for oil-dependent middle-income countries. The key conclusions are then broken down into the following:

1. The impact of economic diversification on economic growth in oil-producing middle-income countries (chapter 4)
2. The impact of economic diversification on human development in oil-producing middle-income countries (chapter 5), and
3. The impact of economic diversification on economic development in Nigeria (chapter 6)

7.2.1 The impact of economic diversification on economic growth in oil-producing middle-income countries

The study, in chapter four, investigated empirically the impact of economic diversification on economic growth in middle-income oil-producing countries using panel data covering 18 years, which is between 2000 and 2017. The study used 30 middle-income oil-producing countries for the analysis. To accomplish the objective pooled OLS, fixed effect model and random effect model and the system GMM modelling techniques were adopted for the analysis.

The study used GDP per capita growth to proxy economic growth as the dependent variable whereas economic diversification, i.e., agricultural Sector production (AGR), manufacturing Sector Production (MAN), and service sector production (SER), were used as the main explanatory variables. Other explanatory variables include crude oil production (OPR), exchange rate (EXCR), corruption perception index (CPI) which was the variable for institutional quality, capital (CAP) and labour (LAB) were used as the control variables.

The study found that the effect of economic diversification on economic growth measured by GDP per capita growth rate in oil-producing middle-income countries was negative and

insignificant except for the services sector which was negative but significant and thus shows that economic diversification does not appear to lead to economic growth.

The results indicated that the services sector production had a negative but significant impact on economic growth and hence agreed with the resource curse theory. A similar pattern of results was obtained for both the manufacturing and agriculture sectors suggesting for all three sectors representing economic diversification, the impact was negative and hence does not contribute to economic growth. This shows that these sectors among these oil-producing middle-income countries have not received great attention to ensure more sustainable economic growth.

Furthermore, the results provided evidence that oil production has a positive impact on economic growth and met the a priori expectation. However, if we look at the significance of oil and compare it to the non-oil sectors, this finding showed a positive insignificant impact for oil production and presents the neglected non-oil sectors as great opportunities to achieve sustainable economic growth and thus economic development in oil-producing middle-income countries.

The results from the exchange rate volatility which was identified to be a contributing factor to the Dutch disease was negative on economic growth. This result further validated the Dutch disease phenomenon and hence the resource curse. However, it was observed that the variable for institutional quality, i.e., corruption perception index, was negative and indicated the presence of corruption which suggest rent-seeking. This result also upholds the resource curse theory.

The results which were obtained for the labour force participation and capital, i.e., the gross capital formation was positive in both cases and thus have a positive impact on economic growth. These results were consistent with economic theory i.e., Solow's growth model. From

the results obtained, this thesis concludes that the oil-producing middle-income countries should put more focus on achieving economic diversification and relying less on oil production. Sectors such as the agricultural, services and manufacturing sectors should particularly be focused on as the prices of oil do not have much bearing on them. The enhancement of economic diversification should become a pressing focus for these oil-producing middle-income countries. The conclusions from this research may therefore be of considerable value to the policymakers of these countries while they develop their longer-term economic strategies. Furthermore, since these countries fall in the middle-income group as classified by the World Bank and with rising inequality, the governments of these countries, policymakers and other stakeholders should ensure more economic diversification which would achieve a more sustainable economic growth making it a key policy initiative as they plan the future for their countries.

7.2.2 The impact of economic diversification on human development in oil-producing middle-income countries

The study further assessed the impact of economic diversification on human development in middle-income oil-producing countries in chapter five and used panel data between 2000 and 2017 for 30 middle-income oil-producing countries. To accomplish the objective, the study in this chapter adopted the human development index (HDI) as a proxy for human development as the new dependent variable. This variable is measured from 0 -1 thus, this led to the use of the generalised linear model (GLM) for further econometric analysis while explanatory variables remained the same. Furthermore, the pooled OLS, fixed and random effects models were all used to assess the impact of economic diversification on human development in middle-income oil-producing countries.

The results which were obtained from this study showed that the impact of economic diversification does not entirely contribute to human development in oil-producing middle-

income countries, as only one sector, i.e., the manufacturing sector had a positive impact and the other two sectors, i.e., agriculture and service sectors had a negative impact on human development. The manufacturing sector production had a positive impact on human development. When this sector was compared with economic growth results, it was negative but for human development, there is a positive contribution. This means that the sector potentially presents a way to tackle the resource curse and hence enhance human development and economic diversification for oil-producing middle countries.

However, both the agricultural and services sector have a negative impact suggesting they do not contribute to human development and hence agreed with the resource curse theory in oil-producing middle-income countries. Interestingly, the results were the same for economic growth further validating the resource curse theory. This indicates that these sectors among the oil-producing middle-income countries have not received great attention to ensure more sustainable economic development yet.

The results from this chapter also reflected that oil production now had a negative impact on human development and did not meet the a priori expectation. It was surprising to see that oil production led to a negative contribution on human development thus reducing economic development for the oil-producing middle-income countries which further suggests the need for more economic diversification away from oil for more sustainable economic development among these countries.

Furthermore, the exchange rate volatility which had been identified to be a contributing fact to the Dutch disease now had a positive impact on human development. The positive impact was not statistically significant, and the coefficient was close to zero so it may not completely suggest that it impacts human development.

However, it was observed that the variable for institutional quality, i.e., corruption perception index, was now positive and still indicated the presence of corruption which suggests rent-seeking. This result upholds the resource curse theory. The same conclusion was found for both economic and human development. Thus, the conclusion can be made that the impact of corruption on economic development is negative.

From the results of the impact of economic diversification on economic development, i.e., both economic growth and human development, it is concluded that there is a pressing need for economic diversification based on the evidence provided from this research. Focusing on HDI, i.e., human development presents a better way to plan for sustainable economic development as the impact on the welfare of citizens rather than what is just produced in the economy through the GDP.

From the results obtained, the evidence shows that the oil-producing middle-income countries should put more focus on achieving economic diversification and relying less on oil production as both scenarios indicate sustainable economic development would be achieved by better-targeted policies on economic diversification.

7.2.3 The impact of economic diversification on economic development in Nigeria

The study, in chapter six, explored the impact of economic diversification on economic development from a country-specific viewpoint, using Nigeria as a case study. Time series data between 1980 and 2017 was adopted for the analysis in this case study chapter. The Augmented Dickey-Fuller (ADF) test for unit root indicated that the data which was adopted for all the variables were integrated of order I (1). This opened the possibility to conduct a co-integration analysis to answer the research questions. Since the explanatory variables were more than one, the Johansen test for co-integration was adopted. The results from the tests suggested that there

are co-integrating vectors for economic and human development and the explanatory variables thus the presence of long term and short-term relationships between the variables.

After analysis of the long-term relationship, the findings showed two major implications:

1. The first is that crude oil production does not influence human development while economic diversification significantly influences human development in Nigeria.
2. Secondly, for economic growth, both crude oil production and economic diversification have a significant influence on Nigeria economy except the manufacturing sector. This shows that policymakers can focus more on policies to solve over-reliance on one natural resource and encourage diversification away from oil production as well as improve the welfare of citizens in Nigeria.

The study further reveals that in the long run, if human development is the targeted issue, then policy targets to grow the economic diversification like agriculture, manufacturing, and services sector among others should be intensified to achieve more economic diversification and to improve the living standards of Nigerians. However, this research showed that crude oil production, in the long-term has no influence on human development in the Nigerian economy and would not be a great option for the future in Nigeria.

After the short-term analysis, oil production was found for both economic growth and human development in Nigeria to be a better option. This further shows that oil production can still contribute to the economic development in Nigeria as revenue from this sector can be used to improve the economy as well the individual lives of people in Nigeria. However, as concluded in the long run, it was not the best sector to focus on for Nigeria to achieve economic development.

Additionally, the implication that no explanatory variables were significant for economic growth in the short run whereas four variables were significant for human development shows

the inadequacy of relying on economic growth to reflect welfare for a country. It does not imply that those variables do not affect economic growth rather when human development is the main policy focus, then economic growth would not be adequate.

7.3 Policy guidelines and Recommendations

The results from this thesis intend to provide information to guide policymakers in oil-producing middle-income countries to achieve sustainable economic development. Understanding the impact of economic diversification on economic development empowers the policymakers by expanding the knowledge available to them, thus raising awareness to them of the relevance of the non-oil sectors i.e., economic diversification and shows them to further re-prioritize future economic development strategies. Thus, the result from this thesis presents to them what sectors to achieve more economic diversification which has been identified by most middle-income countries as a policy target. This study also provides the Nigerian policymakers with information and guideline to achieve sustainable economic development.

7.3.1 Recommendations for Middle-income countries

For these countries, the process of understanding the benefits of economic diversification by the policymakers should introduce ways to strengthen the roles of the sectors in achieving economic development for the future. Highlighting, the agricultural, services and manufacturing sectors as engines for the expansion of economies would let policymakers grasp the forethought of strengthening these three sectors. However, careful attention should be placed on the manufacturing sector and the reallocation of labour fwhich could leade to premature industrialization noticed by Rodrik, (2016) who concluded that manufacturing may not necessarily contribute to increased economic development. This can be achieved by key

policy measures such as policies that would solve the resource curse, discourage rent-seeking, strengthen exchange rate impacts, and develop more advanced infrastructures for these sectors.

Thus, this thesis recommends that governments among the oil-producing middle-income countries should adopt a step-by-step method to grow the non-oil sectors in their respective countries. This would help them gradually pilot their countries through well-planned and thought-out strategies designed to achieve greater economic diversification. As such, they should plan and encourage policy focus to mitigate the hindrances to economic diversification, which comes from the non-oil sectors of the economy and promote the development of these sectors rather than be reliant on the revenues from oil. The oil sector may not provide a reliable pillar for economic development as it is influenced by factors such as international markets and international conflicts. Therefore, it would be difficult for any of the countries to ascertain or forecast their economies based on the revenues from oil production. The results indicate that the policy focus which would lead to the growth of agriculture, manufacturing and services sectors should be put in place as the findings from the study on both human development and economic growth indicate that these sectors would help them achieve more economic diversification and as such avoid problems from the international prices of oil and the related price volatility.

Thus, the decision-makers that are responsible for economic development should encourage investments into the non-oil sectors. Continued reliance on the oil sector leads to an imminent threat to the oil-producing nations. High dependence on this sector without planned attempts to diversify the national income sources that would solve the problems of falling oil prices ignores the potential impact that could occur. An example of this was the fall of the oil price by more than 75.8% in 2016 and the recent fall above 100% in 2020 that negatively impacted the economies of oil-producing nations.

Overall, the relationship between economic diversification and economic development is negative which proposes to the governments of the oil-producing middle-income countries to invest in the development of this field. Generally, economic diversification has the potential to push economic development, however, the oil sector seems more responsible for economic development. Conversely, in this study, the impact was not significant enough when the measurement of economic progress was looked at. The non-oil sectors, however, don't follow the oil sector and have bucked the trend. The evidence of this fact, therefore, calls for an increase in their performance because of the establishment of a more diversified economy.

7.3.2 Recommendations for Nigeria

The country has not diversified sufficiently to become less susceptible to oil price changes. However, the results of this study imply that a new strategy should be taken by the government to ensure more economic diversification. The results suggest that Nigeria must concentrate on long-term best predictors to achieve greater economic development. The strategy for long-term rather than short-term development should thus be a central policy priority, and the conclusions imply that economic diversification can help the country escape the problem of low oil prices and their instability. Decision-makers responsible for non-oil development should thus be urged to invest to the maximum degree feasible in these areas.

The results showed that oil production does not influence human development while economic diversification significantly influences human development in Nigeria and for economic growth, both the crude oil production and the economic diversification have a significant influence on Nigeria economy except the manufacturing sector in the long term. This provides proof that the diversity of the revenue sources of Nigeria is key and thus recommends that policymakers should focus more on policies that improve the non-oil sectors such as

agriculture, manufacturing, and services. This would solve over-reliance on one natural resource and encourage diversification away from oil production as well as improve the welfare of citizens in Nigeria.

Policymakers should make every effort to rationalise investments into the oil sector. A viable strategy to addressing this issue may be to diversify revenue sources and reduce reliance on oil. As a result, there is a clear need to look elsewhere for answers, and one of the conclusions of these results is that the agriculture sector, as well as non-oil exports, i.e., economic diversification if encouraged, should be considered while looking for solutions.

Planning for long-term economic development should thus be a top governmental goal. Thus, if the Nigerian economy is to catch up with the economies of other more modern nations, it must focus on crucial non-oil factors such as agriculture, manufacturing, and services sectors. Lastly, the evidence from this study calls for the government of Nigeria to ensure transparency and accountability on the part of government officials in the administration of government spending (income from crude oil production) into the country so that it will enhance the development of the non-oil sectors.

7.4 Limitations of the study and direction for further research

The findings of this thesis, as is expected from finding from any other PhD had some limitations. Some of them were a.) The lack of comprehensive data for long period for some of the variables such as the human development index (HDI) made it unavoidable to calculate the Nigerian HDI. b.) This study researched middle-income countries and as such the variable from different sources had inconsistencies in terms of their dependency on secondary data. To avoid this problem, this thesis data were derived from different international sources including the World Bank, United Nations Development Programme. c.) The gathering of the data for

Nigerian HDI resulted in gathering secondary data from the Central Bank of Nigeria statistical bulletin.

Further research should be carried out to investigate the impact of economic diversification on economic development especially manufacturing led development. Thus, the use of the ease of doing business, as a control variable would help move this area of study forward. The list of non-oil sectors is not exhaustive so further research on what other non-oil sectors contribute to economic diversification. Furthermore, the impact of technology on the three sectors and other non-oil sectors would also move the study of economic diversification forward.

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