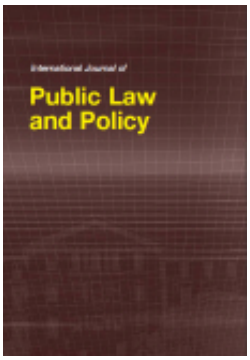

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Sustainable management of petroleum resource revenues: an exploration of Ghana's institutional options

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Sustainable management of petroleum resource revenues: an exploration of Ghana's institutional options

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Abstract: The study explores sustainable management practices as well as the relationship between institutional factors and the sustainable management of oil revenues in Ghana. Close-ended questionnaires were used to collect primary data among the revenue management institutions in Ghana. The study used a simple random sampling technique to analyse the 116 valid responses. The result reveals a significant positive relationship between regularity quality (RQ), government effectiveness (GE), voice, transparency and accountability (VTA) and sustainable management of petroleum resources. To ensure sustainable management of petroleum revenues, governments must strengthen institutional factors and collaborate with Public Interest and Accountability Committees to curtail likely misappropriation of oil proceeds. Though this study is the first to explore and ascertain the relationship between institutional

factors and long-term management of oil revenues in Ghana, it was not able to fully unpack all the channels through which petroleum revenues are astutely managed.

Keywords: sustainable management; petroleum revenues; exploration; institutions; Ghana.

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1 Introduction

In their effort to ensure sustainable management of petroleum revenues, various oil and gas-producing countries have put in place measures that guarantee oil and gas proceeds become a blessing and not a curse. Some of the measures include but are not limited to strengthening the institutional quality of the revenue management institutions and

engaging in sustainable management practices such as investing oil revenues in physical infrastructure, health and education, diversification, renewable energy and petroleum funds (Stevens, 2008; Adams et al., 2019).

Institutions according to some scholars including Graham et al. (2019) and Glynn and D'Aunno (2023), have been theorised to be one of the causes of oil revenue mismanagement. Countries with strong and effective institutions such as Norway, Canada, and Australia among others have managed to escape the oil curse. Consistent with research into the causes of the oil curse, there is a link between weak institutional quality in African oil-producing countries and corruption, lack of voice, transparency and accountability (VTA), ineffective regulatory quality (RQ), and lack of the rule of law (RL), among others (Adams et al., 2019). Kopiński et al. (2013) opined that African oil-producing countries are vulnerable to petroleum revenue mismanagement (oil curse) as a result of these ineffective institutional factors. The relationship between petroleum revenue management and institutional factors such as government effectiveness (GE), RQ, RL, control of corruption (CC), VTA, and political stability and absence of violence (PSAV) is the focus of this study.

In 1983, Ghana's first petroleum law (PNDCL 64) was approved, establishing the legal foundation for crude oil exploration and extraction. Other laws, such as the Petroleum Exploration and Production Law, 1984 (PNDCL 84) and the Petroleum Income Tax Law, 1987 (PNDCL 188), do apply to the oil industry. The Petroleum Revenue Management Act, 2011 (Act 815) (PRMA) was created to act as a working document for assessing, collecting, disbursing, and utilising Ghana's oil revenue per the provisions of Article 36 of the 1992 Constitution.

According to the PRMA, the Ghana Revenue Authority (GRA) is in charge of assessing and collecting oil proceeds, and such proceeds (oil revenues) should not be considered part of the GRA's usual tax revenue collection, and Ghana Revenue Authority Act, 2009 (Act,791), will not apply to oil revenues. By law, all oil proceeds collected by the GRA must be deposited in the Petroleum Holding Fund (PHF) at the Bank of Ghana, where they will be disbursed to the Ghana National Petroleum Corporation (GNPC), Annual Budget Funding Amount (ABFA), Ghana Stabilization Fund (GSF), and Ghana Heritage Fund (GHF). The ABFA, on the other hand, provides financing to the Ghana Infrastructure Investment Fund (GIIF) (PRMA, 2011, 2015).

Based on the findings of the appraisal and drilling wells, Kosmos Energy reported the commercial discovery of petroleum resources in Ghana off the Cape Three Points Block on 18 June 2007. In 2007, the first commercially significant discovery of crude oil was made off the coast of Cape Three Points, allowing Ghana to enter the league of oil-producing nations (Oteng-Adjei, 2011).

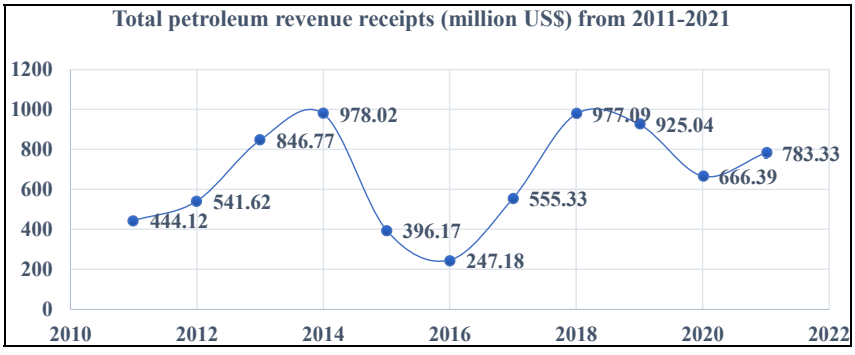
To commemorate crude oil extraction in Ghana, the third president of the Fourth Republic of Ghana flipped on the valves of the Jubilee Field on 15 December 2010 (Oteng-Adjei, 2011). Production of crude oil began in December 2010 at the Jubilee Field (Aryeetey and Ackah, 2018) and that the Jubilee Filed has a daily production capacity of 12,000 bpd. The reserves of the Jubilee Field were estimated at 600 MB with an upside potential of 1.8 billion barrels (Aryeetey and Ackah, 2018; Ayelazuno, 2014).

Until the Tweneboa-Enyenra-Ntomme (TEN) and Sankofa fields began operating in 2016 and 2017, respectively, Ghana only had one field, the Jubilee Field (Aryeetey and Ackah, 2018). According to Aryeetey and Ackah, the TEN field will produce roughly 80,000 barrels of oil per day and 180 million cubic feet of natural gas per day when it reaches its peak. TEN has 239 million barrels of crude oil and 360 billion cubic feet of

natural gas in its reserves (GNPC, 2016; Aryeetey and Ackah, 2018). According to GNPC (2016) and Aryeetey and Ackah (2018), the Sankofa field has a crude reserve of 204 million barrels and a natural gas reserve of 1,071 billion cubic feet. PIAC (2021) estimated that Ghana earned US$7.36 billion from its oil production.

PIAC (2022) notes that Ghana currently produces from Jubilee, TEN and Sankofa Gye-Nyame. The combined production capacity of these three fields for the year 2021 stood at 55,050,391 barrels thus about a 17.7% reduction compared with the 2020 production figure (66,926,806 barrels).

Figure 1 Ghana's total oil and gas revenue earned from 2011 to 2021 (see online version for colours)



Source: Authors' construct with data from PIAC (2021)

To use this natural treasure to promote economic development, a country needs to take pragmatic measures to manage it well to avoid the oil curse (Sachs and Warner, 1997). Ghana like any other crude oil-producing and exporting nation, has high hopes and expectations of turning the treasure to better the lives of its people (Oteng-Adjei, 2011).

The study is structured in five different parts. Part, one deals with the general introduction, part two delves into related literature, part three comprises the methodology while part four analyses the research data and the final part concludes the study with critical recommendations.

2 Theoretical literature and hypotheses

This section discusses the literature on sustainable management of petroleum revenues, the role of administrators in institutional management and the measurement of relevant variables.

2.1 Sustainable management of petroleum revenues

How have countries producing and exporting crude responded to the challenge of managing this fortune? Have they used up the fortune immediately for the benefit of the current generation or they have setup investment funds? Some countries have set aside a substantial amount of this fortune for future use or generations yet unborn (Hannesson, 1998; Adams et al., 2019). Oil-producing and exporting countries can translate their

non-renewable natural resources like petroleum into a long-term development for their people (Van Ingen et al., 2014). Many scholars and practitioners including Stevens (2008) and Van Ingen et al. (2014) view sustainable management practices as a process where governments of oil-exporting countries resist spending pressures by investing in durable infrastructure such as education and other social services, diversification of oil funds or accumulating it in budget surpluses.

Petroleum resources are non-renewable. It may be argued that the price determination for oil and gas takes little notice of this fact, or it may be that for all practical purposes' petroleum resources are plenty that they could be regarded as infinite with a long-term supply of price being determined by what it takes to maintain reasonable inventories of these resources. Revenues generated through oil production can force governments to overspend above their budget appropriations or even sometimes invest in non-priority areas like the GNPC investing in the Ghana Football Association which has no direct benefit to the company (PIAC, 2018). Oil revenue utilisation should be guided by appropriate revenue policies like that of the Ghana Petroleum Revenue Management Act, 2011 (Act 815) where petroleum revenues are invested in GHF GSF and GIIF (Van Ingen et al., 2014; PRMA, 2011).

Hannesson (1998), however, believes that things may look different when taken from the point view of a particular oil-producing nation. The petroleum reserves in a particular country can be depleted over the life time of a generation even though reserves may be discovered in another country so that global reserves can be maintained. It is not enough to have a petroleum revenue framework, but it should be guided by transparency and accountability on the part of the various petroleum revenue management institutions (Ross, 2012; Graham et al., 2019).

The assertion that countries that deplete their petroleum reserves over a lifetime of a generation face the option of either using up the entire petroleum wealth for the benefit of only the present generation or leave some of the petroleum wealth for future generations resonates well with Humphreys et al. (2007). This is possible when the non-renewable resource can be transformed into a renewable resource. To do this requires investing the rents earned from the extraction of this resource in ways that increase the production capacity of the nation or region or province at home or abroad to raise the living standards of the present generation as well as generations yet unborn (Hannesson, 1998). The global benchmark is that oil-producing and exporting countries can leverage on their oil revenues to reduce their public debt and invest the rest of the oil wealth in infrastructure, education, health, social services, diversification and petroleum funds (Van Ingen et al., 2014).

Achieving this transformation practically requires establishing an investment fund where petroleum rent or an appropriate share thereof is channelled. The fund may invest in financial assets, company stocks, bonds and real estate behind which the nation can have real capital in the form of buildings, infrastructure, equipment, and human resource development among others (Hannesson, 1998). Prudent revenue management systems ensure that oil-producing and exporting countries invest in public infrastructure instead of private consumption. Oil revenues should be structured in such a way that they can be used to finance expenditure on public goods that can serve as a special purpose vehicle for diversification, private sector investment and long-term growth (Van Ingen et al., 2014). The World Bank (2004) revealed that investing oil revenues in education, infrastructure and productive sectors of the economy could raise Africa's long-term growth by 2% every year.

Besides investing in public expenditure, petroleum funds can be established for the oil wealth to benefit both present and future generations (Stevens, 2008). However, some scholars have raised concerns as to how petroleum funds can ensure sustainability. Integrating petroleum funds into the overall fiscal policy can sometimes be problematic, despite these funds, expenditure stabilisation has always been elusive. Easy access to these petroleum funds and lack of transparency and accountability promote corruption in crude-producing and exporting countries with weak institutions (Drysdale, 2007).

2.2 Corruption and rent seeking

According to Stevens (2008), rent seeking occurs when the administrators of an organisation or a specific resource want to use the resource (petroleum revenue) for their personal gain or interest at the expense of the masses or citizens. This practice he says is always prevalent in predatory states. Thus, countries in which governments practice kleptocracy whereby the minority ruling elites plunder the oil revenues of the country for their selfish purposes. Rent seeking has been described by Goumandakoye (2016) as income for men who reap where they did not sow. Leaders of rentier states can decide to ignore their people because they have resource rents as income instead of taxes from the citizens. The leaders in such countries can use the resource rents (oil revenue) to buy votes or buy enough support to stay in power without the need to formulate and implement sound economic policies to engineer economic development (Boutilier, 2017). Kassouri and Altıntaş (2020) observed that weak institutional quality and bad governance will lead oil-producing and exporting countries to rent seeking and poor accountability. Rent seeking and corruption overlap.

Economically speaking, the problems of the oil curse especially in developing countries are not so much of rent the seeking and corruption if you put aside moral and income distribution issues, but rather what the proceeds of the rents and corrupt deals are used for by these powerful individuals. If the rents are invested productively, that can result in a successful capitalist state. The problems with rent and corrupt deals will always be an issue if the monies obtained are used in conspicuous consumption or are deposited in foreign bank accounts (Stevens, 2008).

The literature so far feeds into a general debate about a rentier state. Most centralised political-economic models focus on the decisions taken by the managers of petroleum wealth. In the absence of an effective fiscal policy or transparency and accountability, the managers of petroleum wealth can decide to use the rents to enrich themselves or use it to sponsor political parties to gain favour or have access to the rents in future (Goumandakoye, 2016). Countries with good institutions characterised by democratic accountability and the RL are in a better position to astutely manage their oil revenues whiles countries with weak institutions characterised by corruption and mismanagement of oil revenues such as Nigeria, Angola, Niger and Equatorial Guinea will find it difficult to escape the natural resource curse (Collier and Goderis, 2007; Mehlum et al., 2006; Goumandakoye, 2016; Boutilier, 2017). Resource-rich countries with improved GDPs are countries with robust or strong institutions that have the tendency of preventing politicians and bureaucrats from taking advantage of state resources (oil revenues) for personal gain (Stevens, 2008).

Ghana is endowed with a lot of natural resources like gold, bauxite, and diamond, among others and Ghana was given the name ‘Gold Coast’ because of the abundance of

gold in Ghana (Adams et al., 2019). As such, the contributions of the mining industry to Ghana's GDP cannot be overemphasised. Debrah and Graham (2015) found that the mining industry accounts for 12% of government revenues, 7% of corporate earnings and 41% of total export revenues. Yet these revenues have not been managed prudently over the years. Most mining communities in Ghana are underdeveloped when it comes to infrastructure. Poverty, as well as diseases, are rampant in so many mining communities including Ayemfuri, Bogoso, and Kenyasi. The question many people ask is does Ghana have what it takes to sustainably manage its petroleum wealth considering the fact that it has mismanaged its mineral wealth in the past?

2.3 Institutions

Institutional theory is concerned with the more complex and durable features of social structure. It looks at the steps that institutions, norms, rules, and schemas go through to become authoritative control mechanisms for social behaviour (Scott, 2004). Institutional theory determines how institutions are created, adopted, adapted and diffused over time and space and how these institutions come to be of use or of no use (Scott, 2004). There is no one accepted definition of institution as there are many interpretations of it as there are institutions (Scott, 2004). A generic definition of institutions is, institutions are the rules of the game that influence human behaviour in society (North, 2008). This is further explained as a set of rules that regulate how human beings interact in a particular society by helping them fully or partially develop expectations of what other actors will or will not do (Rodrik, 2007). Veblen (1909, p.626) defines institutions as "settled habits of thought common to the generality of men." Glaeser et al. (2004) see institutions as property rights and the fundamental structures of the government.

The term institutions could also be defined as the social, economic, legal and political structures of a given society. North (2008) indicates that most of the time, organisations are classed as formal institutions. Examples of formal institutions include political institutions, government departments, trade unions, national oil companies (NOCs), international or independent oil companies (IOCs), legislature and judiciary among others (Acemoglu et al., 2001). Dale et al. (2001) explain that institutions apply not only to government departments, but also to routine patterns of behaviour between the individual (micro level) and other groups in society (meso level) and the state (macro level) at large whether formal or informal or directly or indirectly involved in the petroleum resource revenue management.

Institutions are neither static nor neutral (Leftwich, 2005). As indicated earlier, institutions allocate incentives (advantages and opportunities) and disincentives (disadvantages) in different ways and of course there will be winners and losers in the course of establishing or changing them. It is commonly agreed that institutions can be formal or informal depending on the context, thus the definition of institution will depend on the purpose of the analysis (Leftwich, 2005). A social organisation in which individuals cooperate and which impacts people's behaviour and the way they do things is known as an institution. Every organisation serves a certain purpose. Institutions are permanent, which implies they do not terminate with the death of a single person. An institution has and can enforce human behaviour guidelines (Akuhata-Huntington et al., 2020). Because formal institutions, such as organisations, conventions, regulations, and formal social systems, are easier to modify than informal institutions, the term is used to refer to them for, the purposes of, this study.

Depending on the quality of its institutions, every country has what it takes to benefit from its natural resource boom. Strong institutions, according to Eregha and Mesagan (2016), tend to turn natural resource endowment into a blessing because natural resources and growth have some spillover effects. In countries with weak institutions, however, bad governance, rent seeking, and corruption are more likely to dominate, leading to conflict and other societal problems (Wizarat, 2013). Whilst good institutions raise the cost of rent seeking (Graham et al., 2019), making it more difficult for corruption to thrive. This demonstrates that natural resource richness combined with good institutions would not only act as a catalyst but also as a driver. Though improving weak institutions can be difficult (Addison and Baliamoune-Lutz, 2006), leaders or managers of resource or oil rich nations should focus on either developing or building strong institutions that promote economic development in those resource or oil rich countries (Beland and Tiagi, 2009). This is because, if institutions are weak, it will be difficult if not impossible to translate petroleum wealth into economic development.

Sala-i-Martin et al. (2003) and Eregha and Mesagan (2016) both emphasised the importance of institutions in resource-rich countries' socioeconomic development. In Ghana's oil and gas industry, what constitutes sustainable management practices? What is the relationship between institutional factors and long-term oil and gas revenue management? The study focuses on investigating sustainable management practices in Ghana and the relationship between institutional factors and long-term or sustainable oil and gas revenue management.

2.4 Measurement of variables

It is important that researchers explicitly define the conceptual terms and variables used in their studies so that other researchers can replicate and analyse the studies more accurately. Therefore, it is imperative to provide both conceptual and operational definitions to limit the definitions to a particular context (Patten and Newhart, 2018).

The constructs used in this study were in line with worldwide governance indicators (WGIs) adopted from Kaufmann and Lafarre (2021) as updated in 2019. A total of six measures were used: CC, GE, VTA, PSAV, RQ and RL. All six constructs were used to test the hypotheses. For this study, it is important to operationalise the following terminologies. The operational definitions of the following variables below were adopted from Kaufmann and Lafarre (2021).

- *GE:* The perception of services provided by these petroleum revenue management institutions. How independent are these institutions from political pressures and interference? The ability of these institutions to implement to the latter the provisions of the PRMA (Act 815). It also demonstrates these institutions' commitment to the tenets of the Act. It also involves the governments, executives, and judiciary's roles in guaranteeing transparent administrative decision-making.

  Damette and Seghir (2018) looked at the relationship between per capita GDP and oil rent per capita from 1996 to 2011 and discovered that the relationship between oil income and economic development is not linear. In furtherance to their study, they found that the main issue that can cause an oil curse or blessing is government spending and particularly the quality of government (government effectiveness). Their specification model examined the differences in terms of quantity and quality

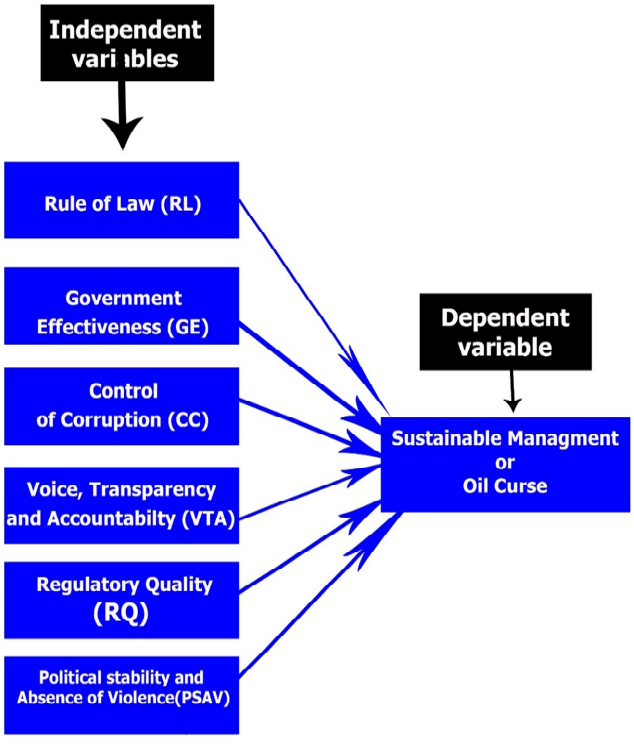
of government expenditures regarding oil revenue. They interact oil exports per capita with government effectiveness and expenditure. Each of the regressors was included independently to capture their direct impact on economic growth. They concluded that oil revenues interaction with government effectiveness has a significant negative coefficient of –0.03 (with a t-statistic of –4.482) (Damette and Seghir, 2018). They also found that the growth impact of government revenue is positive whiles the growth impact of government expenditures is insignificant.

- *RQ:* The public perception about whether the Petroleum Revenue Management Institutions promote diversification and private sector development. Do they provide quality services to the other stakeholders in the oil and gas sector? In the context of mineral resource management in Ghana, the regulatory agencies include the Public Interest and Accountability Committee (PIAC), Minerals Commission, Petroleum Commission, Public Accounts Committee (PAC) of Parliament and Parliamentary Select Committee on Energy and Mines among others.
- *RL:* What is the perception of Ghanaians about the petroleum revenue management institutions? Are the institutions able to enforce all the legal provisions of the Act including property and contract rights? Is the justice system including law enforcement free and fair among these institutions?
- *VTA:* The degree to which citizens in a given country, in this study (Ghana), are involved in determining who controls its petroleum resources. The scope of freedom of association, freedom of communication, and a free press in relation to petroleum revenue activities. Are Ghanaians able to express themselves freely regarding issues of petroleum revenue management? As a result of this, PIAC, Extractive Industry Transparency Initiative (EITI), and Ghana Integrity Initiative (GII), among other civil society organisations were put in place to ensure VTA.
- *PSAV:* The perception citizenry holds about the likelihood of a government overthrow unconstitutionally. In this study, it entails the likelihood that the managers of the petroleum revenue management institutions would be sacked illegally. In other words, issues bothering the job security of the managers of these institutions.
- *CC:* The extent to which institutional power is exercised for the good of the state instead of for private gain. What is the level of the corruption perception index? Is there a case of the state capture by elites for personal interest at the expense of the masses? Is there political interference and pressure from political elites to circumvent the rules?

The evidence for a link between natural resource endowment and corruption is divided in the literature. Many studies have found a positive association between natural resource availability and corruption, whether at the meso or macro levels of the economy (Dong et al., 2019). Adams et al. (2019) also argued that natural resource endowment leads to corruption irrespective of the type of natural resource, whether minerals (such as gold, diamond, bauxite, etc.) or oil and gas. Brunnschweiler and Bulte (2006) and Brunnschweiler (2007), on the other hand, contend that natural resource dependence indicators such as the ratio of natural resource exports to GDP, as proposed by Sachs and Warner (1995), are influenced by the quality of institutions and the effectiveness of government, such as corruption control. Nunn and Puga (2012) discovered that before mineral extraction, geographical factors influenced the formation of institutions, implying

that institutions existed prior to the extraction of mineral resources. Crude oil discoveries indicated Vicente (2010) increase vote buying and corruption in natural resource abundance countries, especially in Africa.

Figure 2 The conceptual framework of the study (see online version for colours)



Source: Authors' construct (2021)

From a qualitative standpoint, political scientists, historians, and economists generally agree that the abundance of natural resources, particularly oil and gas, can lead to rent-seeking behaviour and corruption, resulting in a decrease in government effectiveness and quality, and thus negatively impacting economic performance (Brunnschweiler, 2007; Tiba, 2019; Tiba and Frikha, 2020).

- *Sustainable long-term management of revenue:* Refers to preserving the petroleum wealth in such a way that both present and future generations benefit from it. Sustainable management of petroleum resources is made possible through the establishment of petroleum funds, human capital formation, diversification and investment in durable public infrastructure that will benefit and advance society for generations yet to come. This includes the obligation to account for environmental sustainability and sustainable accounting methods that promote sensible natural resource management (Adams et al., 2019).
- *Petroleum resources and petroleum revenues:* In this study, it is the petroleum revenue that accrues to the government of Ghana from the various sources as contained in the PRMA. Sources of such revenues are but not limited to: royalties,

carried and participating interest (CAPI), corporate income tax (CIT), surface rentals and other oil entitlements (PRMA, 2011). The two terms: petroleum resource and revenue are been used interchangeably.

H_1 There is significant positive relationship between RL and Sustainable management of petroleum revenues.

H_2 VTA has a significant positive relationship with sustainable management of petroleum revenues in Ghana.

H_3 There is a significant positive relationship between RQ and sustainable management of petroleum revenues.

H_4 There is no significant relationship between CC and sustainable management of petroleum revenues in Ghana.

3 Empirical literature

Though the effect of the oil revenues might be debated, the local or regional damage always comes in the form of environmental and human rights. Meanwhile, the benefits of these revenues go to the central government rather than the local or regional level. In other words, the curse is always more felt at the local or regional level where these energy projects are ongoing.

To explore the mechanisms that link natural resource endowment (oil and gas) to excellent or bad economic performance, one must first investigate the influence of petroleum resource endowment on economic growth (Majumder et al., 2020). Because petroleum discovery, production and export have a positive impact on the economies of industrialised countries, it is logical to believe that petroleum resource discovery in underdeveloped settings, particularly in Sub-Saharan Africa, would be advantageous to the economies of those African countries (Yates, 2006). On the contrary, the likelihood that petroleum revenue in Africa would be a blessing instead of a curse is a topic that has been debated among academics, policymakers and analysts within the oil and gas industries of these oil rich countries (Ablo, 2015).

Although the oil curse hypothesis has attracted significant academic attention, particularly in the energy industry (Van der Ploeg, 2011; Ackah-Baidoo, 2012; Corrigan, 2014; Adams et al., 2019), most of these works focused on transparency and accountability as the drivers to sustainable management of petroleum resource revenues in Africa. The pioneering studies of the resource curse hypothesis (Sachs and Warner, 1995) are considered important studies that aimed to understand the connection between countries endowed with petroleum resources and their economic development rates (Tiba and Frikha, 2020). Any country that is blessed with oil and gas resources has some special features, that is, it brings revenue and can also be an engine for industrialisation (Satti, 2014; Stevens and Dietsche, 2008).

Ingen et al. (2014) revealed that petroleum revenue contributes about 90% of Nigeria's export revenue and that Nigeria is currently the largest producer of crude oil in Africa. Their study concluded that despite the abundance of hydrocarbons in Nigeria and the huge revenues earned from the production of oil and gas, the country is, however, not significantly better off. Nigeria has failed to leverage on the abundance of petroleum revenues to attain high economic and social indices. In Nigeria, Asekunowo (2012) did a

similar analysis between 1974 and 2008 on the relationship between natural resource endowment and economic performance, confirming the oil curse theory. They attributed the oil curse in Nigeria to weak institutions, excessive spending, over-borrowing and oil revenue volatility due to crude oil fluctuations and OPEC restrictions.

Ross (2012) did a similar study and concluded that the oil curse is as a result of bad democracy, weak institutions and civil war. This confirmed the works of Asekunowo (2012). Sarmidi (2014), while researching the relationship between natural resource abundance and economic growth, emphasised the importance of institutions in the management of petroleum resources. From 1984 to 2005, Sarmidi (2014) used data from over 90 countries. They confirmed that natural resource endowment can have a favourable impact on economic growth if institutional quality meets a certain threshold.

Acemoglu et al. (2001) evaluated the effects of mineral resource abundance on current income levels of their instrumented indicator for institutions to country proportions of world non-fuel mineral reserves and per capita crude resources. They concluded that institutional quality may explain in great detail the differences in economic development across nations, and even questioned the oil curse hypothesis (Brunnschweiler, 2007). Implying that the impact of growth and development on natural resource abundance is unclear and that when institutional quality is factored into the resource curse study, the natural resource curse may only exist in countries with low-quality institutions. In this context, the most important institutional quality indicators appear to be: GE, RQ, RL, VTA, PSAV and CC.

As indicated previously, considering all the revenues earned by oil-producing and exporting countries in Africa, yet in terms of economic growth, infrastructural development and human resource formation, these resource-endowed countries grew less rapidly than resource-poor or deficient countries (Karl, 1997; Katz et al., 2004). Besides, in 2011, out of 32 oil-producing and exporting countries sampled globally, 6 out of the 9 with the poorest human capital formation were found in Sub-Saharan Africa (Boschini et al., 2007). Nations blessed with natural resources have an opportunity to benefit enormously from such resources. Revenues from these resources can help boost infrastructural development such as roads, schools, health facilities, and human resource development, just as Norway, the UK, the USA, Canada and Botswana did (Acquah-Sam, 2014).

Several studies attempted to use corruption control as a variable to establish the correlation between sustainable management and corruption. These studies found mixed evidence between the two (e.g., Brunnschweiler, 2007; Bhattacharya and Hodler, 2014). Vincente (2010) offered evidence that abundant natural resources led to corruption and vote buying. Andersen and Ross (2014), on the other hand, believe that the Haber-Menaldo findings may not be correct or applicable to data after the 1980s because oil wealth has stymied democratic transition after the 1980s due to governments in developing countries capturing oil profits previously siphoned off by IOCs firms (Dong et al., 2019). One reason why resource endowed countries do not outperform their counterparts (resource poor or deficient countries) could be that resource poor countries have to live with their wits while their counterparts can afford to relax. This inverse relationship between natural resource abundance and economic development is intriguing hence the study seeks to establish Ghana's institutional options to ensure sustainable or long-term management of oil revenues.

Another study was conducted in Brazil in Latin America by Caselli and Michaels (2013) on the effects of oil revenues on public services. The study wanted to find out whether royalties from oil revenues have an effect on the decision-making of local authorities, social services and the welfare of the people (Iacono, 2016). The study found that, despite significant increases in government spending on infrastructure, education, and health care as a result of oil profits, there was no comparable shift in the economic and social results of the massive sums invested.

Do Vale did a study in Angola in 2013, aimed at examining the effect of petroleum resource endowment on its economic development and it revealed about 10% GDP growth between 2004 to 2011. Angola is the second largest exporter of crude oil in Africa, after Nigeria. Angola has an operation budget of about US$40 billion of which oil alone accounts for more than 80% of the government's revenue (World Bank, 2004). The World Bank report further added that Luanda, Angola's national capital appeared to be one of the most expensive cities to live in the world. Despite its enormous endowment with petroleum resources, the City of Luanda is one of the most impoverished urban cities in the world. 90% of its citizens do not have access to portable drinking water and electricity. The least said about corruption in their oil industry the better. For example, embezzlement of petroleum revenue is a common practice in Angola whereby political elites manipulate the system to enrich themselves with oil revenue (Do Vale, 2013). The above assertions support the findings of Atkinson and Hamilton (2003), Papyrakis and Gerlagh (2004), Kopiński et al. (2013) and Satti (2014), which show that mineral-rich countries, particularly in Africa, are prone to corruption, petroleum revenue mismanagement, and rent seeking, among others. Angola's petroleum regulatory institutions promote secrecy in public accounts and petroleum revenues collected from the IOCs are kept confidential. Surprisingly, Sonangol (the GNPC equivalent in Angola) is only accountable to the presidency. An IMF report in 2012, revealed an amount of US$1 billion was missing from their public accounts, and the IMF in 2011, unearthed that between 2007 and 2010, an amount of US$32 billion of Angola's petroleum revenue was unaccounted for (Do Vale, 2013).

Following these misfortunes that bedevil African oil-producing and exporting countries, Ghana is expected to do better in terms of economic and social indicators following the discovery of hydrocarbons in 2007.

Adams et al. (2019) conducted a similar study in Ghana, using multiple regression and the variables of quality of governance, quality of institutions, GE, and accountability and corruption control mechanisms, and found that the key determinants for the long-term management of petroleum resources are GE, quality of institutions, accountability, and corruption control mechanisms. This current study takes a different approach to determine the relationship between sustainable management of oil revenues and GE, VTA, RQ, RL, PSAV and CC using structural equation modelling (SEM).

In summary, the literature review was divided into various themes or subtopics that were relevant to the research objectives. The first part of the literature review looked at sustainable management practices such as investing in infrastructure, education, health services, and diversification and petroleum funds.

Last but not least, the literature assessment focused on the role of institutional elements in the long-term management of petroleum income. A conceptual framework was created to show the relationship between institutional quality and long-term petroleum revenue management, as well as the role of institutional elements.

No empirical studies have been undertaken to analyse sustainable management practices in Ghana's oil and gas industry, with a focus on the influence of institutional elements, therefore this study aims to address that gap. The next provides a detailed research methodology.

4 Methodology

The study adopts the positivist philosophy of inquiry. This section focuses on the presentation of the data sources and the reason for the use of the empirical SEM techniques.

4.1 Data and data sources

The respondents were chosen from the entities designated to collect and manage Ghana's oil revenue under the PRMA (Act 815) framework. To achieve the research objectives, the researchers also deemed it necessary to involve key policy analysts in the study. Questionnaires were distributed among the petroleum revenue management institutions as well as some civil society organisations (CSOs). The commonly used data collection instruments in business and management inquiries are interviews and questionnaires (Creswell, 2009; Saunders et al., 2009). This study relied on questionnaires. The study used Ghana as a case study because it is one of the African countries that has discovered petroleum resources in recent times. As noted earlier, many institutional factors can help Ghana to sustainably manage its oil revenues. Some of these factors are GE, RQ, VTA, RL, PSAV and CC.

4.2 Model specification and estimation method

This study used SEM to test the hypotheses. Unlike first-generation models, such as discriminant analysis, factor analysis, and multiple regression, SEM techniques are classified as the second generation of multivariate analysis that enables researchers to simultaneously consider various relationships existing among multiple independent and dependent variables (Amoh and Ali-Nakyea, 2019; Fornell, 1987). SEM techniques allow researchers to adopt a multiplicity of predictors and criterion variables and model errors in measurement for observed variables, thus, aiding test mediation and moderation relationships in a single model (Blanthorne et al., 2006; Hair et al., 2016). Unlike other models, SEM has no identification and other technicalities challenges, it allows for testing complex models with varied constructs and indicators (Amoh and Ali-Nakyea, 2019; Rigdon, 2014). This approach adopted helps the researchers to examine a particular social phenomenon (sustainable management of petroleum resource revenue and the role of institutional factors to escaping the oil curse) from which the study findings were obtained and understood.

The research philosophy relied upon is consistent with Saunders et al. (2009) findings, as it is concerned with knowledge development and the character of that knowledge. The outcomes of this study will provide policymakers and other stakeholders with an overview of the sustainable management of petroleum revenues and the impact of institutional elements in the long-term management of Ghana's oil revenue.

5 Empirical results and discussion

5.1 Sample data and demographics of respondents

Since the study sought to test hypotheses, the questionnaire was designed and distributed to the petroleum revenue management institutions, policy analysts and CSOs. The questionnaire was self-administered online (Google Forms). Because of the global pandemic (COVID-19), many researchers and scholars recently relied on online surveys including Amoah and Jibril (2020) and Haseeb et al. (2019). The questionnaire was designed with the Likert scale five-point rating consisting of 32 self-evaluating questions. The Likert scale was used to determine the level of comprehension of the respondents about the questions. Each survey item was rated using the Likert scale as in *1 = strongly disagree*, *2 = disagree*, *3 = unsure*, *4 = agree* and *5 = strongly agree*. On the average, each respondent used 25 minutes. 116 responses were received and analysed using SEM as shown in Table 1.

A sample of 116 questionnaires was returned for the survey within the age brackets of 18–60 years and above. Males were more represented and participated in the survey than females. These demographic data confirmed the works of the United Nations Development Programme (UNDP) on gender participation in the oil and gas industry. UNDP indicated that women are more interested in low paid jobs, and non-technical fields such as marketing, public relation, management and administration (UNDP, 2018).

Out of the 116 returned questionnaires, those within the age brackets of 31–45 dominated with a percentage of 70.7, followed by 19.0 who were between the ages of 46–60 years and lastly, 12 respondents representing 10.3% with the ages ranging between 18–30 years. Given that the majority of Ghana's youth work in oil and gas revenue management, this presents a huge opportunity for the country's oil industry.

As can be seen from Table 1 the respondents with masters' degrees participated more in the study than those with PhD and diploma/first degree. The implication is that the information provided is sourced from respondents with good educational background on the topic under study. Therefore, their responses, thus, help in a great deal in answering the research questions because most of them have the requisite knowledge suitable for the items on the questionnaire because of their knowledge and experience in the oil and gas industry.

The study was dominated by respondents with work experience in the oil and gas industry of between 1–5 representing 61 or 52.6% who have worked within the various institutions in the petroleum industry, followed by 30 respondents representing 25.9% with work experience of between 6–10 years who have also served in these institutions. There was a good number of 17 or 14.7% of the respondents who have worked in various institutions for between 11–20 years. This is indeed good for experience and institutional memory. The respondents 4 or 3.4% who worked for a long period for these institutions are those above 20 years. For those who have worked (between 6–10 years) for the industry with respect to the Petroleum Revenue Management Act, 2011 (Act 815), it is understandable because our oil industry is relatively new and the act itself was passed in 2011, though some of these respondents might have been working in other energy companies before the passage of the Petroleum Revenue Management Act.

Table 1 Structure of respondents according to some selected demographics

Details		*Frequency*	*Percent*
Gender	Male	82	70.7
	Female	34	29.3
Age	18–30	12	10.3
	31–45	82	70.7
	46–60+	22	19.0
Education	Diploma/first degree	24	20.7
	Masters	85	73.3
	PhD	6	5.2
	Other	1	.9
No. of years of service	Less than 1 year	4	3.4
	1–5	61	52.6
	6–10	30	25.9
	11–20	17	14.7
	20+	4	3.4
Respondents institutions	GNPC	10	8.6
	GRA	11	9.5
	Audit service	2	1.7
	PIAC	33	28.4
	Parliament	5	4.3
	BoG	2	1.7
	Ministry of Finance	1	.9
	Ministry of Energy	4	3.4
	Policy analysts	5	4.3
	EITI	2	1.7
	TIG	3	2.6
	Civil society	5	4.3
	EPA	2	1.7
	Private sector	1	.9
	Education	1	.9
	Petroleum Commission	1	.9
	Other	28	24.2

Source: Field data (2021)

5.2 Sustainable management practices in Ghana's oil and gas industry

From the descriptive statistics on Table 2, the mean of individual sustainable management practices was shown from the highest to the lowest sustainable management practice. The study graded the sustainable management techniques by comparing mean score variables with the same mean score and standard deviation to see which variable was more powerful than the other.

For the SMPs: investment of oil revenues in infrastructure such as roads, and hospitals as a sustainable management practice ranked first with a mean score of 4.15.

Investing oil revenues in social services such as health care and education so that future generations can also benefit from the oil and gas find in Ghana rated second with a mean score of 4.06. Diversification into the other sectors of the economy such as agriculture, manufacturing, petrochemicals had a mean score of 3.78~4.0. Investing oil revenue in renewable energies also had a mean score of 3.59~4.0. The revenues allocated to the Ghana Heritage Fund are invested offshore (abroad) had a mean score of 3.61~4.0. 5 out of the 13 of the sustainable management practices rated approximately 4.0 which were significant for an emerging oil and gas country like Ghana. The average mean of all the mean scores as depicted in Table 2 was *3.826* which explained that they were moderately significant.

Table 2 The mean scores of sustainable management practices in Ghana's oil and gas sector

Descriptive statistics						
SM practice	*N*	*Minimum*	*Maximum*	*Mean*	*Std. deviation*	*Rankings*
Investment in health and education	116	1	5	4.06	0.868	2nd
Diversification	116	1	5	3.72	0.958	3rd
Investment in infrastructure	116	1	5	4.15	0.749	1st
Investment in renewable energy	116	1	5	3.59	0.904	5th
Investment in petroleum funds	116	1	5	3.61	0.862	4th
Overall average	*116*			*3.826*		

Source: Field data (2021)

With these descriptive statistics about sustainable management practices, the study deemed it necessary to compare the respondents' opinions about how petroleum revenue should be managed sustainably vis-a-vis government priority areas for investment of petroleum revenues from 2011 to 2022.

Table 3 Government priority areas for ABFA investment of oil revenues from 2011–2022

No.	*2014–2016*	*2017–2019*	*2020–2022*
1	Agriculture modernisation	Agriculture	Agriculture
2	Road and other infrastructure	Road, rail and other critical infrastructure development	Road, rail and other critical infrastructure development
3	Expenditure and amortisation of loans for oil and gas infrastructure	Physical infrastructure and service delivery in health	Physical infrastructure and service delivery in education and health
4	Capacity building (including oil and gas)	Physical infrastructure and service delivery in education	Industrialisation

Source: PIAC (2014 and 2021)

Compared with government priority areas for investment from 2011 to 2022 as depicted in the Table 3, the opinions of the respondents are in consonance with government's investment options to ensure sustainable management of petroleum revenues in Ghana. Investing oil revenues in education and health services, infrastructure, and

diversification/industrialisation were aptly captured by the participants of the study. In the 2014 PIAC report for example, out of a total amount of GHS1, 871,558,042 of oil revenue invested between 2011 and 2014, infrastructure received the highest amount of the ABFA of the oil revenue which is consistent with the opinions of the study subjects in the descriptive statistics.

Surprisingly, since 2011, agriculture has always been the number one priority yet in terms of allocation of oil revenues, infrastructure, health and education services received the highest amounts of GHS1,958,971,270.23 (70.69%) and 698,243,057.04 (25.20%) of the ABFA respectively as evident in the 2020 ABFA allocation and utilisation.

5.3 The relationship between institutional factors and sustainable management of petroleum revenues

5.3.1 Exploratory factor analysis, validity and reliability tests

This section looks at how measurement instruments are validated in terms of content, convergent, and discriminant validity. An exploratory factor analysis (EFA) was used to statistically determine whether the factor groups were appropriate before the study's hypotheses were tested, in order to validate the factor structure of the measurement variables. This analysis is especially important because the items in the survey were adapted from many previous research, thus it is important to make sure the grouping of the items is correct.

To do so, the data was tested using the principal components analysis and varimax rotation in Statistical Package for Social Sciences (SPSS) v26 to see if it was good enough for factor analysis. The EFA analysis in this study employed 32 determinants for the dimension of independent components. The Kaiser-Meyer-Olkin tests (KMOs) yielded a score of 0.855, suggesting high sample adequacy and data appropriateness for factor analysis. Table 4 shows that the Bartlett's test of sphericity was likewise positive and significant at p = 0.000 0.05. This result reinforced the idea that the results were sound for further analysis by confirming a linear dependence among the variables (Pallant, 2010).

Table 4 KMO and Bartlett's test of sphericity

KMO and Bartlett's test		
Kaiser-Meyer-Olkin measure of sampling adequacy		0.855
Bartlett's test of sphericity	Approx. chi-square	2,868.091
	df	465
	Sig.	0.000

The scale employed in this study was examined using a tougher criterion for item retention advocated by Ladhari (2012). The items had to

a load at 0.5 or more on a factor

b not load at more than 0.50 on two factors

c have a greater than 0.50 item-to-total correlation

d have an eigenvalue greater than 1.

In total, seven components with eigenvalues greater than 1 emerged from the analysis (Guttman-Kaiser rule).

Table 5 Matrixes of the components extracted from the EFA (see online version for colours)

	EFA (32 items)					
	1-RL	*2-GE*	*3-CC*	*4-VTA*	*5-RQ*	*6-PSAV*
RL2	0.836	0.146	–0.121	0.247	–0.013	–0.004
RL4	0.786	0.213	–0.119	0.208	0.086	0.152
RL3	0.770	0.190	–0.147	0.244	0.114	0.035
RL6	0.729	0.356	–0.138	0.166	0.014	–0.070
RL8	0.717	0.244	–0.053	0.209	–0.086	–0.073
RL5	0.603	0.289	–0.026	0.099	0.112	0.067
RL1	0.577	0.500	–0.214	0.130	0.014	0.239
RL7	0.523	0.208	–0.165	0.204	0.154	0.400
GE3	0.286	0.809	–0.121	0.180	0.140	0.114
GE6	0.212	0.739	–0.185	0.072	–0.081	0.182
GE2	0.310	0.716	–0.240	0.133	0.083	–0.087
GE5	0.292	0.690	–0.124	0.269	0.084	–0.034
GE4	0.299	0.653	–0.237	0.102	0.240	0.251
GE1	0.273	0.420	–0.174	0.311	0.200	0.346
CC6	–0.167	–0.152	0.855	0.062	–0.212	–0.061
CC4	–0.032	–0.235	0.855	0.013	–0.280	–0.067
CC5	–0.030	–0.281	0.838	–0.091	–0.198	0.023
CC3	–0.284	–0.113	0.754	–0.035	0.216	–0.161
CC2	–0.174	–0.079	0.706	–0.243	0.155	–0.249

Source: Field data (2021)

Table 5 Matrixes of the components extracted from the EFA (continued) (see online version for colours)

	EFA (32 items)					
	1-RL	*2-GE*	*3-CC*	*4-VTA*	*5-RQ*	*6-PSAV*
VTA4	0.291	0.200	–0.065	0.875	0.176	0.080
VTA3	0.319	0.170	–0.047	0.859	0.211	0.107
VTA2	0.249	0.197	–0.065	0.846	0.143	0.038
VTA6	0.248	0.120	–0.027	0.758	0.277	0.236
RQ3	0.044	–0.018	–0.176	0.176	0.815	0.122
RQ4	–0.111	0.133	0.000	0.145	0.788	0.186
RQ1	0.268	0.098	0.022	0.369	0.672	0.125
RQ5	0.026	0.189	–0.217	0.242	0.567	0.388
VTA5	0.368	0.397	–0.216	0.235	0.409	0.054
PSAV2	0.142	0.197	–0.201	0.113	0.171	0.799
PSAV3	–0.100	0.010	–0.060	0.123	0.281	0.763
PSAV4	–0.133	–0.003	0.037	–0.002	0.218	0.111
% of variance	*16.516*	*12.953*	*12.154*	*12.051*	*9.646*	*6.826*

Source: Field data (2021)

Table 5 provides the results of the EFAs. Even though seven factors emerged from the analyses with eigenvalues greater than 1, only six were selected. This is because all factors that retained only one item of the original dimension were discarded. This was in response to the fact that the 7th factor loaded only one item so it was discarded. The six selected factors that emerged from the EFA, all together accounted for 70.15% of the variance in the sample.

According to Table 5, *RL* maintained all of its eight-dimensional items such as RL2, RL4, RL3, RL6, RL8, RL5, RL1 and RL7 with 16.52% explanatory variance. The purpose of using the RL as a variable was to see if the petroleum revenue management institutions followed all of the precepts, rules, and regulations of the Petroleum Revenue Management Act (Act 815) as revised in 2015 (Act 893).

- *GE* lost one of its original dimensional items (GE1) but retained five (GE3, GE6, GE2, GE5 and GE4). GE1 could not meet the standard to be included in the analysis. The four maintained dimensions resulted in an average total variance of 12.953%. GE seeks to measure the quality and effectiveness of services provided by the petroleum revenue management institutions.
- *CC* is used to measure the corruption perception and CC among the petroleum management institutions. CC maintained all of its five-dimensional items (CC6, CC4, CC5, CC3 and CC2 with an average total variance of 12.154%
- *VTA* lost one item out of the five-dimensional items. VTA measures the level of transparency and accountability among the oil revenue management institutions in Ghana as mandated by the PRMA. However, VTA maintained VTA4, VTA 3, VTA2 and VTA6 except for VTA5 which did not meet the benchmark for inclusion.
- *RQ* measures and monitors the nature and quality of policies and projects undertaken by PIAC, GNPC, GRA, BoG, IAC, Ministry of Finance and other CSOs in terms of oil and gas revenue management. With a total variance of 9.646%, it retained all of its four-dimensional items (RQ3, RQ4, RQ1 and RQ5).
- Last but not the least, *political/institutional stability and absence of violence* (*PSAV*) aims at measuring the level of stability and conflict of interest among the various actors (PIAC, GNPC, GRA, BoG, IAC, Ministry of Finance and other CSOs) in the petroleum revenue management. PSAV lost one of its items (PSAV4) and retained only two (PSAV2 and PSAV3) with an average total variance of 6.826%.

It is noteworthy that no modifications to the labels were suggested after the grouping of the EFA, given the zero overlap with original dimensions. A summary of the factor structure after conducting the EFA is provided in Table 5.

Six further independent factor analyses using an orthogonal rotation approach (varimax) were carried out to assess the uni-dimensionality of the newly generated factors, each with only the items proposed in the previous phase (the shaded items in Table 5). Only one element was recovered by each of the six factors, proving the validity of our method. Table 6 displays the results of this analysis, which only include the loads of those elements that significantly contribute to explaining each of the factors (loadings > 0.6). Table 6 shows the reliability and convergent validity data for each of the six criteria. The high loadings (loads > 0.6) of each of the products attested to their dependability. Cronbach's alpha and the composite reliability of all factors exceeded the internal consistency requirement of 0.7 (Shemwell et al., 2015).

Table 6 Loads of the six factors and their reliability statistics

	1		*2*		*3*		*4*		*5*		*6*	
	RL		*GE*		*CC*		*VTA*		*RQ*		*PSAV*	
	RL2	0.868	GE3	0.901	CC6	0.899	VTA4	0.971	RQ3	0.868	PSAV2	0.888
	RL4	0.866	GE6	0.78	CC4	0.903	VTA3	0.968	RQ4	0.838	PSAV3	0.888
	RL3	0.847	GE2	0.832	CC5	0.884	VTA2	0.912	RQ1	0.782		
	RL6	0.815	GE5	0.794	CC3	0.787	VTA6	0.877	RQ5	0.769		
	RL8	0.752	GE4	0.826	CC2	0.744						
	RL5	0.712										
	RL1	0.785										
	RL7	0.669										
Alpha Cronbach	0.911		0.883		0.899		0.949		0.83		0.888	
Range of Cronbach's alpha if one items deleted	0.81–0.912		0.80–0.873		0.81–0.902		0.92–0.958		0.747–0.810			
Range of correlations between items and total corrected scale	0.54–0.808		0.67–0.831		0.61–0.825		0.71–0.943		0.61–0.742		0.579–0.579	
Composite reliability	0.930476653		0.915586599		0.967627965		0.963983274		0.887740286		0.881771989	
AVE	0.627656		0.6850274		0.801688667		0.8701845		0.66463825		0.788544	
Sqrt. (AVE)	0.792247436		0.827663821		0.895370687		0.932836802		0.815253488		0.888	

Note: All loads significant at p-value = 0.01.

Source: Field data (2021)

Table 6 shows that the average variance extracted (AVE) for each factor was greater than 0.5, which is the required threshold benchmark (Fornell and Larcker, 1981). With the exception of RL, CC, and VTA, when any of the items were removed from the scales for each dimension, the Cronbach's alpha values did not improve, and the correlations between each item and the total corrected scales were all over 0.5. An item was not removed under RL, CC and VTA because the new Cronbach to be obtained was not significantly different from what the study already has. Again, the new Cronbach to be obtained is still greater than 0.7 (just like what the study had already) which is the benchmark. 'Will of the factors' convergent validity was validated, with all of the items having large loads ($t > 2.58$) (Malhotra, 1999).

Table 7 displays the results of the discriminant validity analysis, which was conducted using linear correlations or standardised covariances among latent factors to see if the inter-factor correlations were less than the square root of the AVE (Fornell and Larcker, 1981).

Table 7 Correlation matrix of latent factors

Factors		*1*	*2*	*3*	*4*	*5*	*6*
1	Rule of law	*0.792*					
2	Government effectiveness	0.685**	*0.828*				
3	Control of corruption	–0.390	–0.476	*0.895*			
4	Voice, transparency and accountability	0.577**	0.475**	–0.227	*0.933*		
5	Regulatory quality	0.253**	0.339**	–0.268	0.506**	*0.815*	
6	Political stability and absence of violence	0.215*	0.289**	–0.299	0.325**	0.496**	*0.888*

Notes: In the main diagonal the square root of AVE of each construct.
*correlation significant at 0.05.
**correlation significant at 0.01.

Source: Field data (2021)

The square roots of each AVE (shown boldly in the main diagonal) were also greater than the off-diagonal elements, as shown in Table 7 (correlations or standardised covariances among latent factors). As a result, discriminant validity was also checked (Hair et al., 2010).

5.4 Structural equation modelling

The next stage in creating the definitive scale is to analyse the six dimensions as dimensions in a second-order confirmatory factor analysis (CFA). From the asymptotic variance-covariance matrix, the model was estimated using the robust maximum likelihood technique. Table 8 demonstrates that the variables converged towards the factors established in the CFA based on the fit statistics acquired during measurement model estimation.

With 980 degrees of freedom and a p-value of 0.000, the Satorra-Bentler χ^2 was 2,916.644; the χ^2/df was 0.770, which was below the allowable limit of 5. The root mean-square error of approximation (RMSEA) was 0.075, well below the acceptable level of 0.08, the comparative fit index (CFI) was 0.837, and the RMSEA 90%

confidence range was reported to be between 0.076 and 0.093. Table 8 also shows that the Cronbach's alpha and the reliability coefficient Rho for the CFA are 0.897 and 0.941, respectively. Taking the importance of the robust 2 statistic with a grain of salt and considering the global indicators, it is clear that the global fit was satisfactory.

Table 8 Confirmatory factor analysis

Dimension	*Item*	*Load*	*t-value*	r^2
Rule of law	RL1	0.587	–	0.587
	RL4	0.709	9.820*	0.709
	RL3	0.682	8.419*	0.682
	RL6	0.602	9.451*	0.602
	RL8	0.483	6.707*	0.483
	RL5	0.427	7.190*	0.427
	RL2	0.725	9.198*	0.725
	RL7	0.383	6.454*	0.383
Government effectiveness	GE2	0.617	–	0.617
	GE6	0.467	7.606*	0.467
	GE3	0.763	11.272*	0.763
	GE5	0.511	8.661*	0.511
	GE4	0.647	9.280*	0.647
Control of corruption	CC2	0.329	–	0.329
	CC6	0.836	4.764*	0.836
	CC4	0.859	4.822*	0.859
	CC5	0.766	4.722*	0.766
	CC3	0.399	3.686*	0.399
Voice, transparency and accountability	VTA2	0.740	–	0.740
	VTA4	0.963	25.791*	0.963
	VTA3	0.960	18.820*	0.960
	VTA6	0.644	11.561*	0.644
Regulatory quality	RQ1	0.448	-	0.448
	RQ3	0.750	8.585*	0.750
	RQ4	0.633	6.323*	0.633
	RQ5	0.414	6.828*	0.414
Political stability and absence of violence	PSAV2	1.000	–	1.000
	PSAV3	0.335	3.686*	0.335
		Standardised coefficient	*t-value*	r^2
Sustainable management	RL	0.019	0.256	0.584
	GE	0.205	2.570*	
	CC	–0.001	–0.024	
	VTA	0.191	2.405*	
	RQ	0.184	2.130*	
	PSAV	0.076	1.539	

Note: *significant.

Source: Field data (2021)

Table 8 Confirmatory factor analysis (continued)

Goodness of fit summary	
Satorra-Bentler scaled χ^2	930.4887
Degrees of freedom (df)	507
p-value	0.00000
χ^2/df	0.770
Comparative fit index (CFI)	0.837
Root mean-square error of approximation (RMSEA)	0.075
90% confidence interval of RMSEA	(0.076–0.93)
Cronbach's alpha	0.897
Reliability coefficient Rho	0.941

Note: *significant.

Source: Field data (2021)

Table 8 again provides the loads of the items used in the CFA and their test statistics. The table also shows that all the items had higher loadings (greater than 0.5), validating the fact that the items strongly measure the dimensions. The table again shows that the t-values of all the items were significant (t > 2.58); indicating a good level of significant prediction of the items to accurately measure their respective dimensions. The relatively higher levels at which the items explain their respective dimensions (r^2) are also presented in Table 8, as well as the factor means for each of the dimensions.

Table 8 also includes the standardised coefficients for the model's established associations, as well as their t-values, from which the relevant findings can be determined.

Table 8 shows that there is a positive association between RL and sustainable petroleum resource income management, with a standardised coefficient of 0.019 and a t-value of 0.256. Thus, any unit of effort to enforce the RL among the revenue management institutions will result in 0.019 increase in the sustainable management of oil and gas revenues and vice versa. This does not support the study H_1 that there is significant positive relationship between *RL* and sustainable management of petroleum revenues. Though the relationship is statistically insignificant, it is however, positive and that is good for an emerging oil and gas production country like Ghana.

This implies that, if PIAC is able to enforce the RL among these institutions, Ghana will astutely manage its oil revenue. However, if these institutions have no zeal to abide by all the provisions of the PRMA, that can lead to mismanagement of oil revenues. This relationship shows that RL is not a determining factor for the sustainable management of oil revenues. This assertion contradicts the works of Larsen (2006) and Graham et al. (2019) who cited examples of countries like Botswana, Norway, Australia, and Denmark among others as countries who are able to manage their oil revenues because of RL and strong institutional arrangements.

The results also indicate that there is a significant positive relationship between *GE* and sustainable management of oil and gas revenues with a *standardised coefficient of 0.205* and a corresponding *t-value of 2.570**. This shows that the result is relatively robust. Thus, a unit increase in GE in terms of effective government policies and quality

of services provided by these institutions will result in 0.205 increase in sustainable management of petroleum resource revenues. This shows that GE is statistically significant in the long-term management of petroleum revenue. The findings of the study confirm an earlier study by Adams et al. (2019) who also alluded to the fact that GE is an important determinant for Ghana in escaping the oil curse.

On the contrary, *CC* appears to have a negative relationship with sustainable management of petroleum revenues with its corresponding *standardised coefficient of –0.001* and *t-value of –0.024*. A unit decrease in CC among the institutions will consequently lead to –0.001 decrease in sustainable management of petroleum revenues. This indicates that CC is not a determining factor (statistically insignificant) to sustainable management of petroleum resources because of its negative relationship. The findings of the study confirm H_4 that there is no significant positive relationship between CC and sustainable management of petroleum revenues.

However, Al-Kasim et al. (2013) reported that one of the contributing factors to oil curse especially in Africa is weak institutions aptly characterised by corruption. In other words, their assertion confirms the fact that corruption inhabits sustainable management of petroleum resources. This position (CC is not a determinant factor to sustainable management of petroleum resources) contradicts the works of Dong et al. (2019) who in their study also found a positive relationship between CC and coal mining in China.

The probable reason why CC is not a statistically significant determinant of sustainable management of petroleum revenues in Ghana may be as a result of the passage of the PRMA (Act 815) as amended in 2015 (Act 893) to serve as the legal and legislative framework for the management of oil revenues. Under this Act, PIAC was established as an independent institution to monitor, evaluate and report on the activities of these revenue management institutions (Stephens, 2019).

VTA has a significant positive correlation with the long-term management of petroleum revenues with a *standardised coefficient of 0.191* and a *t-value of 2.405**. As a result, every unit of work put in to ensure that revenue management institutions demonstrate VTA will result in a 0.191 rise in the long-term management of oil and gas revenues, and vice versa. This shows that the result is robust. This confirms the study's H_2 that VTA has a significant positive relationship with sustainable management of petroleum revenues. As a result, transparency and accountability are required for the long-term management of oil and gas income. This backs the claim of Graham et al. (2019) that the establishment of PIAC under the PRMA (Act 815) has greatly improved transparency and accountability in the management of Ghana's petroleum resources.

The VTA is also consistent with the IMF's report that transparency and accountability are very important in improving natural resource governance in oil-producing and exporting countries (IMF, 2014). On the contrary, some scholars argue that VTA alone is not a panacea to eliminating corruption and ensuring sustainable management (Kolstad and Wiig, 2009).

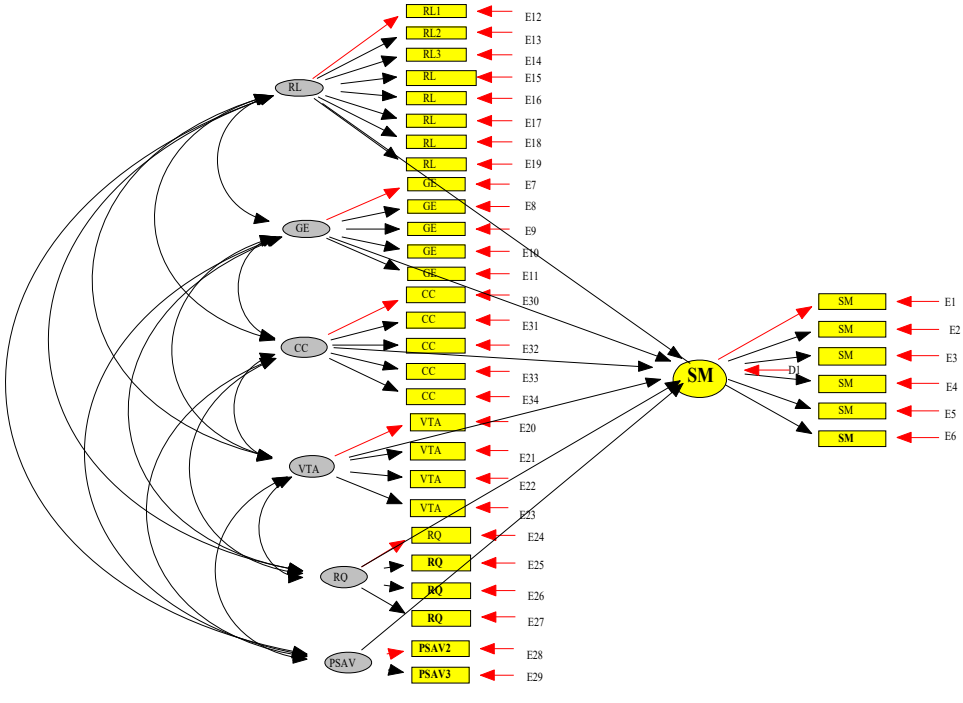
Last but not the least, the statistical correlation between *RQ* and sustainable management of petroleum revenues has a significant positive relationship with a *standardised coefficient of 0.184* and a corresponding *t-value of 2.130**. The result is robust and thus, a unit increase in RQ services provided by these institutions will result in 0.184 increase in sustainable management of petroleum revenues. This indicates that RQ is a significant determining factor in the sustainable management of petroleum resources and vice versa. The findings of the study support the H_3 that there is a significant positive relationship between RQ and Sustainable management of petroleum revenues. This

shows that RQ is an important determinant of sustainable management of petroleum resources as confirmed by Katz et al. (2004), Stevens (2008) and World Bank (2014) that RQ is an essential ingredient for the long-term management of petroleum revenues whether in developed or underdeveloped settings.

Finally, the findings of the study show a positive relationship between *PSAV* and the sustainable management of petroleum revenues with their respective *standardised coefficient of 0.076* and *t-value of 1.539*. Thus, a unit increase in PSAV in terms of institutional stability, absence of violence or conflict among these institutions will result in 0.076 increase in sustainable management of petroleum revenues. PSAV is one of the indicators of WGIs for effective natural resource management. This indicates that PSAV is also relatively an important determinant for the sustainable management of petroleum resources and vice versa. This is consistent with the studies of Kaufmann et al. (2019) who opine that those countries who are able to turn their natural resources into a blessing are nations with limited or no political violence. This positive relationship between PSAV and sustainable management of petroleum resources is congruent with the studies of Kopiński et al. (2013) who touted Ghana as a country with relative political stability with a relatively diversified economy which makes it possible to attract foreign direct investment (FDI). Despite the recent political vigilantism, Adams et al. (2017) also confirmed that PSAV is very important to escaping the natural resource curse when they alluded to the fact that Ghana has been classified as one of the fastest growing economies in Sub-Saharan Africa with enviable democratic credentials.

A pictorial representation of the relationships between the variables of this study and their standardised coefficients for the relationships are shown in Figure 3.

Figure 3 SEM model with path coefficients (see online version for colours)



6 Summary of findings

The study's goal was to look at Ghana's oil and gas industry's sustainable management practices. In order to do this, the study looked into Ghana's institutional possibilities for long-term petroleum revenue management. The findings revealed that investment of oil revenues in durable infrastructure such as roads, and hospitals as a sustainable management practice ranked first with a mean score of 4.15. Investing oil revenues in social services such as health care and education rated second with a mean score of 4.06. Diversification into the other sectors of the economy such as agriculture, manufacturing, petrochemicals had a mean score of 3.72~4.0. Investment into petroleum funds such as the GHF and GIIF had a mean score of 3.61~4.0 and renewable energy had a mean score of 3.59~4.0. Also, the study sought to ascertain the relationship between institutional factors and long-term management of oil revenues in Ghana.

Regarding the relationship between institutional factors and sustainable management of petroleum resources, the CFA (findings) show that PSAV, RL have relatively positive relationships with the sustainable management of petroleum resources in Ghana with *t-values of 1.539 and 0.256* respectively. The relationships between RQ, GE, VTA and sustainable management of petroleum resources had significant positive relationships with *t-values of 2.130**, *2.570** and *2.405** respectively as indicated in Table 8. The conclusions of this study corroborated those of Adams et al. (2019), who suggested that GE, VTA, and RQ are crucial predictors for Ghana's ability to escape the oil curse. According to Oppong (2016) and Graham et al. (2019), through its initiatives, PIAC has legitimised GE, RL, and VTA in the oil and gas sector.

The findings contradict the study H_1 that there is significant positive relationship between RL and Sustainable management of petroleum revenues. The findings do not support the assertion that RL is a determining factor in the sustainable management of oil revenues. Larsen (2006) and Graham et al. (2019) disagree and cited examples of countries like Botswana, Norway, Australia, Denmark among others as countries who are able to escape the oil curse because of RL and strong institutional arrangements. These scholars further added that RL has a positive relationship and an essential ingredient for sustainable management of natural resources. The findings also support the study's H_2 that VTA has a significant positive relationship with sustainable management of petroleum revenues. This confirms the assertion of Graham et al. (2019) that the establishment of PIAC under the PRMA (Act 815) has contributed tremendously to transparency and accountability in the management of petroleum resources in Ghana. The VTA also affirms IMF's report that transparency and accountability are very important in improving natural resource governance in oil-producing and exporting countries (IMF, 2014). The study's findings also agree or support the H_3 that there is a significant positive relationship between RQ and sustainable management of petroleum revenues. The findings of the study confirm its H_4 that there is no significant positive relationship between CC and sustainable management of petroleum revenues. Finally, the study did not find any positive relationships between CC and sustainable management of petroleum revenues. However, Al-Kasim et al. (2013) reported that one of the contributing factors to mismanagement of oil revenues especially in Africa is weak institutions characterised by rent seeking and corruption. In other words, their assertion confirms the fact that corruption inhabits sustainable management of petroleum resources.

7 Conclusions, recommendations and policy implications

In order to effectively manage Ghana's oil revenues, the study looked into sustainable management practices using oil proceeds. It also looked at the strength of Ghana's oil sector institutions and the link between institutional factors and long-term petroleum revenue management. In order to prevent the mismanagement of the revenues from natural resources, the study's conclusions could be applied to other natural resources such as gold, bauxite, diamonds, etc.

Governments, policymakers, and other oil and gas-producing and exporting countries, particularly in Sub-Saharan Africa, will benefit from the study's conclusions. For policy makers, the findings of the study provide insights into Ghana's institutional quality.

- The study discovered a positive relationship between sustainable management and various institutional factors except for CC; as a result, the study suggests that in order to ensure sustainable management of petroleum revenues, the government in collaboration with PIAC must work hard to ensure that misappropriation of oil proceeds is curtailed through strengthening its institutional quality in terms of VTA, GE, RL, RQ, PSAV, and CC.
- The findings will also help the government of Ghana to come out with strategic institutional reforms to the PRMAA so that government/political interference in the management of oil revenues can be curbed. Government can also introduce strict corruption control measures and tougher punishments to institutions that violate the PRMA's provisions in line with the law.
- The study also recommends that PIAC, with the help of government should closely monitor and collaborate with the other petroleum revenue management institutions to ensure that oil proceeds allocated to government priority areas especially agriculture and diversification are fully implemented.

There are however, some limitations with the study. The study was not able to unpack the channels through which petroleum revenues affect economic development (GDP). The study could have included as part of its objective Ghana's petroleum fiscal regimes or the impact of gas extraction alone on Ghana's GDP and revenue projections. However, at this time, this is outside the scope of the study. In terms of future research, a comparative or cross-country study among African oil-producing and exporting countries may be conducted to see how differences in institutional quality between countries affect sustainable management of petroleum revenues.

References

Ablo, A.D. (2015) 'Local content and participation in Ghana's oil and gas industry: can enterprise development make a difference?', *Extractive Industries Society*, Vol. 2, No. 3, pp.20–327 http://dx.doi. org/10.1016/j.exis.2015.02.003.

Acemoglu, D., Johnson, S. and Robinson, J. (2001) 'The colonial origins of comparative development: an empirical investigation', *American Economic Review*, Vol. 91, No. 5, pp.1369–1401.

Ackah-Baidoo, A. (2012) 'Enclave development and 'offshore corporate social responsibility' implications for oil-rich Sub-Saharan Africa', *Resource Policy*, Vol. 37, pp.152–159 http:// dx.doi.org/10.1016/j.resourpol.2011.12.010.

Acquah-Sam, E. (2014) 'Economic effects of oil and gas production and management on the Ghanaian economy', *European Scientific Journal*, Vol. 10, No. 10, pp.463–479.

Adams, D., Ullaha, S., Akhtara, P., Adams, K. and Saidi, S. (2019) 'The role of country-level institutional factors in escaping the natural resource curse: insights from Ghana', *Resources Policy*, Vol. 61, pp.433–440.

Addison, T. and Baliamoune-Lutz, M. (2006) 'Economic reform when institutional quality is weak: the case of the Maghreb', *Journal of Policy Modeling*, Vol. 28, No. 9, pp.1029–1043.

Akuhata-Huntington, Z., Foster, S., Gillon, A., Merito, M., Oliver, L., Parata, N., Ualesi, Y. and Naepi, S. (2020) 'COVID-19 and indigenous resilience. Higher education', *Research & Development*, Vol. 39, No. 7, pp.1377–1383.

Al-Kasim, F. Soreide, T. and Williams, A. (2013) 'Corruption and reduced oil production: an additional resource curse factor?', *Energy Policy*, Vol. 54, pp.137–147.

Amoah, J. and Jibril, A.B. (2020) 'Management of SME's operational sustainability in developing countries: a conceptual study', in *16th European Conference on Management, Leadership, and Governance*, October, p.9.

Amoh, J.K. and Ali-Nakyea, A. (2019) 'Does corruption cause tax evasion? Evidence from an emerging economy', *Journal of Money Laundering Control*, Vol. 22, No. 2, pp.217–232.

Andersen, J.J. and Ross, M.L. (2014) 'The big oil change: a closer look at the Haber Menaldo analysis', *Comparative Political Studies*, Vol. 47, No. 7, pp.993–1021.

Aryeetey, E. and Ackah, I, (2018) *The Boom, The Bust, and The Dynamics of Oil Resource Management in Ghana*, WIDER Working Paper, No. 2018/89, ISBN 978-92-9256-531-2, The United Nations University World Institute for Development Economics Research (UNU-WIDER), Helsinki.

Asekunowo, V.O. (2012) 'Crude oil revenue and economic development in Nigeria (1974–2008)', *OPEC Energy Revenue*, Vol. 36, No. 2, pp.138–169.

Atkinson, G. and Hamilton, K. (2003) 'Savings, growth and the resource curse hypothesis: part special issue: links between poverty and environment degradation in Latin America', *World Development*, Vol. 31, No. 11, pp.1793–1807 http://dx.doi.org/10.1016/j.worlddev.2003.05.001.

Ayelazuno, J. (2014) 'Oil wealth and the well-being of the subaltern classes in Sub-Saharan Africa: a critical analysis of the resource curse in Ghana', *Resources Policy*, Vol. 40, pp.66–73 https://doi.org/10.1016/j.resourpol.2013.06.009.

Beland, L.P. and Tiagi, R. (2009) *Economic Freedom and The 'Resource Curse', An Empirical Analysis*, Fraser Institute, Toronto [online] https://www.fraserinstitute.org/sites/default/files/EconomicFreedomandResourceCurse_1 (accessed 10 May 2023).

Bhattacharyya, S. and Hodler, R. (2014) 'Do natural resource revenues hinder financial development? The role of political institutions', *World Development*, Vol. 57, pp.101–113.

Blanthorne, C., Jones-Farmer, L.A. and Almer, E.D. (2006) 'Why you should consider SEM: a guide to getting started', *Advances in Accounting Behavioral Research*, Vol. 9, pp.179–207.

Boschini, A.D., Pettersson, J. and Roine, J. (2007) 'Resource curse or not: a question of appropriability', *Journal of Economics*, Vol. 109, No. 3, pp.593–617.

Boutilier, R.G. (2017) 'Raiding the honey pot: the resource curse and week institutions at the project level', *The Extractive Industries and Society*, Vol. 4, No. 2, pp.310–320.

Brunnschweiler, C.N. (2007) 'Cursing the blessings? Natural resource abundance, institutions, and economic growth', *World Development*, February, Vol. 36, No. 3, pp.399–419, Elsevier Ltd., DOI: 10.1016/j.worlddev.2007.03.004, http://thepsychologist.bps.org.uk/volume-26/edition-2/methods-teaching-thematic-analysis.

Brunnschweiler, C.N. and Bulte, E.H. (2006) *The Resource Curse Revisited and Revised: A Tale of Paradoxes and Red Herrings*, Working Paper, No. 06/61, December [online] http://www.ideas.repec.org/p/eth/wpsuif/06-61.html (accessed 11 July 2019).

Caselli, F. and Michaels, G. (2013) 'Do oil windfalls improve living standards? Evidence from Brazil', *American Economic Journal: Applied Economics*, Vol. 5, No. 1, pp.208–238.

Collier, P. and Goderis, B. (2007) *Commodity Prices, Growth and the Natural Resource Curse: Reconciling a Conundrum*, CSAE WPS, No. 15.

Corrigan, C.C. (2014) 'Breaking the resource curse: transparency in the natural resource sector and the extractive industries transparency initiative', *Resource Policy*, Vol. 40, pp.17–30 http://dx.doi.org/10.1016/j.resourpol.2013.10.003.

Creswell, J.W. (2009) *Research Design: Qualitative, Quantitative and Mixed Methods Approaches*, 3rd ed., SAGE Publications, Inc., LA, USA.

Dale, V. H. et al. (2001) Climate change and forest disturbances', *Bioscience*, Vol. 51, pp.723–734.

Damette, O. and Seghir, M. (2018) 'Natural resource curse in oil exporting countries: a nonlinear approach', *International Economics*, No. 156, pp.231–246.

Debrah, E. and Graham, E. (2015) 'Preventing the oil curse situation in Ghana: the role of civil society organisations', *Insight on Africa*, Vol. 7, No. 1, pp.21–41, African Studies Association of India SAGE Publications, DOI: 10.1177/0975087814554067, http://ioa.sagepub.com.

Do Vale, H. (2013) *The Centre for Political and Constitutional Studies of the Spanish Ministry of the Presidency*, Governance Officer for the United Nations Development Programme in Angola.

Dong, B., Zhang, Y. and Song, H. (2019) 'Corruption as a natural resource curse: evidence from the Chinese coal mining', *China Economic Review* https://doi.org/10.1016/j.chieco.2019.101314.

Drysdale, J. (2007) 'Sustainable development or resource cursed? An exploration of Timor-Leste's institutional choices'.

Eregha, P.B. and Mesagan, E.P. (2016) 'Oil resource abundance, institutions and growth: evidence from oil producing African countries', *Journal of Policy Modelling*, Vol. 38, pp.603–619 http://www.sciencedirect.com.

Fornell, C. (1987) 'A second generation of multivariate analysis: classification of methods and implications for marketing research', in Houston, M.J. (Ed.): *Review of Marketing*, pp.I407–1450, American Marketing Association, Chicago.

Fornell, C. and Larcker, D.F. (1981) 'Structural equation models with unobservable variables and measurement error: algebra and statistics', pp.382–388.

Glaeser, E., La Porta, R., Lopez-de-Silanes, F. and Shleifer, A. (2004) 'Do institutions cause growth?', *Journal of Economic Growth*, Vol. 9, No. 3, pp.271–303.

Glynn, M.A. and D'Aunno, T. (2023) 'An intellectual history of institutional theory: looking back to move forward', *Academy of Management Annals*, Vol. 17, No. 1, pp.301–330.

GNPC (2016) Ghana National Petroleum Corporation.

Goumandakoye, H. (2016) 'Oil in Niger: a foundation for promise or a new resource curse?', *The Extractive Industries and Society*, Vol. 3, No. 2, pp.361–366.

Graham, E., Van Gyampo, R.E., Ackah, I. and Andrews, N. (2019) 'An institutional assessment of the public interest and accountability committee (PIAC) in Ghana's oil and gas sector', *Journal of Contemporary African Studies*, Vol. 37, No. 4, pp.316–334, DOI: 10.1080/02589001.2020.1715929.

Hair, J.F., Black, W.C., Babin, B.J. and Anderson, R.E. (2010) *Multivariate Data Analysis*, 7th ed., Pearson, New York.

Hair, J.F., Hult, G.T.M., Ringle, C.M. and Sarstedt, M. (2016) *A Primer on Partial Least Squares Structural Equation Modelling (PLS-SEM)*, 2nd ed., Sage, Thousand Oaks.

Hannesson, R. (1998) *Petroleum Economics: Issues and Strategies of Oil and Natural Gas Production*, Greenwood Publishing Group Inc., Quorum Books, USA.

Haseeb, M., Hussain, H. I., Ślusarczyk, B. and Jermsittiparsert, K. (2019) 'Industry 4.0: a solution towards technology challenges of sustainable business performance', *Social Sciences*, Vol. 8, No. 5, p.154.

Humphreys, M., Sachs, J.D. and Stiglitz, J.E. (2007) *Escaping the Resource Curse*, Colombia University Press, New York, USA.

Iacono, R. (2016) 'No blessing, no curse? On the benefits of being a resource-rich southern region of Italy', *Research in Economics*, Vol. 70, No. 2, pp.346–359.

Ingen, C., Wait, R. and Kleynhans, E. (2014) 'Fiscal policy and revenue management in resource-rich African countries: a comparative study of Norway and Nigeria', *South African Journal of International Affairs*, Vol. 21, No. 3, pp.367–390, DOI: 10.1080/10220461.2014.968200

International Monetary Fund (IMF) (2014) *Update on Fiscal Transparency Initiative*, IMF Policy Paper, Washington [online] https://www.imf.org/en/Publications/Policy-Papers/Issues/2016/12/31/Update-on-theFiscal-Transparency-Initiative-PP4888.

Karl, T.M. (1997) *The Paradox of Plenty: Oil Booms and Petro-States*, University of California Press, California, USA.

Kassouri, Y. and Altıntaş, H. (2020) 'Human well-being versus ecological footprint in MENA countries: a trade-off?', *Journal of Environmental Management*, Vol. 263, No. 0301-4797, p.110405 https://doi.org/10.1016/j.jenvman.2020.110405.

Katz, M., Bartsch, U., Malothra, H. and Cuc, M. (2004) *Lifting the Oil Curse: Improving Petroleum Revenue Management in Sub-Saharan Africa*, International Monetary Fund, Washington, DC.

Kaufmann, N., Sanders, C. and Wortmann, J. (2019) 'Building new foundations: the future of education from a degrowth perspective', *Sustainability Science*, Vol. 14, pp.931–994, https://doi.org/10.1007/s11625-019-00699-4.

Kaufmann, W. and Lafarre, A (2021) 'Does good governance mean better corporate social performance? A comparative study of OECD countries', *International Public Management Journal*, Vol. 24, No. 6, pp.762–791, DOI: 10.1080/10967494.2020.1814916.

Kolstad, I. and Wiig, A. (2009) 'Is transparency the key to reducing corruption in resource – rich countries?', *World Development*, Vol. 37, No. 3, pp.521–532.

Kopiński, D., Polus, A. and Tycholiz, W. (2013) 'Resource curse or resource disease? Oil in Ghana', *African Affairs*, Vol. 112, No. 449, pp.583–601.

Ladhari, R. (2012) 'The lodging quality index: an independent assessment of validity and dimensions', *International Journal of Contemporary Hospitality Management*, Vol. 24, No. 4, pp.628–652.

Larsen, E.R. (2006) 'Escaping the resource curse and the Dutch disease?', *The American Journal of Economics and Sociology*, Vol. 65, No. 3, pp.605–640 http://dx.doi.org/10.1111/j.1536-7150.2006.00476.x.

Leftwich, A. (2005) 'Democracy and development: is there institutional incompatibility', *Democratization*, Vol. 12, No. 5, pp.686–703.

Majumder, M.K., Raghavan, M. and Vespignani, J. (2020) 'Oil curse, economic growth and trade openness', *Energy Economics*, Vol. 91, p.104896, Elsevier.

Malhotra, N.K. (1999) *Marketing Research: An Applied Orientation*, Library of Congress Cataloguing in Publication Data.

Mehlum, H., Moene, K. and Torvik, R. (2006) 'Cursed by resources or institutions?', *The World Economy*, Vol. 29, No. 8, pp.1117–1131.

North, D.C. (2008) *Entitled, Institutions, Institutional Change and Economic Performance*, The Limits of Rationality, p.383, Cambridge University Press, Cambridge.

Nunn, N. and Puga, D. (2012) 'Ruggedness: the blessing of bad geography in Africa', *Review of Economics and Statistics*, Vol. 94, No. 1, pp.20–36.

Oppong, N. (2016) 'Ghana's public interest and accountability committee: an elusive quest for 'home-grown' transformation in the oil industry', *Journal of Energy & Natural Resources Law*, Vol. 34, No. 3, pp.313–336, DOI: 10.1080/02646811.2016.1179464.

Oteng-Adjei, J. (2011) *Meet-The-Press Series*, 6 November, Minister of Energy, Accra, Ghana.

Oteng-Adjei, J. (2011) *Meet-The-Press Series*, 6 November, Minister of Energy, Accra, Ghana.

Pallant, J. (2010) *SPSS Survival Manual: A Step by Step Guide to Data Analysis using the SPSS Program*, 4th ed., McGraw Hill, New York.

Papyrakis, E. and Gerlagh, R. (2004) 'The resource curse hypothesis and its transmission channels', *Journal of Comparative Economics*, Vol. 32, No. 1, pp.181–193 http://dx.doi.org/10.1016/j.jce.2003.11.002.

Patten, M.L. and Newhart, M. (2018) *Understanding Research Methods: An Overview of the Essentials*, 10th ed., Routledge, 711 Third Avenue, New York, NY 10017.

Petroleum Revenue Management Act, 2011 (PRMA) (2011) *(Act 815) of the Republic of Ghana, Public Interest and Accountability Committee Reports 2011–2021.*

PIAC (2014) Public Interest and Accountability Committee Reports.

PIAC (2018) Public Interest and Accountability Committee Annual Report.

PIAC (2021) Public Interest and Accountability Committee Annual Report.

PIAC (2022) Public Interest and Accountability Committee Annual Report.

PRMA (2015) Petroleum Revenue Management (Amendment) Act (Act 893).

Rigdon, E.E. (2014) 'Rethinking partial least squares path modeling: breaking chains and forging ahead', *Long Range Planning*, Vol. 47, No. 3, pp.161–167 http://dx.doi.org/10.1016/j.lrp.2014.02.003.

Rodrik, D. (2007) *One Economics, Many Recipes: Globalization, Institutions, and Economic Growth*, Princeton University Press.

Ross, M.L. (2012) *The Oil Curse: How Petroleum Wealth Shapes The Development of Nations*, Princeton University Press, New Jersey, USA.

Sachs, D.J. and Warner, A.M. (1995) *Natural Resource Abundance and Economic Growth*, National Bureau of Economic Research (NBER) Working Paper, No. 5398.

Sala-i-Martin, R., Xavier, T. and Subramanian, A. (2003) *Addressing the Natural Resource Curse: An Illustration from Nigeria*, IMF Working Paper, No. WP/03.

Sarmidi, T.L. (2014) 'Resource curse: new evidence on the role of institutions', *International Economic Journal*, Vol. 28, No. 1, pp.191–206 https://doi.org/10.1080/10168737.2013.787110.

Satti, L.S. (2014) 'Empirical evidence on the resource curse hypothesis in oil', *Economic Modelling*, Vol. 42, pp.421–429.

Saunders, P., Lewis, P. and Thornhill, A. (2009) *Research Methods for Business Students*, 5th ed., Pearson Education Ltd., Harlow, UK.

Scott, W.R. (2004) 'Institutional theory: contributing to a theoretical research program', in Smith, K.G. and Hitt, M.A. (Eds.): *Great Minds in Management: The Process of Theory Development*, pp.460–484, Oxford University Press, Oxford.

Shemwell, J.T., Chase, C.C. and Schwartz, D.L. (2015) 'Seeking the general explanation: a test of inductive activities for learning and transfer', *Journal of Research in Science Teaching*, Vol. 52, No. 1, pp.58–83.

Stephens, T.K. (2019) 'Framework for petroleum revenue management in Ghana: current problems and challenges', *Journal of Energy & Natural Resources Law*, Vol. 37, No. 1, pp.119–143 DOI: 10.1080/02646811.2018.1485269.

Stevens, J. (2008) *Sustainable Development or Resource Cursed? An Exploration of Timor-Letse's Institutional Choices*, A Thesis submitted for the degree of Doctor of Philosophy of the Australian National University of the Fenner School for Environment and Society.

Stevens, P. and Dietsche, E. (2008) 'Resource curse: an analysis of causes, experiences and possible ways forward', *Energy Policy*, Vol. 36, No. 1, pp.56–65.

Tiba, S. (2019) 'Modelling the nexus between resources abundance and economic growth: an overview from the PSTR model', *Resources Policy*, Vol. 64, p.101503.

Tiba, S. and Frikha, M. (2020) 'Sustainability challenge in the agenda of African countries: evidence from simultaneous equations models', *Journal of the Knowledge Economy*, Vol. 11, pp.1270–1294.

United Nations Development Programme (UNDP) (2018) *Human Development Indices and Indicators: 2018 Statistical Update*, New York.

Van der Ploeg, F. (2011) 'Natural resources: curse or blessing?', *Journal of Economic Literature*, Vol. 49, No. 2, pp.366–420 http://dx.doi.org/10.1257/jel.49.2.366.

Van Ingen, C., Wait, R. and Kleynhans, E. (2014) 'Fiscal policy and revenue management in resource-rich African countries: a comparative study of Norway and Nigeria', *South African Journal of International Affairs*, Vol. 21, No. 3, pp.367–390, DOI: 10.1080/10220461.2014.96820.

Veblen, T. (1909) 'The limitations of marginal utility', *Journal of Political Economy*, Vol. 17, No. 9, pp.620–636.

Vicente, P. (2010) 'Does oil corrupt? Evidence from a natural experiment in West Africa', *Journal of Development Economics*, Vol. 92, No. 1, pp.28–38.

Vicente, P.C. (2010) 'Does oil corrupt? Evidence from a natural experiment in West Africa', *Journal of Development Economics*, Vol. 92, No. 1, pp.28–38.

Wizarat, S. (2013) 'Natural resources, conflict and growth nexus', *Asian Economic and Financial Review*, Vol. 3, No. 8, pp.1063–1082.

World Bank (2004) *Taxation and State Participation in Nigeria's Oil and Gas Sector*, Energy Sector Management Assistance Programme (ESMAP) Technical Paper, No. ESM 057. © Washington, DC.

World Bank (2014) *Ghana at a Glance* [online] http:// devdata.worldbank.org/AAG/gha_aag.pdf.

Yates, D. (2006) 'The scramble for African oil', *South Afr. J. Int. Aff.*, Vol. 13, pp.11–31 http://dx.doi.org/10.1080/10220460609556800.

Appendix

Figure A1 SEM (factor analysis) (see online version for colours)