Policy Environment and Small and Medium Enterprises Investment in the Ghanaian Oil and Gas Industry

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ABSTRACT

Policy environment particularly local content legislatures in most emerging economies where oil and gas are produced have become major development agenda of host countries and stakeholders alike. Apparently, efforts are made to enact local content legislature as a means of optimizing oil and gas benefits. Per contra, mixed results had been ascertained with regards to outcome of these policies. This study was conducted to determine how dimensions of policy environment impact on small and medium enterprises (SMEs) investment in the Ghanaian oil and gas sector. This study relied on primary data and structured questionnaire to elicit data from 497 Ghanaian SMEs across different industries. Using explanatory research design and binominal regression model we found that Skills and expertise development policy, local workforce education policy, employment policy and macro-economic environment policy significantly increase the odd of SMEs investment in the Ghanaian oil and gas sector. However, technology transfer, research and development policies exert insignificant influence on SMEs investment decisions. This study has implications on oil and gas policy reforms, investment decisions and future research. Particularly we recommend replication of this study within other emerging economies.

Keywords: Ghanaian Small and Medium Enterprises, Logit Model, Oil and Gas, Local Content Policy, Willingness to Invest
JEL Classifications: D02, O17, P31

1. INTRODUCTION

Policy has the efficacy to bring change (Okeyo et al., 2014; Quartey et al., 2017) sustain industries (Nwaizugbo et al., 2013; Appiah et al., 2018) and ensure economic growth and development (Cross, 1988; Maguire, 1990; Litzenger et al., 2011; Pustovoitov, 2014; Medeshova et al., 2016; Sharmin and Khan, 2016; Handayani et al., 2017; He and Gao, 2017; Yasar, 2017) when effectively initiated (involving adequate research and stakeholders' engagements) and implemented. Unfortunately, when a policy loses focus or deviate from original course of action undesirable outcomes are experienced. According to Mackey and Shaxton (2007) policy entails a distinct cause of action which is deem appropriate for the pursuit of established goals within organization or individual context to direct decision making. Policy is a statement of intent which is usual implemented as a protocol or a procedure (Richards and Smith, 2002). Policy has the ability to influence the behaviour of people or managed objectives. Resources allocations are

frequently affected by policy decisions (Moffett, 1994; Wies, 1996; Richards and Smith, 2002).

We use the term "environment to imply spatial distribution of people and culture at a given time period (Cross, 1988; Litzenger et al., 2011). Policy Environment is therefore a blend of national and supra-national institutional structures that support a hyper degree of continuity to reduce political tension reasonably and improve policy harmony via incorporation (World Bank, 2002; Lah, 2017). These include actions, customs, laws, or regulations issued by governments or social bodies/civic groups (Kayanula and Quarterly, 2000; World Bank, 2002; Brown et al., 2007; Anderson et al., 2007; Martin, 2015; Lah, 2017).

Moreover, policy environment is used to encompass decisions, actions and the efficiency of parameters within the population policy process and therefore emphasized on the need to bring into light all the various elements affecting the environment (Cross, 1988;

Maguire, 1990; Adamchak, 1997; Nwaizugbo et al., 2013; Okeyo et al., 2014). Scholars across varying fields have provided distinctive definitions on policy environment. For instance Hall (1991) asserted that policy environment is a scheme to establish operation conditions including rules and prohibition. Relatedly, Adamchak (1997) and McClure et al. (2000) defined policy environment with respect to some variables as the way to be precise about the domain of variables' direct or indirect influence on investment programs. Similarly, McCauley et al. (1994) and Knowles and Stover (1995) avowed that policy environment is a statutory law based upon the codes of colonial masters, as well as customary law carved out of ethnic and religious cultures. Knowles and Stover further argued that policy environment positively or negatively affect program performance above the limit of national program managers' power.

In the oil and gas sector such policies are termed "local content policies" (LPCs) (Melo and Rodrigures-Clare, 2006; Tordo et al., 2013). LPCs are embedded in the larger body of policies termed as productive development policies or industrial policies (IPs) that in large definition, involve all government mediations, measures or initiatives purported to advance shares of employment, services, manufacturing provisions and general financial importance to improve the indigenous industry value chain (Tordo et al., 2013). They include programs that aim at solidifying the effective sectors of the economy of the country, either in manufacturing or agriculture-and is determined via the attained growth or competitiveness or the aimed sectors. The LCPs set a final target to increase growth and enhance the competitiveness of the general economy and still retaining the level of living standards (Melo and Rodrigures-Clare, 2006).

The term local, for instance, has its' own definitional difficulties. For example, company engaging in petroleum extraction is normally a foreign-owned, however more than half of its labor force is indigenous people, while the indigenous company employs higher foreign labor force or would probably be locally owned but with foreign registration license (Tordo et al., 2013). For many reasons these differences are very crucial, however it provides measure through disintegrating areas with value being driven. At the point the nation has concern with the number of indigenous people secured job in the industry, would be in disharmony with a policy that targets a local content policy to be fully meant for local ownership, in which for instance, an indigenous owned business almost full of foreign labor force may have access to progress (Melo and Rodrigures-Clare, 2006; Tordo et al., 2013).

Policy environment dimensions come in different forms as reported by recent researchers (Cross, 1988; Maguire, 1990; Adamchak, 1997; McClure et al. 2000; Knowles and Stover; 1995). Typically, these include; policy on local skills and expertise development (SED), health, environment, education, employment, empowerment, infrastructure development, macro-economic variables, IPs, technological amongst others (Adamchak, 1997; Anderson et al., 2007; Lah, 2017). The relationship between policy environment and industrial growth had been well rooted in literature (Inamete, 1993; Adamchak, 1997; Georgellis and Wall, 2004; Malone, 2005; Brown et al., 2007; Anderson et al., 2007; Lah, 2017).

Although majority of the past studies focused on SED policies in particular (Koyanbayev and Koyanbayev, 2000; Litzenger et al., 2011; Pustovoitov, 2014; Medeshova et al., 2016), quite appreciable number of researchers have reported on specific policies and their concomitant effects on industrial growth. For instance previous studies highlighted the following policies; employment policy (EP) (Blasco and Pertold, 2012; Shimada, 2015), educational infrastructure (Leigh, 2014; Akekere et al., 2017), business development infrastructure (BDI) (Nwaizugbo et al., 2013; Okeyo et al., 2014; Okeyo et al., 2014), research and development policy (Kayanula and Quarterly, 2000; Martin, 2015) and technology transfers (Young, 2005; Audretsch et al.; 2012; Necoechea-Mondragon et al., 2013; Ahali and Ackah, 2015; Oyewunmi and Olujobi 2016).

Since Ghana discovered commercial oil and gas quantities in 2007, efforts had been made to enact local content legislature as a means of optimizing oil and gas benefits. Per contra, mixed results had been ascertained due to inadequate research and stakeholder's engagement during implementation in 2013. There is the need to conduct a new study to determine how the dimensions of local content policy are impacting on small and medium enterprises (SMEs) investment in the Ghanaian oil and gas sector.

1.1. Contextual Consideration - Ghana's Local Content Policy

During the post-independence period of the late 1950s and 1960s, Ghana stood was one the wealthiest economies in the region of sub-Saharan Africa however, mismanagement led the country to economic recovery program, which involved implementing neo-liberal policies to decrease the unfavorable macroeconomic measures and liberalize the external sector. After the production of first oil in the last quarter of 2010, the country experienced economic growth of 14% 2011, 7.9% in 2012 and 7.4% in 213. Average growth rate of 6% was projected for following few years supported by ventures in the petroleum industry, public infrastructure, and commercial agriculture, with mining, manufacturing and construction still ensuring the continuity of the sector. The Ghanaian economy is being dominated by the service sector with more than half of 214 GDP, next is industrial sector with 29.2%, followed by agricultural sector of 20.6% of 2014 GDP. The country's upstream petroleum industry had a serious increase in 2007 at the time a group of companies made up of Kosmos Energy Ghana, Tullow Ghana Limited, Anadarko Petroleum Corporation, Sabre Oil and Gas Holdings Limited and the E.O. Group in collaboration with the Ghana National Petroleum Corporation (GNPC) unearthed relevant oil and gas resources in the offshore Tano/Cape Three Point Basin. The Jubilee Field operational that started in December 2010 was formed as an integrated development spanning the West Cape Three Points Block and the Deep-water Tano contract zones. Hydrocarbon exploration and production in the country is carried out along four key sedimentary basins and they are the inland Voltaian Paleozoic Basin, the Accra-Keta Cretaceous basin (Eastern), Saltpond (Central) Paleozoic basin, and the prolific Tano-Cape Three Points Cretaceous basin (Western), the location of the main discoveries up to date. There are five main fundamental laws that regulate the legislative and regulatory framework for

upstream oil and gas development and these are the Petroleum (Exploration and Production) Act 1984 (PNDC Law 84); (A New Petroleum Exploration and Production Bill) the GNPC Act 1983 (PNDC Law 64); the Petroleum Income tax Act, 1987 (PNDC Law 188); the Petroleum Commission Act, 2011 Act 82; and the Petroleum Revenue Management Act, 2011 (Act 815). In the quest for restructuring the industry to provide productive local-content development, the government of the Ghana through the Ministry of Energy and Petroleum devised the local content as well as Local Participation in Petroleum Activities Policy ("Local-content Policy"), Ministry of Energy, (2010). National Energy Policy. Ghana that establish the base upon which the petroleum (local content local participation) Regulations, 2013 (L.I.2204) were enacted. The whole approach towards local content in the country is regulated by the interaction of the Petroleum (Local content and Local Participation) Regulation, 2013 (L.Il2204), Local content Policy, Industrial Policy, the Petroleum Law and the Model Petroleum Agreement. The Petroleum Commission under section 3(f) of the Petroleum Commission Act is assigned purposely to motivate local content and local participation in petroleum operations described in the Petroleum Exploration and Production Act 1984 (P.N.D.C.L 84) and other compatible laws and regulations of the Local-content regulations to consolidate national development Ghana Petroleum Commission Act (2011). Act 821. Therefore, the whole approach of the country to local content is hanged on four broad areas: Direct recruitment and training of personnel; Procurement of goods and services (e.g., financial and legal services) Indigenous production of materials and Technology transfer/capacity development programs.

2. LITERATURE REVIEW

2.1. Dimensions of Policy Environment and Firms Investment Decision

This section of the paper outlines and discusses dimensions of the local content policy. Again, we present and discuss the linkages between policy environment and industrial growth. Finally, we present the conceptual model and the hypotheses of the study based on the local content policy discussed earlier. Policy environment comes in different forms as reported by recent researchers (Cross, 1988; Maguire, 1990; Inamete, 1993; Adamchak, 1997; Knowles and Stover; 1995; McClure et al. 2000; Strachan et al., 2000; Christensen and Goedhuys, 2004; Effiong, 2010; Singh et al., 2010; Bouazza et al., 2015; Anis and Saddiqui, 2015; Lulic, 2015; Wonglimpiyarat, 2015; Igwe, 2018). Below, we discuss some of the eminent policies that are most likely to influence investors' decision.

2.2. SED

SED is another important dimension of policy environment (Kayanula and Koyanbayev, 2000; Litzenger et al., 2011; Pustovoitov, 2014; Medeshova et al., 2016) as evident in literature. Medeshova et al. (2016) analyzed the outcomes of the study of development of expertise to engineering education to recap institutional cultures function in harmony with the outcomes, and highlighted the problems of adopting that learning experiences in engineering programs. The study showed that the recent meaning of expertise, and the learning processes imply that education must

cover a bundle of learning experiences that give room to students to develop conceptual knowledge, to gain the capacity to apply technical and professional skills effectively.

Medeshova et al. (2016) addressed the development of educational policies via effective strategy towards the content of contemporary education, research views on student training skills and interrelationship among individual skills and competence of students. For instance, in France from Europe, the concept of expertise and ability are almost the same, if not same (Koyanbayev and Koyanbayev, 2000). The study argued that, in the developed economies, teaching and learning process is critical in offering pragmatic knowledge and revealing individual potential of the pupil.

However, the study indicated that cognitive expertise within the learning process is grouped into subsystems (Pustovoitov, 2014). From the presentation herein, the researchers can infer that SED are important component of human growth and resources utilization. Thus with the given skills, expertise and capacity building through formal education of the locals are more likely to influence their willingness to invest (WTI). From the discussions and presentations herein the hypotheses below are formulated.

H_1=Enhancing local companies capabilities will lead to SMEs WTI.
H_2=Educating local companies will positively relate to WTI.
H_3=SED will lead to WTI.

2.3. Technology Transfer

Another dimension of policy environment is technology transfer (Young, 2005; Audretsch et al., 2012; Necoechea-Mondragon et al., 2013). Young (2005) reported that technology transfer is the medium through which knowledge is passed from its provider down to the user (person or organization) for specific or general gains. Young (Ibid.) argued that academic technology transfer climbs upwardly annually, due to the rise of relevance of intellectual property to the academy as well as the introduction of plenty factors beyond the control of the university. In conclusion, the study argued that in the face of multitudes of problems academic technology transfer is still increasing in terms of relevance and functions across the globe.

In Mexico, Necoechea-Mondragon et al. (2013), relied on the current technology transfer models and established new conceptual model. The study asserted that the new model has resolved the challenges of two previous models in the country's S&T context. Thus, the study argued that the developed technology transfer model takes into account the weakness of S&T in the country. Finally, it considers the system of incentives for the researchers of the country. Audretsch et al. (2012) outlined the importance of technology transfer in the international economy. The Authors again indicated that the international differences in institutional environment and the type of technology established would imply that informal technology transfer plays a major role in certain spectrum compared to others. Moreover, informal technology transfer would be very special in the upcoming economies. Upcoming economies would gain the strength to compete

favorably with regards to the development of technology that is cost efficient in terms of laboratories and equipment due to challenges within their infrastructures and would be able to tap from the advanced economies regarding technological increment that are transferable. The report above shows that policy on technological transfer is eminent since it has the capacity to introduce innovation in production across industries. However, this must be regulated to prevent intellectual property (IP) theft and misappropriations. From the discussions and presentations thus given the right transfer to technology SMEs are most likely to invest in the oil and gas sector. The proposed hypothesis is;

H_4=Technology transfer will influence SMEs WTI.

2.4. Research and Development Policy
This is another important component of policy environment (Effiong, 2010; Singh et al., 2010; Bouazza et al., 2015; Anis and Saddiqui, 2015; Lulic, 2015; Wonglimpiyarat, 2015; Igwe, 2018). According to Kayanula and Quarterly (2000) who conducted a related study among SMEs' in Ghana and Malawi and reported that firms with R&D are relevantly more likely: Supply markets within Great Britain and the large EU; and focus on product design (marketing) – quality (value-added) dimensions of production. On the other hand, business organizations without R&D are likely to: Sell to only the indigenous market; and consider cost efficiency (enhancement in their process technology) to ensure competitive advantage (CA). The Author indicated that business organization with R&D exhibited higher absorptive capability depended on a bigger set of elements.

Martin (2015) assessed the evolution of the notion of policy instruments as component of research stock termed as policy design. This necessitates forming nearer relations to policy design and multi-level governance scholars, with those that are now focal in improving the notion of policy mixes, as well as with researchers in associated zones of public policy involving industrial and economic policy, environment policy, health policy and regional policy. From the available evidence in literature we can establish that R & D policies exert significant impact on enterprise success and growth. Therefore, the study emphasized on the importance of these efforts only if R&D policy researchers mean to attain the aim of forming conceptual and empirical framework to have in place clear and efficient R&D policies, deploying a proper policy instruments mix. From the discussions and presentations herein the hypothesis below is formulated.

H_5=Research and development Policy will influence SMEs WTI.

2.5. EP
EP is one of the dimensions of policy environment (Blasco and Pertold, 2012; Shimada, 2015) which has received tremendous attention in recent studies. For instance, Shimada (2015) addressed the issues of EP based on the perspective that the labor market must be dynamic, in order to stop the polarization of regular and irregular employees and attain labor mobility to industrial growth with no unemployment challenges. The study asserted that in order to attain labor mobility into growth industries without sowing seed of unemployment, the EP has an assignment of motivating higher

flexibility of labor market through mode for readjusting regular employment. The study stressed on the systems of restricted regular employment and worker transfer, as the initial stages in reforming regular employment. Again, the study covered the challenges with the principle of prohibiting full-time substitution, suggesting that this be supplanted with the principle of prohibiting abuse of dispatch labor.

In US, Fullerton et al. (2014) explored the effect of various levels of educational achievement and infrastructure venture on income performance in the state of Missouri. The study found that improved educational achievement levels and advanced private capital stocks relate to income benefits. Again, the study found no clear evidence for impact of public capital stocks; however the possible benefits from advancing educational achievement levels were disclosed.

Blasco and Pertold (2012) examined the way active labor market policy programs influence organization's hiring strategies and firms' performance and reported that small organizations benefit substantially from the existing EP as compare to other categories of businesses. Because they make good use of unemployed and unskilled labor. Hence they ought to performance marginally better than their competitors. From the above it can be deduced that policy on education influence the behaviour of businesses operating within such environment. From the presented evidence herein the proposed hypothesis is,

H_6=EP will positively relate to SMEs WTI.

2.6. Macroeconomic Environment
Institutional standard is a major component of policy environment. Some researchers had indeed established that policy environment has influence on enterprises growth (Effiong, 2010; Singh et al., 2010; Delmas and Montes-Sancho, 2011; Schindler et al., 2015; Bouazza et al., 2015; Anis and Saddiqui, 2015; Lulic, 2015; Wonglimpiyarat, 2015; Igwe, 2018). Delmas and Montes-Sancho (2011) examined national institutional variables influence on the implementation of the international environmental management standard ISO 14001 and reported that regulative or coercive force function relevantly at the initial stage of implementing standard compared to the following stages of spreading. Again, the Authors indicated that at the last stages of diffusion of ISO 14001, normative forces like the spread of other management standards, and variable associated with trade, function crucially. Finally, the study asserted that due to commonness among environmental management standards and corporate social responsibility standards, the study would highlight certain problems for spreading of ISO management standards in scope of social responsibility.

Schindler et al. (2015) reported that industrial standards vary across nations and industries hence enough studies are required to understand the viability of reaching at general definition of quality, which is applied to various forms of institutions in varied geographical locations. In addition, the study continued that more studies are to be carried out to increase the knowledge on the impact of culture on the adoption and understanding of quality term. Furthermore, the study asserted that further studies are

needed to find out if quality and quality assurance are compatible with different cultural practices, and either they differ from regional to national levels. Leigh (2014) examined policies that positively influence urban manufacturing and related distribution/logistics activity in the scope of adjusting patterns in industrial infrastructure, conversion pressures on urban industrial land, as well as the efforts to reduce low-density residential progress, and forecasted potential crisis in infrastructure and revolutions in the way manufacturing happen as well as the way infrastructure systems are applied. The study found sophisticated and developing association among urban development trends, industrial land, and improving urban manufacturing.

Moreover, in Nigeria, Akekere et al. (2017) investigated into the relationship between public infrastructure capital and industrial sector growth and evaluated the effect of public infrastructure capital on industrial sector growth in the country. The study revealed that the degree of access to infrastructure or its quality has no effect on industrial growth. Therefore, the study suggested that the country's policy direction must be critical in turning back the unwanted infrastructure deficit, in such a manner to boost economic advancement and general well-being. The Authors recommended that the government must seek for sustainable sources of financing infrastructures in the country such as Sukuk aimed at infrastructural development and financial participation as the case is for Nigeria. From the review, we can deduce that standardization and quality controls are very instrumental when deciding on investment. As evidence these standards and quality measures set off by government and industrial players can enhance business growth drastically. From the discussions and presentations herein the hypothesis below is formulated. Again, there are enough proofs to support the assertion that macroeconomic and investment policies thus impact on enterprises growth and development. Hence, the following hypotheses are formulated;

H_7=Macroeconomic environment will influence SMEs WTI.

H_8=Investment and business environment will relate positively SMEs WTI.

2.7. Technology Infrastructure
Technological infrastructure has been found to have positive association with enterprise growth and development (Esteves and Alves, 2013; Lim and Trimi, 2014). Lim and Trimi (2014) analyzed the effect of information technology infrastructure flexibility (ITIF) on CA of SMEs. The study found that flexible IT infrastructure relates positively to all the four factors of CA. Again, the study revealed that the biggest profit of ITIF for SMEs is the advancement of product quality and an improved flexibility of product design. Finally, the study stressed on the relevance of ITIF for SMEs and cloud computing as a mode of gaining the flexibility.

In Portugal, Esteves and Alves (2013) examined the outcome of academic research about adoption of an information technology infrastructure library (ITIL) process carried out in 2012 within the country's public organization like culture, tourism, and transport regional department of Madeira autonomous region and reported that that ITIL is very important for enhancing the general quality of IT services, decreased costs, enhanced customer satisfaction,

advanced productivity and delivery, however the public sector was found to be hesitant to change. Furthermore, the study revealed these resistances to be crucial in the employment of ITIL cultures in public sector since the informal and bureaucratic processes are being resolved in the culture of firms. From the discussions and presentations herein the hypothesis below is formulated.

H_9=Technological Infrastructure will influence SMEs WTI.

2.8. BDI
BDI is one of the dimensions of policy environment. The associations between this dimension and industrial growth are known in literature (Nwaizugbo et al., 2013; Okeyo et al., 2014). A study by Nwaizugbo et al. (2013) found that provision of business development service (BDS) is very important to thrive and stable growth of small and medium-sized enterprises (SMEs). The study argued that the developed model ensures interactive platform that gives room to marketer to rekindle the newly growing demand of BDS in SMEs by a service co-creation process. The co-creation of BDS helps provide the SMEs' requirements and skill and versatility of the provider is intervened in accordance with the requirements. Additionally, the study showed that institutions of higher learning and business faculties are being aligned appropriately to provide the service provided that their resource of professional and skilled personnel involving the graduate students in different types of business (Nwaizugbo et al., 2013).

In Kenya, Okeyo et al. (2014) assessed the degree of impact of market access and infrastructures on the performance of SMEs in the country and reported that infrastructure facilities have positive and relevant link with performance of SMEs. Again, the study showed that joint impact of three factors on performance of organization studied is higher compared to individual impact. The authors recommended that infrastructure facilities must be improved to boost up business performance of SMEs. From the above the study has again established that BDI has the high propensity to enhance enterprises growth as seen in literature (Okeyo et al., 2014). From the discussions and presentations herein the hypothesis below is formulated.

H_{10}=BDI will relate positively to SMEs WTI.
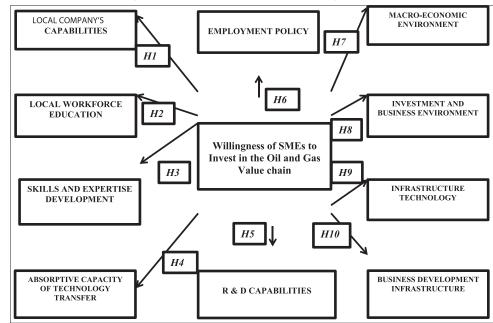
3. CONCEPTUAL FRAMEWORK

The conceptual model as shown in Figure 1 is employed in this study. The conceptual framework was formulated based on empirical reviews and the Ghana's local content policy. From the conceptual model 10 hypotheses are tested against empirical data.

4. METHODOLOGY

4.1. Research Design
The philosophical paradigm employed in this study is positivist ontology. Therefore the research design is quantitative. Zikmund et al. (2012) argued that quantitative research design is a natural partner of positivist epistemology. Quantitative research design encompasses the use of mathematics and numbers to estimate and measure an occurrence (Fox and Bayat, 2007). In particular

Figure 1: Theoretical framework and proposed hypotheses

Source: Authors construct

quantitative studies have the following features: The use of structured questionnaire, collections and analysis of numerical data in relation to objectivity and positivism conception of social reality. In this paper the researchers had deployed a structured questionnaire to gather and analyze numerical data in order to quantify the extent to which policy environment affect or impact on investment decisions of SMEs in Ghana specifically within the country's oil and gas sector. Hence base on the research purpose explanatory design is utilized to accurately estimate the causal relationship between policy environment and SMEs WTI in the Ghanaian oil and gas value chain.

4.2. Population Unit of Analysis and Sampling Design
Population defines the shared characteristics among the study target group. The population of this study is made of all registered SMEs under the monitory and regulations of National Board for Small Scale Industries in Ghana. The SMEs were classified into services, retailing and manufacturing. Even though individuals answered the questionnaires the unit of analyse for this study is organizational. The study setting again is non-contrived - SMEs were studied in their natural settings. Taro Yamme formula was utilized to establish the 497 sample size at 95% confidence level. The researchers employed stratified sampling technique to select the 497 SMEs which were involved in the study using firm sizes as the strata between 2017 and 2018. The employed sampling technique is considered more effective due to its ability to drastically reduce sampling errors and also ensures greater representatives of subjects.

4.3. Data Collection and Analyses
Primary data was the main data which was utilized in this study. Structured questionnaire was the main instrument used in gathering the primary data. Notable scholars (Saunders et al., 2012; Zikmund et al., 2012) argue that when research studies involve quantifiable attributes the survey by questionnaire is particularly required.

This is true for the current study since it is in congruence with the study research design and philosophical paradigm. The study was a cross sectional study hence data were gathered within a fixed time period. Though longitudinal studies such as time series would have offer a chance to study the policy environment a cross stretch of time resources limitation could not permit such a study of magnitude. The field data were analyzed using Statistical Package for Social Sciences (SPSS). The following specific analyses were conducted; Chi-square and binominal logistic regression. All the proposed hypotheses are tested at 0.01, 0.05 and 0.10 significance levels.

4.4. The Use of Log_{it} Regression and Justification
Cox (1958) developed the binary logistic model to estimate the probability of a binary response based on one or more predictors. From the theoretical framework and the philosophical knowledge in the research methodology a cross sectional data and Logit regression model has been specified for this study. Logit model does not hold the same assumptions as the case of linear regression and general linear models which employ ordinary least squares algorithms including; normality, linearity, homoscedasticity and measurement level. Specifically in logit model the relationship between dependent and independent variables is not required to be linear. The cross sectional data and Logit regression model explains the changes and variations in the WTI based on the changes in the independent variables. The model is based on the assumption that the dependent variable is a linear function of the independent variables with an error term (ε_i). This has been illustrated in the equation below. The study has assumed that the relationship between local company's capabilities (LCC), local workforce education (CWE), SED, absorptive capacity of technology transfer (ACTT), R & D capabilities (RDC), EP, macro-economic environment (MEE), investment and business environment (IBE), infrastructure technology (IT) and BDI and WTI (WTI) (DY) is a linear function.

Thus,

$Log_{it} (P)=Log (P/1-P)=Log (p)-Log (1-P)$. This is in reduced form of a Log_{it} model can be expressed as:

$Y=\alpha+\beta iXi+\varepsilon.$

Where:
WTI_i=Willingness to invest
α=The intercept
βi=Coefficient of independence variables
X_i=Independent variables
εi=The error term

Model (1)

$WTI_i=\beta_0+\beta_1 LCC_i+\beta_2 CWE_i+\beta_3 SED_i+\beta_4 ACTT_i+\beta_5 RDC_i+\beta_6 EP+\beta_i MEE_i+\beta_8 IBE_i+\beta_9 IT_i+\beta_1 0BDI_i+\varepsilon_i$

Where;
WTI=Willingness to invest.
LCC=Local company's capabilities.
CWE=Local workforce education.
SED=Skills and expertise development.
ACTT=Absorptive capacity of technology transfer.
RDC=R & D capabilities.
EP=Employment policy.
MEE=Macro-economic environment.
IBE=Investment and business environment.
IT=Infrastructure technology.
BDI=Business development infrastructure.
ε_i=The error term.

5. RESULTS AND DISCUSSIONS

5.1. Policy Environment and SMEs Investment Determinants

The Table 1 shows the Chi-square (χ^2) Goodness of fit test to determine the influence of policy environment on SMEs investment decisions in the Ghanaian oil and gas sector. The study revealed that local companies capabilities, CWE, SED, MEE and BDI have significant association with SMEs WTI. However, the study found insignificant associations between ACTT, RDC, EP, Investment business environment and IT. To determine the strength and contribution of the individual factors on WTI binominal logistic regression was utilized. To determine the strength of association between the variables Cramer's V test was conducted in this regards.

5.2. The Logistic Regression Model Results

A binary logistic regression is used to measure the effects of LCC, CWE, SED, ACTT, RDC, EP, MEE, IBE, IT, and BDI on the likelihood that SMEs are WTI in the Ghanaian oil and gas sector.

$Log_{it} (P)=Log (P/1-P)=Log (p)-Log (1-P)$

The final estimated model is; Model (1)

$WTI_i=\beta_0+\beta_1 0.592_i+\beta_2 221_i+\beta_3 232_i+\beta_4 0.161_i+\beta_5 0.024_i+\beta_6 0.353+\beta_7 0.567_i+\beta_8 0.246_i+\beta_9 0.108_i+\beta_{10} 0.318_i+\varepsilon_i$

The explanatory power of the binary logistic model ranges from 12.1% to 21.2% respectively for Cox and Snell R^2 and Nagelkerke R^2 and correctly classifies 80.7% of the cases suggesting a good model.

5.3. Impact of Policy Environment on SMEs WTI as Interpreted from the Model

In this study we tried to model the effects of policy environment on SMEs WTI in the Ghanaian oil and gas sector. As shown in the Table 2 the strongest determinants of SMEs were identified as CWE ($\beta = 0.841$, $P < 0.05$), LCC ($\beta = 0.592$, $P < 0.05$), MEE ($\beta = 0.567$, $P < 0.05$), SED ($\beta = 0.463$, $P < 0.05$), EP ($\beta = 0.353$, $P < 0.05$), and BDI ($\beta = 0.318$, $P < 0.05$). The positive coefficients imply positive direction with WTI. These results are not only consistent with previous researchers (Cross, 1988; Maguire, 1990; Litzenger et al., 2011; Nwaizugbo et al., 2013; Okeyo et al., 2014; Pustovoitov, 2014; Medeshova et al., 2016; Quartey et al., 2017; Appiah et al., 2018) but strongly affirm the effect of policy on SMEs WTI. The results have been discussed further as following:

To start with, WTI is found to CWE ($\beta = 0.841$, $P < 0.05$). In unit increase in CWE will result 84.1% increase in SMEs WTI in the Ghanaian oil and gas sector. This supports previously studies (Inamete, 1993; Adamchak, 1997; Georgellis and Wall, 2004; Malone, 2005; Brown et al., 2007; Anderson et al., 2007; Lah, 2017) that reported that indigenous education has significant effect on enterprise growth and development. In similar report, Fullerton et al. (2014) examined the effect of various levels of educational achievement and infrastructure venture on income performance and reported that improved educational achievement levels relate to income benefits. Again, the study found clear evidence for impact of advancing educational achievement on firm benefits.

Again, WTI is found to depend LCC ($\beta = 0.592$, $P < 0.05$), this implies a unit increase in local companies capabilities will bring about 59.2% increase in SMEs WTI in the Ghanaians oil and gas sector. Earlier some researchers had reported that enterprise capabilities have influence on their decisions and choices. Strachan et al. (2000) discussed the policy environment score that determines the extent of support policy environment in a nation has for organization. Georgellis and Wall (2004) relied on spatial panel approach to analyze the impact of the government-policy environment on the degree of entrepreneurship. This reaffirms that policy on local company's impact on firm's investment decisions as shown above.

Moreover, the study revealed the WTI depends on MEE ($\beta = 0.567$, $P < 0.05$). This result implies that a unit increase in MEE will result in 56.7% increase in SMEs WTI in the oil and gas sector. Macro-economic policies such as taxation, inflation, foreign direct investment, interest rate amongst others exert are major influence on SMEs investment choices. Christensen and Goedhuys (2004) in a related study reported that the national specific conditions determine the performance and behavior of SMEs more than any other. Christensen and Goedhuys further recalled that the policy

Table 1: Chi-square analysis results

Policy environment	Chi-square (χ^2)	Df	Cramer's V	P-value	Hypothesis decisions
LCC	50.757	2	0.320	0.000**	Supported
LWE	49.682	2	0.316	0.000**	Supported
SED	25.059	2	0.225	0.000**	Supported
ACTT	1.269	4	0.051	0.867	Unsupported
RDC	1.304	3	0.051	0.728	Unsupported
EP	2.002	2	0.063	0.368	Unsupported
MEE	49.630	2	0.316	0.000**	Supported
IBE	2.966	2	0.077	0.227	Unsupported
IT	4.287	4	0.093	0.369	Unsupported
BDI	12.564	4	0.159	0.014**	Supported

Source: Field data *significant at 95% (P=0.05) **significant at 90% (P=0.1). WTI: Willingness to invest, LCC: Local company's capabilities, CWE: Local workforce education, SED: Skills and expertise development, ACTT: Absorptive capacity of technology transfer, RDC: R & D capabilities, EP: Employment policy, MEE: Macro-economic environment, IBE: Investment and business environment, IT: Infrastructure technology, BDI: Business development infrastructure

Table 2: Binary logistic regression analysis results

Hypothesized relationship	β	SE	Wald	Exp (B)	P-value	95% CI
LCC	0.592	0.225	6.948	1.807	0.008**	1.164–2.806
LWE	0.841	0.221	14.473	2.319	0.000**	1.504–3.577
SED	0.463	0.232	3.973	1.589	0.046**	1.008–2.506
ACTT	0.067	0.161	0.172	1.069	0.678	0.779–1.467
RDC	0.024	0.143	0.029	1.025	0.865	0.774–1.356
EP	0.353	0.205	2.956	1.423	0.086*	0.952–2.128
MEE	0.567	0.236	5.785	1.763	0.016**	1.111–2.797
IBE	0.246	0.215	1.310	1.279	0.252	0.839–1.950
IT	0.108	0.080	1.851	1.114	0.174	0.953–1.302
BDI	0.318	0.130	5.965	1.375	0.015**	1.065–1.775
Constant	−6.52	0.945	47.604	0.001	0.000	
Model fit statistics						
-2loglikehood (final model)				450.823[a]		
X2(df) final model				64.337**		
X2(df) Hosmer and Lemeshow Test				21.189**		
Cox and Snell R2				0.121		
Overall percentage classification				80.7%		

Source: Primary data **significant at 5% and *significant at 10%. CI: Confidence interval, WTI: Willingness to invest, LCC: Local company's capabilities, CWE: Local workforce education, SED: Skills and expertise development, ACTT: Absorptive capacity of technology transfer, RDC: R & D capabilities, EP: Employment policy, MEE: Macro-economic environment, IBE: Investment and business environment, IT: Infrastructure technology, BDI: Business development infrastructure

environment universally is considered to be an obstacle to job generation; high labor costs, laborious labor regulation as well as taxation.

Sequel to the above, the study discovered that WTI depend on SED (β = 0.463, P < 0.05), suggesting that a unit increase in enterprises skills, and expertise will increase their WTI by 46.3% in the oil and gas sector. Many previous studies had maintained that SED (human capital) has effect on enterprise investment decisions such as SME WTI in the Ghanaian oil and gas sector. SED is another important dimension of policy environment (Koyanbayev and Koyanbayev, 2000; Litzenger et al., 2011; Pustovoitov, 2014; Medeshova et al., 2016) as evident in literature. Medeshova et al. (2016) reported that the recent expertise and learning processes room to students to develop conceptual knowledge, to gain the capacity to apply technical and professional skills effectively. In similar vein, Medeshova et al. (2016) found that development of educational policies via effective strategy towards the content of contemporary education improve training skills and interrelationship among individual skills and competence.

Furthermore, WTI is found to depend EP (β = 0.353, P < 0.05),

this results also implies that a unit change in EP in the country will result in 35.3% increase in Ghanaian enterprises decisions to invest in the country's oil and gas sector. EP affects businesses in many diverse ways. For instance unfavourable employment policies will discourage potential investors. This result had been adequately supported with literature. EP is one of the dimensions of policy environment (Blasco and Pertold, 2012; Shimada, 2015) which has received tremendous attention in recent studies. Shimada (2015) addressed the issues of EP based on the perspective that the labor market must be dynamic, in order to stop the polarization of regular and irregular employees and attain labor mobility to industrial growth with no unemployment challenges.

More so, the survey found that WTI depend on BDI (β = 0.318, P < 0.05), this implies that a unit increase in BDI will result in 31.8% increase in Ghanaian enterprises WTI in the country's oil and gas sector. Large scale literature had been found to support this current finding. The associations between this dimension and industrial growth are known in literature (Nwaizugbo et al., 2013; Okeyo et al., 2014). A study by Nwaizugbo et al. (2013) found that provision of BDS is very important to thrive and stable growth of small and medium-sized enterprises (SMEs). The study argued that the developed model ensures interactive platform that gives

room to marketer to rekindle the newly growing demand of BDS in SMEs by a service co-creation process.

Finally, the study found that IT, RDC and ACTT and investment business environment have insignificant positive directions with SMEs WTI in the Ghanaian oil and gas sector. These results have inverse relations with previous studies. For instance according to Kayanula and Quarterly (2000) who conducted a related study among SMEs' in Ghana and Malawi reported that firms with R & D are relevantly more likely: Supply markets within Great Britain and the large EU. On the other hand, business organizations without R&D are likely to: Sell to only the indigenous market; and consider cost efficiency (enhancement in their process technology) to ensure CA. The Author indicated that business organization with R&D exhibited higher absorptive capability depended on a bigger set of elements.

6. CONCLUSIONS AND IMPLICATIONS

This study was conducted to determine how dimensions of policy environment impact on SMEs investment in the Ghanaian Oil and Gas Sector. The study employed explanatory design and binominal regression model to analyze data from 497 Ghanaian SMEs across retail, service and manufacturing industries. The study had established that SED policy, CWE policy, EP and MEE policy significantly increase the odd of SMEs investment in the oil and gas sector. However, factors such as ACTT, Research and Development capabilities, IT, IBE had insignificant effect on SMEs WTI in the oil and gas sector.

Key policy implications of the study include; SMEs that were satisfied with workforce education policy had 2.34 times the odds of investing in the Ghana's oil and gas sector than unsatisfied SMEs. Likewise SMEs that were satisfied with SED policy had 1.58 times the odds of investing in the oil and gas sector than unsatisfied SMEs. More so, SMEs who are satisfied with MEE policy had 1.76 times the odd of investing than unsatisfied SMEs. Again, SMEs that were satisfied with EP had 1.42 times the odd of investing than unsatisfied SMEs. Also, SMEs that were satisfied with BDI policy had 1.37 times the odd of investing than unsatisfied SMEs.

This study recommends that the local content as well as local participation in petroleum activities policy ("local-content policy") which were established under the petroleum regulations, 2013 (L.I.2204) must be wholly enforced. Again, monitoring and evaluation of these policies implementation process must be assessed for improvement. Moreover, media blitz and stakeholder engagements must be used to further enhance SMEs participation in the oil and gas sector for economic growth and development. This study was limited to only four metropolitan areas in Ghana. The study utilized logit model to estimate the SMEs investment decisions. The researchers suggest replication of this study by employing a different model like SEM. This study has implications on oil and gas policy reforms, investment and future researches particularly within Africa and other emerging economies.

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